Recirculated Focused Draft Initial Study/Mitigated Negative Declaration

Bowerman Power Renewable Natural Gas Plant Project

August 2025

Prepared for:

COUNTY OF ORANGE
OC Waste&Recycling
Our Community. Our Commitment.

601 N. Ross Street, 5th Floor
Santa Ana, CA 92701

Prepared by:

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General Information About This Document

Document Overview:
OC Waste & Recycling (OCWR) has prepared this Recirculated Focused Draft Initial Study/Mitigated Negative Declaration (IS/MND), which examines revisions to the potential environmental impacts and mitigation measures for air quality, greenhouse gas, and threatened and endangered species being considered for the proposed Bowerman Power Renewable Natural Gas Project (Project) in Orange County, California. OCWR is the lead agency under the California Environmental Quality Act (CEQA).

In accordance with the California Environmental Quality Act (CEQA) Section 21091 and State CEQA Guidelines Section 15073, the original Draft IS/MND for the Project was circulated for a 30-day public review and comment period from October 17, 2024, to November 15, 2024. In response to comments received on the original Draft IS/MND, OCWR has decided that the following information/analysis should be revised and recirculated for public review:

- potential impacts to Crotch's bumble bee (*Bombus crotchii*), in response to comments from California Department of Fish and Wildlife (CDFW) (Biological Resources Special-status Species Section)
- revisions to the Air Quality, Greenhouse Gas (GHG), and Health Risk Assessments, in response to comments from South Coast Air Quality Management District (SCAQMD) (Air Quality and GHG Sections)
- analysis of the impacts of the Project on Irvine Ranch Water District (IRWD)-owned facilities (potable water, recycled water, and sewer systems). in response to comments from (IRWD) (Utilities and Service Water Section)

Pursuant to Section 15073.5 of the State CEQA Guidelines, the above sections of the Recirculated Focused Draft IS/MND are being recirculated for public review. Changes to the text in these sections are indicated in "~~strikeout~~/underline" format, which captures revisions to these documents. The reader can view all deleted text as indicated in strikethrough format.

Reader Guidance:

OCWR requests that reviewers limit their comments to the revised analysis portions of the Recirculated Focused Draft Initial IS/MND as the comment period has closed for those previously distributed portions of the original Draft IS/MND. Comments on the original Draft IS/MND and this Recirculated Focused Draft Initial IS/MND will be included in the Final MND. For ease of review, OCWR has included the Project Description, in addition to the sections that have been revised for recirculation.

The Recirculated Focused Draft Initial IS/MND will be available for a 30-day public review period from September 2, 2025, through October 1, 2025. Please submit your written comments to Leila Barker, OCWR CEQA & Habitat Program Manager, OCWR, 601 N. Ross Street, 5th Floor, Santa Ana, CA 92701 or via email to ocwr-ceqareview@ocwr.ocgov.com, by no later than 5:00 p.m. on October 1, 2025.

Next steps:

After comments are received from the public and reviewing agencies, the comments on the original Draft IS/MND and this Recirculated Focused Draft IS/MND and responses to any comments will be included in the Final MND. The Project and the Final IS/MND will be reviewed by the Orange County Board of Supervisors. A hearing to determine approval of the Project and the Final IS/MND will occur at County Administration North, Board Hearing Room, First Floor, 400 W. Civic Center Drive, Santa Ana, 92701. The proposed hearing date is December 2, 2025.

RECIRCULATED FOCUSED INITIAL STUDY/MITIGATED NEGATIVE DECLARATION AND NOTICE OF INTENT TO ADOPT THE PROPOSED MITIGATED NEGATIVE DECLARATION

This serves as the Notice of Intent by OC Waste & Recycling (OCWR) to adopt a Mitigated Negative Declaration for the Bowerman Power Renewable Natural Gas Plant Project, prepared in accordance with the California Environmental Quality Act (CEQA) and its guidelines.

Name of Project: Bowerman Power Renewable Natural Gas Plant Project ("Project").

Project Location: The proposed renewable natural gas plant is located at the Frank R. Bowerman (FRB) Landfill at 11002 Bee Canyon Access Road in unincorporated Orange County, California, north and within the sphere of influence of the City of Irvine. The Project involves constructing a renewable natural gas processing plant and a new SoCalGas pipeline connecting the processing plant to an existing SoCalGas pipeline at the corner of Portola Parkway and Jeffrey Road. FRB Landfill is located within Township 5 South, Range 8 West, and parts of Sections 143, 144, 145, and 118 of the El Toro, California, U.S. Geological Survey (USGS) 7.5-minute Quadrangle Map (1997).

Lead Agency: OCWR
601 N. Ross Street, 5th Floor
Santa Ana, CA 92701

Lead Proponent: Bowerman Power LFG, LLC (Bowerman Power)
5313 Campbells Run Road
Suite 200
Pittsburgh, PA 15205

Project Description: A renewable natural gas (RNG) plant will be designed to produce RNG from landfill gas (LFG). Most of the LFG produced by the FRB Landfill is sent to the existing Bowerman Power Plant to produce energy. Currently, when the Bowerman Power Plant reaches production capacity, excess LFG is sent to a flare station for incineration. The proposed RNG plant will process the LFG, that would otherwise require incineration at the existing adjacent flare station and deliver it to SoCalGas. The Project does not include the storage of RNG, instead RNG will be directed into the existing SoCalGas natural gas pipeline system.

This effort will promote the beneficial reuse of existing and future LFG collected by FRB Landfill, support long-term sustainability goals in the region, and help reduce

Orange County's reliance on fossil fuels. Additionally, the Project will contribute to California Public Utility Commission's Renewable Gas Program to procure RNG made by methane from organic waste from landfills and other sources. By processing LFG into RNG and delivering it to SoCalGas, the Project will reduce the volume of LFG being flared and the associated greenhouse gas (GHG) emissions from the flares. The RNG Plant will have the capacity to process 6,000 scfm of LFG is equivalent to avoiding the GHG emissions from trash landfilled over an approximately 1.5 year period.

The Project site is not designated a hazardous waste property, nor is it a hazardous waste disposal site as defined under Section 65962.5 of the California Government Code.

Revised Determination:

OCWR circulated a Draft IS/MND on October 17, 2024, for a 30-day review. Based on comments received from CDFW on potential impacts to Crotch's bumble bee (Bombus crotchii), SCAQMD on Air Quality, Greenhouse Gas (GHG), and Health Risk Assessments, and IRWD on impacts on IRWD facilities, OCWR has prepared a Recirculated Focused Draft IS/MND for this Project.

Based on the original Draft IS/MND and the comments received on the document, it was determined that the Project would have no significant impacts on Aesthetics, Agricultural Resources, Energy, Geology and Soils, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Mineral Resources, Noise, Population and Housing, Public Services, Recreation, Transportation, Tribal Cultural Resources, non-IRWD related Utilities and Service Systems, and Wildfire. Therefore, these issues have not been included in this Recirculated Focused Draft IS/MND.

OCWR, pending public review, expects to determine from this Recirculated Focused Draft IS/MND that the proposed Project would also not have a significant effect on to Crotch's bumble bee, Air Quality, GHG, and Health Risk Assessments, and IRWD facilities.

- **NOTICE IS HEREBY GIVEN THAT** the OCWR proposes to adopt a Mitigated Negative Declaration for the above-cited Project. This Mitigated Negative Declaration is based on the finding that, by implementing the identified mitigation measures, the Project's potential impacts will be maintained at a less than significant level. The reasons to support such a finding are documented by the Initial Study prepared by Tetra Tech, Inc. Copies of the Initial Study, the proposed Mitigated Negative Declaration, and supporting materials are available for review at: oclandfills.com/bp-rng-ceqa

- OCWR located at 601 N. Ross Street, 5th Floor, Santa Ana, California, 92701;
- FRB Landfill, 11002 Bee Canyon Access Rd, Irvine, CA 92602; and
- Irvine Heritage Park Library, 14361 Yale Avenue, Irvine, CA 92604.

For questions regarding the Mitigated Negative Declaration, please contact:

NAME: Leila Barker **PHONE**: 714.834.4013

TITLE: OCWR CEQA & Habitat Program Manager

EMAIL: ocwr-ceqareview@ocwr.ocgov.com

ADDRESS: OCWR
601 N. Ross Street, 5th Floor
Santa Ana, CA 92701

Public Review Period: **30 days** **Begins: 9/2/2025** **Ends: 10/1/2025**

Public Hearing: Adoption of the Mitigated Negative Declaration will be considered at a public hearing by the County of Orange Board of Supervisors which is proposed for December 2, 2025, at 9:30 a.m. at the County of Orange Hall of Administration Board of Supervisors - Board Hearing Room, First Floor, 400 W. Civic Center Drive, Santa Ana, California

In accordance with CEQA Guidelines, any comments concerning the findings of the Recirculated Initial Study/Mitigated Negative Declaration must be submitted in writing and **received by the OCWR no later than 5:00 p.m. on October 1, 2025**, in order to be considered prior to the final determination on the Project by OCWR. Please submit your written comments to Leila Barker, OCWR CEQA & Habitat Program Manager, OCWR, 601 N. Ross Street, 5th Floor, Santa Ana, CA 92701 or via email to ocwr-ceqareview@ocwr.ocgov.com.

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Acronyms and Abbreviations

§	Section
AQIA	Air Quality Impact Assessment
AQMP	Air Quality Management Plan
BACT	Best Available Control Technology
BMP	best management practice
Bowerman Power	Bowerman Power LFG, LLC
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CH4	methane
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
FRB	Frank R. Bowerman
GHG	Greenhouse Gas
GIS	geographic information system
HCP	Habitat Conservation Plan
HDD	Horizontal Directional Drilling
HRA	Health Risk Assessment
IS	Initial Study
IUSD	Irvine Unified School District
IRWD	Irvine Ranch Water District
LFG	landfill gas
LST	Localized Significance Threshold
MND	Mitigated Negative Declaration
MT	Metric Ton
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCCP	Natural Community Conservation Planning

NPDES	National Pollutant Discharge Elimination System
OC Parks	Orange County Parks
OCFA	Orange County Fire Authority
OCFCD	Orange County Flood Control District
OCWR	OC Waste & Recycling
OSR	Open Space Reserve
Plant	renewable natural gas production plant
POR	Point of Receipt
PRC	Public Resources Code
Project	Bowerman Power Renewable Natural Gas Plant Project
RELOOC	Regional Landfill Options for Orange County
RNG	renewable natural gas
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
scfm	standard cubic feet per minute
SCS	Sustainable Communities Strategy
SoCalGas	Southern California Gas Company
SRA	State Responsibility Area
SSC	Species of Special Concern
Tetra Tech	Tetra Tech, Inc.
TOU	Time of Use
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
UWMP	Urban Water Management Plan

1.0 INTRODUCTION

This document is the Recirculated Focused IS/MND for Bowerman Power Renewable Natural Gas Plant Project (Project).

Section 15073.5 of the California Environmental Quality Act (CEQA) State Guidelines provides that an IS/MND shall be recirculated for public review and comment when the lead agency determines that new measures or project revisions are required to reduce potential impacts to a less-than-significant level. "Recirculation" simply means that agencies and the public are provided an additional opportunity to comment on the new or revised sections of the Recirculated Focused IS/MND.

The Bowerman Power Renewable Natural Gas Plant Project Draft IS/MND (SCH# 2024100760) has been revised to add mitigation for potential impacts to Crotch's bumble bee (*Bombus crotchii*), revise analysis and add mitigation for Air Quality and Health Risk Assessments, and revise analysis for greenhouse gas (GHG) and IRWD facilities.

1.1 Project Overview

Bowerman Power LFG, LLC (Bowerman Power) is working with OC Waste & Recycling (OCWR) to develop a renewable natural gas (RNG) production plant (Plant). The RNG Plant will be located on land at the Frank R. Bowerman (FRB) Landfill leased to Bowerman Power by OCWR. The Bowerman Power Renewable Natural Gas Plant Project (Project) will be designed to produce RNG from landfill gas (LFG). Most of the LFG produced by the FRB Landfill is sent to the existing Bowerman Power Plant to produce energy. Currently, when the Bowerman Power Plant reaches production capacity, excess LFG is sent to a flare station for incineration. The proposed RNG Plant will process the LFG, that would otherwise require incineration at the existing adjacent flare station, and deliver it to the existing Southern California Gas Company (SoCalGas) pipeline. The Project does not include storage of RNG, instead RNG will be directed into the existing SoCalGas natural gas pipeline system.

This effort will promote the beneficial reuse of existing and future LFG collected by FRB Landfill, support long-term sustainability goals in the region, and help reduce Orange County's reliance on fossil fuels. Additionally, the Project will contribute to the California Public Utility Commission's Renewable Gas Program to procure RNG made by methane from organic waste from landfills and other sources. By processing LFG into RNG and delivering it to SoCalGas, the Project will reduce the volume of LFG being flared and the associated GHG emissions from the flares.

Benefits of the Project include the following:

- RNG has a lifecycle Carbon Intensity (CI) that is 20 percent lower than conventional natural gas.
- The Project creates a beneficial use for the excess LFG that would otherwise be incinerated in the flares.
- When compared to flaring LFG, the Project will reduce air emissions from all criteria pollutants at the FRB Landfill by 60 percent.
- When compared to flaring LFG, an RNG Plant will reduce GHG emissions by 90 percent.

- The annual GHG emissions avoided from 6,000 standard cubic feet per minute (scfm) of LFG going to the RNG facility are equivalent to approximately the amount of trash landfilled over a 1.5-year period.
- California law specifically encourages the production and use of RNG. Senate Bill (SB) 1440 directs the California Public Utilities Commission to evaluate establishing goals or targets for RNG purchases by California gas utilities.
- The California Air Resource Board's 2022 Scoping Plan for Achieving Carbon Neutrality emphasizes the importance of relying on RNG to reduce emissions for hard-to-electrify end uses.

1.2 Prior CEQA Documentation

In accordance with the California Environmental Quality Act (CEQA) Section 21091 and State CEQA Guidelines Section 15073, the original Draft IS/MND for the Project was circulated for a 30-day public review and comment period from October 17, 2024, to November 15, 2024. The original Draft IS/MND and any supporting attachments were available during normal business hours at: the offices of OC Waste & Recycling, 601 N. Ross Street, 5th Floor, Santa Ana, CA 92701; Irvine Heritage Park Library, 14261 Yale Avenue, Irvine, CA 92604; and also available on the OCWR website.

OCWR held a virtual public information meeting on October 22, 2024, to share Project information and respond questions from stakeholders and community members. Representatives from OCWR, Bowerman Power, and the Project consultant team were available to discuss the Project and answer questions. OCWR mailed notices with information about the public information meeting and availability of the original IS/MND for the Project to properties located 1.5 miles from the FRB Landfill. This information was also advertised in the Orange County Register newspaper on October 15, 2024, and posted at the County Clerk on October 17, 2024. The meeting was recorded and was provided to the public for viewing here: www.vimeo.com/1022613976.

During the public review period, 35 comment letters or emails were received from the following sources:

- California Department of Fish and Wildlife (CDFW)
- California Department of Transportation (Caltrans)
- City of Irvine
- Irvine Ranch Water District
- Southern California Air Quality Management District (SCAQMD)
- U.S. Fish and Wildlife Service (USFWS)
- Community members

Responses to these comments will be presented in the Final IS/MND.

1.3 Statutory Authority and Requirements

This Recirculated Focused Draft IS/MND has been prepared for review and approval by OCWR with technical assistance from Tetra Tech, Inc. (Tetra Tech) to evaluate if implementation of the proposed Project would have a significant effect on the environment. Pursuant to Section 15070 of the *Guidelines for Implementation of the California Environmental Quality Act* (14 California Code of Regulations Sections [§§] 15070-15075), a public agency shall prepare or have prepared a proposed negative declaration or mitigated negative declaration for a project subject to CEQA when:

> *(a) The initial study shows that there is no substantial evidence, in light of the whole record before the agency, that the project may have a significant effect on the environment, or*
>
> *(b) The initial study identifies potentially significant effects, but:*
>
> > *(1) Revisions in the project plans or proposals made by, or agreed to by the applicant before a proposed mitigated negative declaration and initial study are released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur, and*
> >
> > *(2) There is no substantial evidence, in light of the whole record before the agency, that the project as revised may have a significant effect on the environment.*

1.4 Document Review / Revised Content

Text in Section 3, Environmental Checklist, has been revised and is shown in <u>underlined</u> for additions and ~~struck-through~~ for deletions. The reader can view all deleted text as indicated in strikethrough format.

OCWR requests that reviewers limit their comments to the revised portions of the Recirculated Focused Draft Initial IS/MND as the comment period has closed for those unrevised analysis portions of the original Draft IS/MND that were found to have no significant impacts. Comments on the original Draft IS/MND and this Recirculated Focused Draft Initial IS/MND will be included in the Final MND.

2.0 PROJECT INFORMATION

Project title:	Bowerman Power Renewable Natural Gas Plant Project
Lead agency name and address:	**OC Waste & Recycling** 601 N. Ross Street, 5th Floor Santa Ana, CA 92701
Contact person and phone number:	**Francine Bangert, Public Information Officer** 714.834.4059
Project location:	The proposed renewable natural gas (RNG) plant is located at the Frank R. Bowerman (FBR) Landfill at 11002 Bee Canyon Access Road in unincorporated Orange County, California, north and within the sphere of influence of the City of Irvine. The Project involves constructing an RNG processing plant and a new SoCalGas pipeline connecting the processing plant to an existing SoCalGas pipeline at the corner of Portola Parkway and Jeffrey Road; see Figure 2-1, Project Vicinity, and Figure 2-2, Project Location, for additional details.
Project sponsor's name and address:	**Bowerman Power LFG, LLC (Bowerman Power)** 5313 Campbells Run Road Suite 200 Pittsburgh, PA 15205
Contact person and phone number:	**Sharon Frank, Vice President Environmental Health and Safety** 412.789.9370
General Plan Designation:	4LS (Public Facilities Landfill Site)
Zoning Designation:	A1 General Agriculture
Surrounding land uses:	The surrounding land uses consist of Open Space Reserve. State Routes 241 and 133 are located to the west, approximately 0.5 and 0.6 miles, respectively. Interstate 5 is located approximately 3.8 miles to the west, and Interstate 405 is located approximately 5.4 miles to the southwest.

2.1 Environmental Setting

The Project will be located at the FRB Landfill in unincorporated Orange County within the sphere of influence of the City of Irvine, except for the new SoCalGas pipeline, which will be located within the City of Irvine.

2.1.1 Regional

Orange County is located along the Pacific Ocean between Los Angeles County to the north and northwest, San Bernardino County to the northeast, Riverside County to the east, and San Diego County to the southeast, covering 798 square miles (County of Orange 2012). The FRB Landfill is in one of the unincorporated areas of Orange County. The unincorporated territory, consisting of approximately 321 square miles, is geographically diverse with unincorporated areas spread throughout Orange County.

The City of Irvine is situated in central Orange County and covers approximately 66 square miles of land (City of Irvine 2022; see Figure 2-1, Project Vicinity). The City boundaries stretch from State Route 73 in the southwest to the foothills of the Santa Ana Mountains in the northeast. The FRB Landfill is situated in these foothills northeast of the City.

Physiographically, the FRB Landfill is located in the Peninsular Ranges Geomorphic Province, which is characterized by a series of mountain ranges that are sub-parallel to the coast from Los Angeles to San Diego (CGS 2002). The Santa Ana Mountains are located in the northern end of the province, and the Project site is located on the southwestern flank of the Santa Ana Mountains, in the foothills that transition to an alluvial plain which encompasses most of the City of Irvine. The FRB Landfill is located within the Bee Canyon topographic feature providing space to accommodate a large volume of municipal solid waste. Bee Canyon is within the larger San Diego Creek watershed, which drains across the alluvial plain and into Newport Back Bay, and from there connects to the Pacific Ocean.

The FRB Landfill is surrounded by an area designated by the Orange County General Plan as Open Space Reserve (OSR) and is part of the Orange County Central and Coastal Subregion Natural Communities Conservation Plan/Habitat Conservation Plan Reserve.

2.1.2 Project Site

The Project site is situated near the northeastern edge of the City of Irvine (see Figure 2-2, Project Location) and within the FRB Landfill boundaries, except for the western end of the new SoCalGas pipeline connecting to the existing SoCalGas pipeline. The Project will consist of three “localities” where disturbances will occur: the new Project RNG Plant, the new SoCalGas pipeline, and the existing soil stockpile area (see Figure 2-3, Project RNG Plant Site and FRB Landfill Soil Stockpile Area Locations and Figure 2-4, Proposed SoCalGas Pipeline Route).

The RNG Plant site involves 3.52 acres of part of the undeveloped land leased to Bowerman Power by OCWR (see Figure 2-3). This land is adjacent to the existing Bowerman Power 19.6-megawatt landfill gas to energy facility (Bowerman Power Plant) and the FRB Landfill flare station. Approximately 90,000 cubic yards of fill material will be extracted from an existing soil stockpile area (see Figure 2-3) within the FRB Landfill boundaries and will be used to provide fill materials for the RNG Plant pad including a point of receipt (POR) facility to be developed and operated by SoCalGas.

The new SoCalGas pipeline will run from the POR within the RNG Plant boundary, down Bee Canyon Access Road to the existing SoCalGas pipeline on the corner of Portola Parkway and Jeffery Road. The new SoCalGas pipeline will be approximately 2.0 miles in length along Bee Canyon Access Road and approximately 0.4 mile in length along Portola Parkway, for a total of 2.4 miles.

2.2 Project Description

2.2.1 Background

The FRB Landfill is a state-of-the-art, Class III, municipal solid waste facility, owned by the County of Orange and operated and maintained by OCWR. FRB Landfill opened in 1990 and spans approximately 725 acres of hillside with 534 acres allocated for waste disposal. It is permitted for 11,500 tons per day maximum with an 8,500 tons per day annual average. The FRB Landfill is currently receiving approximately 8,000 tons of refuse per day. The FRB Landfill has enough projected capacity to serve

residents and businesses until approximately 2053. The current permitted capacity is 266 million cubic yards, of which approximately 105.7 million cubic yards have been placed as of June 2022.

The Regional Landfill Options for Orange County (RELOOC) defines the permitted vertical and horizontal expansions for the Master Development Plan of the FRB Landfill (P&D Consultants 2006). The permitted vertical and horizontal expansions are implemented in phases to provide for sufficient landfill operation areas and not disturb all parts of the landfill at once. The Master Development Plan includes three Phase VIII subareas (VIII-A, B, and C). The FRB Master Development Plan also includes several on-site stockpile locations for soil excavated as part of landfill phase development and operations. All soil stockpiles are within the landfill property. The soil is used for daily and intermediate cover, road construction and other related uses. Excavations are currently underway for the development of Phase VIII-A1. Soils excavated from the development of Phase VIII-A1 are stockpiled in the soil stockpile area (see Figure 2-3).

The LFG currently created by the landfill is managed via a gas collection and control system that includes vertical and horizontal gas extraction wells, a collection pipe system, and a flare station complex comprising six flares. The Bowerman Power Plant, an existing 19.6-megawatt landfill gas to energy facility, was opened in 2016 and is an award-winning, public-private partnership producing enough electricity for the City of Anaheim to power 26,000 homes. Bowerman Power currently owns and operates the Bowerman Power Plant. It is located adjacent to the flare station and processes approximately 8,350 scfm of raw LFG. The LFG not processed by the Bowerman Power Plant is incinerated at the flare station.

2.2.2 General Description

Bowerman Power, as the Project Proponent, is proposing to develop an RNG Plant at the FRB Landfill on land at the FRB Landfill leased to Bowerman Power by OCWR. Bowerman Power is a renewable energy company specializing in the recovery and processing of biogas from landfills and other non-fossil fuel sources for beneficial use as a replacement to fossil fuels. They develop, own, and operate RNG projects, using proven technologies that supply renewable fuel into the transportation and electrical power sectors. Having participated in the industry for over 30 years, they are one of the largest U.S. producers of RNG. They have an operating portfolio of 12 RNG and three Renewable Electricity projects that span six states, including the Bowerman Power electricity generation site located within FRB Landfill.

As described above, the LFG not processed by the Bowerman Power Plant is incinerated at the flare station. California law specifically encourages the production and use of RNG. SB 1440 directs the California Public Utilities Commission to evaluate establishing goals or targets for RNG purchases by California gas utilities. The California Air Resource Board's 2022 Scoping Plan for Achieving Carbon Neutrality emphasizes the importance of relying on RNG to reduce emissions for hard-to-electrify end uses.

The RNG Plant will be designed to process the excess LFG that would otherwise require incineration at the existing adjacent flare station, and then deliver the processed RNG to SoCalGas, as detailed in Table 2-1, and shown in Figure 2-5, RNG Process Design Flow. The Project does not include the storage of RNG, but will instead direct RNG to SoCalGas's existing natural gas pipeline infrastructure. The RNG

Plant layout (see Figure 2-6, Project Site Plan) will comprise two areas: the process equipment area (see Figure 2-7, RNG Process Equipment Area Layout) and the control and electrical buildings (see Figure 2-8, RNG Control / Electrical Buildings Layout).

The RNG Plant will be designed to process a maximum of 6,000 scfm of raw LFG at the inlet. The process will remove nitrogen, oxygen, carbon dioxide, sulfur hydroxide, volatile organic chemicals, hydrogen sulfide, as well as other minor impurities to meet the gas specifications of SoCalGas. The RNG Plant was sized based on the available capacity of the existing SoCalGas pipeline system, as provided by SoCalGas.

Table 2-1. Project RNG Plant Components

Component	Data
RNG Plant Owner	Bowerman Power
Project Name	Bowerman Power Renewable Natural Gas Plant
Project Site Location	Frank R. Bowerman Landfill 11002 Bee Canyon Access Road Irvine, CA 92602
Landowner	County of Orange
Project Type/Size	LFG to RNG conversion plant (Bowerman Power Plant) Maximum capacity of 6,000 scfm
Source Fuel	Landfill gas; 46-53% methane (dry basis)
Equipment Location	Primarily outdoor equipment with some enclosures (required for noise abatement or environmental control). Electrical and control equipment to be enclosed.

As noted previously, excavation is currently underway for the development of FRB Landfill Phase VIII-A1. The soils removed during the excavation are stockpiled within the FRB Landfill boundaries (see soil stockpile area on Figure 2-3). The RNG Plant pad is expected to require approximately ~~7~~90,000 cubic yards of fill material. This fill material will be extracted from within the soil stockpile area and trucked to the RNG Plant site for development of the RNG Plant pad.

SoCalGas will develop a POR facility which will receive RNG from the plant, odorize, compress, and insert the RNG into its pipeline. A 250-gallon odorant tank will be installed in the POR facility. SoCalGas will construct a new 12-inch-diameter pipeline to convey the RNG from the POR (see Figure 2-9) on the Project site to the existing SoCalGas pipeline at the corner of Portola Parkway and Jeffrey Road (see Figures 2-4.1 through 2-4.12).

The new RNG Plant will process excess LFG and deliver the resulting RNG to the SoCalGas pipeline. This effort will promote the beneficial reuse of existing and future LFG collected by FRB Landfill, support long-term sustainability goals in the region, and help reduce Orange County's reliance on fossil fuels. Additionally, the Project will contribute to California Public Utility Commission's Renewable Gas Program to procure RNG made by methane from organic waste from landfills. By processing LFG into RNG and delivering it to SoCalGas, the Project will reduce the volume of LFG being flared and the associated GHG emissions from the flares.

Benefits of the Project include the following:

- RNG has a lifecycle Carbon Intensity (CI) that is 20 percent lower than conventional natural gas.
- The Project creates a beneficial use for the excess LFG that would otherwise be incinerated in the flares.
- When compared to flaring LFG, the Project will reduce air emissions from all criteria pollutants at the FRB Landfill by 60 percent.
- When compared to flaring LFG, an RNG Plant will reduce GHG emissions by 90 percent.
- The annual GHG emissions avoided from 6,000 scfm of LFG going to the RNG facility are equivalent to approximately the amount of trash landfilled over a 1.5-year period.
- California law specifically encourages the production and use of RNG. SB 1440 directs the California Public Utilities Commission to evaluate establishing goals or targets for RNG purchases by California gas utilities.
- The California Air Resource Board's 2022 Scoping Plan for Achieving Carbon Neutrality emphasizes the importance of relying on RNG to reduce emissions for hard-to-electrify end uses.

2.2.3 Operations

The proposed RNG systems are intended to support continuous operation with appropriate equipment and components. To support minimal staffing, the Plant will be automated to allow station operations as detailed in Table 2-2 and below. Under normal conditions, maintenance personnel will be on-site for site inspections and maintenance only as needed, and typically only during daylight hours.

Table 2-2. General Plant Operations

Parameter	Design Requirements
Operation Staff	Manned operations: A total of 10 Bowerman Power employees, 8-10 hours per day/5 days per week Unmanned/remote operations: 14-16 hours per day/5 days per week, and 24-hours/2 days per week
Service Life	20 years (approximately 2026 to 2046)
Shut Down	Depressurize to facility off-spec flare and landfill flares
Shut Down Sequence	Automated
Start Up Sequence	Semi-Automated
Planned Shut Down Time	Minimize annual down time
Turn Down	Losses in recovery efficiency are expected and acceptable to achieve turn down Two-stage public service announcement system maximum turndown is 75% (25% of nameplate capacity)

The RNG Plant will be supplied LFG from the existing flare station for upgrading into RNG. The RNG Plant will be designed to produce RNG that meets the Product Gas Composition requirements as set forth pursuant to SoCalGas' Rule Number 30[1].

The RNG Plant will have two buildings: an Electric Building, which is planned to be unoccupied, and a Control Building, which will be occupied by the operational staff, see Figures 2-7 and 2-8. The process equipment will be placed outside on the RNG Plant pad. The Control Building will house the Control Center (computer stations), lavatories, and the Electric Building will house the electrical room. The type of equipment expected for operation of the RNG Plant is shown in Figure 2-10, Equipment List.

The SoCalGas POR facility located on the RNG Plant site, see Figure 2-9, will be 8,000 square feet and include an electrical shelter, analyzer shelter, automated control valve(s), filter separator, meter, odorant skid, above-ground piping and pipe supports, bollards, fencing, roadways, and gates. The POR's equipment and their functions are briefly described below:

- **Electrical Shelter:** The electrical shelter provides power to the POR's electrical equipment, gas instrumentation, and communication controls.
- **Analyzer Shelter (or Gas Analyzer System):** The analyzer shelter samples and analyzes incoming RNG, from the RNG Plant, to evaluate gas composition and quality. If inlet gas qualities deviate from the allowable limits, the analyzer shelter will trigger the overpressure protection valve to close and rejected gas will be routed back to the RNG Plant for re-processing or flaring. Once permissible gas composition and quality are confirmed by the analyzer shelter, the overpressure production valve will open, and gas will be allowed into the POR station.
- **Automated Control Valve(s):** The control valves regulate the gas pressure of the RNG that is injected into SoCalGas' existing natural gas infrastructure.
- **Filter Separator:** The filter separator separates incoming particulates, entrained liquids, and RNG entering the POR facility and allows for dry gas to flow into the flow meter.
- **Metering (or Flow Metering):** The flow meter calculates the corrected gas flow of the RNG entering the POR facility.
- **Odorant Skid (or Odorizing System):** The odorizing system injects odorant (mercaptan) into the RNG stream prior to injection into SoCalGas' existing natural gas infrastructure. Odorant is injected as a safety provision to make a gas leak readily detectable by sense of smell. The odorant skid contains a 250-gallon odorant storage tank, two expansion tanks, two injection pumps, two verometers, and four odorant filters.
- **Above-Ground Piping and Pipe Supports:** The above-ground piping and pipe supports transport the RNG through the POR facility and allow for SoCalGas personnel to perform future maintenance on the facility.
- **Bollards, Fencing, Roadways, and Gates:** The bollards, fencing, roadways, and gates protect the POR facility from vehicle collision and unauthorized access.

[1] SoCalGas Renewable Natural Gas Quality Standards, https://www.socalgas.com/1443740736978/gas-quality-standards-one-sheet.pdf

Normal operational power will be provided by Southern California Edison (SCE) service. In case of SCE power outage, a natural gas generator will be onsite to power critical facility safety and control systems. The generator will be used for temporary back-up power only. hazardous

2.2.4 Safety and Operability

Bowerman Power Plant has safely operated at the FRB Landfill since 2016. The existing Bowerman Power Plant includes a hazardous management business plan prepared in accordance with County regulations. The plan shall be updated to address new aspects of the RNG Plant equipment and operation. The current plan addresses business activities, safe handling practices, hazardous material inventory, emergency response, and employee training plans.

The Project will be designed for normal operation from the Control Building, but with the ability to have both local and remote startup, operation, shutdown, and emergency shutdown capabilities for equipment. Emergency eyewash and/or safety shower stations (meeting ANSI/ISEA Z358.1 standards) will be provided. The process equipment area will include a gas detection system.

The RNG Plant will include the following emergency systems:

- The RNG Plant control system will be designed to operate and maintain the RNG process under normal conditions. If conditions occur outside of the normal operating range, the RNG Plant will shut down due to any potentially hazardous process conditions and the LFG will be combusted in the landfill flares.
- The electronic auto-dialing system, currently in place at the adjacent Bowerman Power Plant, will be expanded to include the proposed Project. The system will notify the operator of an abnormal condition during non-business hours and will provide visual and audible warnings to assist operator response.
- In the event of planned maintenance, unplanned process changes, or other event, the RNG Plant will be either manually or automatically shut down and LFG will be redirected to landfill flares as necessary.
- The pipeline pressure and flow will be monitored and any change outside of normal operating parameters will shut off the pipeline and shut down the RNG Plant.
- The RNG Plant will have a seismic sensor. In the event of a large earthquake, the RNG Plant equipment will be shut down and pipeline valves will be closed.
- The RNG Plant will have a gas detection system.
- Access and circulation for large vehicles will be provided to the RNG Plant.
- Water supply for firefighting will be supplied by existing on-site FRB Landfill water tanks.
- In adherence to the OCFA's Fuel Modification and Maintenance Program, the RNG Plant site will be located on an area that will be devoid of vegetation or other fuel sources. An additional 0.8 acre will be cleared of vegetation; see the area shown in red and yellow on Figure 2-11. Another 0.05 acre will be cleared of vegetation and trenched for installation of a fire suppression water line. Post-construction, the areas shown in red, blue, and yellow on Figure 2-11 will be revegetated with low fuel vegetation approved by OCFA and OCWR.

The new SoCalGas pipeline wil also be designed to meet the most stringent design, pipeline class, and safety standards (Class 4 requirements) in accordance with Title 49 Code of Federal Regulations (CFR). Emergency shut-off valves, pressure monitoring devices and other control equipment shall be incorporated into the design of the pipeline. The system shall include devices required by 49 CFR 192 and as deemed appropriate by the County. These devices shall be installed on the pipeline at locations and distance intervals specified in federal regulations. In addition, SoCalGas will take the safety precaution of pressure testing the new pipeline prior to placing it in service to validate the engineering and fitness of the pipe.

2.2.5 Water Use

The Project will use an estimated 350,000 gallons of non-potable water during construction activities (soil compaction, dust suppression, etc.). Non-potable water for construction activities will either be supplied from existing on-site FRB Landfill water tanks or trucked in from an off-site provider. Initially during operations, the RNG Plant system will require 1,000 gallons of water to supply the chiller system. Typically, no additional water will be required for the system except in the case of non-routine maintenance. Personal Potable water usage (bathroom, sink, shower, etc.) is estimated to be 110,000 gallons per year. Per Bowerman Power's agreement with OCWR, water for RNG Plant maintenance and personal water use will be supplied by OCWR from the existing domestic water line that currently serves the Bowerman Power Plant. Septic waste from the RNG Plant's bathroom facilities will be pumped to a sanitary holding tank that will be regularly pumped out and hauled off-site by a licensed third-party vendor.

The fire suppression system for the Project will utilize the 46,000-gallon fire water tank that was constructed in early 2016 to service the adjacent Bowerman Power Plant. The system will draw water from the existing tank through dedicated hydrants positioned at the northeastern and southwestern ends of the RNG Plant.

2.2.6 Construction Details

Construction is anticipated to begin in the first quarter of 2026~~5~~ and is expected to occur over a span of 2 years, with the majority of the emitting construction phases overlapping during a 1-year period.

All Project equipment and building materials staging for the RNG Plant and SoCalGas POR will occur on-site within the construction site work zones. The staging area for the new SoCalGas pipeline would be on a previously disturbed unpaved area adjacent to the westbound lane of Bee Canyon Access Road, approximately 600 feet northeast from the center of the Bee Canyon Access Road Bridge (No. 55-785).

Non-hazardous waste and excess debris will be disposed of at the FRB Landfill.

Construction of the RNG Plant will include approximately 313 working days of construction and the new SoCalGas Pipeline will include approximately 239 working days of construction during normal working days and hours (Monday through Friday, except federal holidays). The construction labor force will vary from a minimum of 2 to a maximum of 35 workers per day for the duration of the construction activities. The type of heavy construction equipment expected for construction of the RNG Plant and the new SoCalGas pipeline is shown in Figure 2-10.

The approximately 3.52-acre Project site will require grading for the approximately 2.3-acre RNG Plant pad, see Figure 2-11. The pad will be composed of approximately 1.38 acres of concrete and 0.22 acres of graded land. The pad is expected to require approximately ~~7~~90,000 cubic yards of fill material, which will be extracted from an existing soil stockpile area within the FRB Landfill boundaries (see Figure 2-3). The soil stockpile area was previously graded as part of FRB Landfill Master Development Plan development and is currently used as the soil stockpile area for the soils excavated as part of the Phase VIII-A development.

An additional 0.8 acre will be cleared of vegetation, see the area shown in red and yellow on Figure 2-11, to comply with Orange County Fire Authority's (OCFA's) Fuel Modification and Maintenance Program. Another 0.05 acre will be cleared of vegetation and trenched for installation of a fire suppression water line. Post construction, the areas shown in red, blue, and yellow on Figure 2-11 will be revegetated with low fuel vegetation approved by OCFA and OCWR.

Construction of the new SoCalGas pipeline route will take place along Bee Canyon Access Road and Portola Parkway. The majority of the pipeline installation construction activities will use open-trench techniques within the paved sections of the roadways, with horizontal directional drilling techniques in some locations. The construction work area along the proposed pipelines will be approximately 50 feet wide. The disturbance for trenching activities will be approximately 30 inches wide with an average depth of 6 feet.

In order to cross the Highway 241 Transportation Corridor, it is expected that the new SoCalGas pipeline will be hung under the "Bee Canyon Access Rd. Bridge" or Bridge #55-785. The new SoCalGas pipeline will be designed and constructed to handle potential lateral hydraulic loading and buoyant forces in order to support the pipe's weight between bridge piers. The new SoCalGas pipeline will be secured under the bridge by pipe hangers made from either carbon steel or galvanized steel. If this method of crossing the Highway 241 Transportation Corridor cannot be used, SoCalGas would perform a Horizontal Directional Drilling (HDD) operation along Bee Canyon Access Road to install approximately 1,300 feet of 12.7-inch steel pipeline beneath the Highway 241 Transportation Corridor. The entry and exit workspaces would be located on private property outside of Caltrans Right of Way (see Figure 2-4, Sheets 4 and 5, and Figure 2-12). The HDD entry workspace would be approximately 150 feet by 100 feet in size and located within the "dirt lot" adjacent to the west-bound lane of Bee Canyon Access Road, approximately 600 feet northeast from the center of the "Bee Canyon Access Rd. Bridge". The HDD exit workspace would be approximately 150 feet by 60 feet in size and would be located along Bee Canyon Access Road, approximately 800 feet southwest from the center of the "Bee Canyon Access Rd. Bridge." The maximum excavation depths for both the HDD entry and exit workspaces should not exceed 10 feet.

The HDD process, if necessary, could be divided into four main phases: pilot hole, reaming, swabbing, and pullback. The pilot hole would be approximately 10 inches in diameter and would drill a complete profile from entry to exit locations. During the reaming and swabbing phases, the pilot hole would be expanded to a minimum of 18 inches. The final hole size would be determined by the HDD contractor. Prior to the pullback phase, the steel pipeline would be hydrostatically tested and upon completion, would be pulled into the hole. A bentonite mixture would be placed downhole to solidify and fill the void space and cap the ends of the entry and exit holes. The approved material would be determined

by the drilling contractor and any permitting conditions. An estimated 100 cubic feet of drill mud waste would be produced during the HDD operation. All HDD waste would be disposed of off-site at an appropriate landfill site. The specific construction approach for the crossing of the Highway 241 Transportation Corridor is preliminary and subject to change depending on permitting conditions and requirements.

A traffic control plan will be prepared to accommodate this work area corridor along the new SoCalGas pipeline route. The plan will be reviewed and approved by OCWR and the City of Irvine Department of Public Works & Sustainability prior to implementation.

2.2.7 Mitigation Measures

The following mitigation measures have been incorporated into the scope of work for the proposed Project and will be fully implemented by Bowerman Power to avoid or minimize adverse environmental impacts identified in this Initial Study/Mitigated Negative Declaration. These mitigation measures are identified in the Mitigation Monitoring and Reporting Plan (MMRP) prepared for this Project (see Appendix A) with the assigned responsibility for implementation and reporting.

Mitigation Measures:

AQ-1 Construction equipment greater than 350 HP for the trenching and pipeline construction phase must be equipped with Tier 4 Final engines.

BIO-1 To address potential Project impacts to intermediate mariposa lily (*Calochortus weedii* var. *intermedius*), an in-lieu fee shall be paid via minor amendment to the NCCP/HCP, as approved by USFWS and CDFW. The in-lieu fee will contribute to a management and monitoring program for rare plants in the Nature Reserve of Orange County.

Silt fencing or flagging shall be installed under the guidance of a biological monitor along the limits of coastal sage scrub areas that are immediately outside of the grading/impact limits. The silt fencing/flagging shall be used to minimize impacts to sensitive natural resources including special-status plant species and native plant communities outside and immediately adjacent to the grading limits. Construction activities and personnel will be restricted within these adjacent coastal sage scrub areas and a biological monitor will be present during the silt fence/flagging installation and removal.

BIO-2 Impacts to coastal sage scrub habitat shall occur outside the breeding and nesting season of the coastal California gnatcatcher (February 15 through July 15) to the extent practicable.

A pre-construction survey shall be conducted within the Project site to determine the presence/absence of coastal California gnatcatcher and coastal cactus wren prior to clearing or grading activities. The survey shall include a 100-foot buffer around the grading limits. Any coastal California gnatcatcher or coastal cactus wren observations shall be recorded and marked on the construction/grading plans.

All coastal sage scrub habitat outside of the Project impact area shall be fenced or marked with flagging materials prior to the commencement of grading. No

construction access, parking, or storage of equipment or materials will be allowed within these areas.

A qualified biologist shall conduct and document a pre-construction meeting to educate construction staff (including supervisors, equipment operators, and other site employees) on all mitigation measures required for the Project.

A qualified biologist shall monitor the clearing of coastal sage scrub and oak woodland. USFWS/CDFW shall be notified at least 7 calendar days (preferably 14 calendar days) prior to clearing habitat occupied by Target/Identified Species, if observed. The qualified biologist will ensure that clearing activities and earth-moving equipment do not harm coastal California gnatcatchers or coastal cactus wren. The biologist will also ensure that these activities do not harm other species that may occur, including western spadefoot, orange-throated whiptail, red-diamond rattlesnake, and coast patch-nosed snake.

The access road(s) shall be sprayed with water on occasion to reduce dust accumulation on the leaves of coastal sage scrub species, as overseen by the biological monitor.

BIO-3 Avoid ground-disturbing and vegetation removal activities during the nesting bird season (February 15 to September 15). If these activities must occur during the nesting season, a pre-construction nesting bird survey shall be conducted by a qualified biologist on and within 300 feet of the Project construction area. The survey shall be conducted no more than 10 days prior to initiation of ground-disturbance, vegetation clearing, or construction activities and repeated between delays of greater than 10 days during the nesting season.

If an active nest is found, an appropriate no-disturbance buffer for the species shall be visibly established in the field by a qualified biologist (e.g., flagging, staking, caution tape). No ground-disturbing or vegetation removal activities shall occur within the buffer until the nesting season has ended or the nest is vacated and juveniles have fledged, as determined by the qualified biologist. At the discretion of a qualified biologist, limited encroachment into the buffer may occur for non-listed bird species but no disturbance of active nests or nesting activities is allowed per the Migratory Bird Treaty Act.

BIO-4 For work occurring during the Crotch's bumble bee nesting season between March 15 through September 15 where potential nesting habitat occurs, a pre-construction nesting survey shall occur prior to ground-disturbing or vegetation-trimming activities within the Project's work area and a 50-foot buffer. A qualified Crotch's bumble bee biologist, whose resume has been submitted and approved by CDFW, will conduct a nest clearance survey within 2 weeks of ground-disturbing construction activities. Surveys shall be conducted during daylight hours when ambient temperatures are between 60 degrees Fahrenheit (°F) and 90 °F. In the event that a bumble bee nest is suspected (i.e bumble bee was observed to have entered a burrow or tree cavity, or

disappeared under a shrub or into thatch), the suspected nest location will be passively observed for at least 20 minutes to confirm the presence/absence of a nest. A minimum 50-foot no disturbance buffer will be established and visibly flagged for avoidance if a nest location is discovered and the discovery shall be reported to CDFW by the qualified Crotch's bumble bee biologist within 24 hours of discovery. If Crotch's bumble bee and/or Crotch's bumble bee nests are detected, surveys should record the location of the nest, nest substrate, slope, aspect, and distance to nearest active foraging areas (if known), number of Crotch's bumble bee observed, and vegetation used by individuals. During active construction, the Crotch's bumble bee biologist will monitor the nest on a weekly basis and will update the buffer size as necessary and in coordination with CDFW to ensure protection. Construction activities will not occur within the buffer until the nest is no longer active as determined by the qualified Crotch's bumble bee biologist[2] and CDFW will be notified prior to deactivation of the avoidance buffer and commencement of construction activities in this area. The Crotch's bumble bee qualified biologist shall submit results of preconstruction surveys to CDFW prior to start of vegetation removal activities and shall provide a weekly status update should a Crotch's bumble bee nest no disturbance buffer be established and until the nest is determined to be no longer active.

BIO-5 Herbicide and insecticide use shall be limited to spot spraying individual plants that are not in bloom and avoiding all rodent burrows to the greatest extent possible within suitable Crotch's bumble bee nesting areas. The qualified Crotch's bumble bee biologist will review the proposed spray areas with OCWR and contractor to ensure burrows and nectar sources are avoided to the greatest extent possible.

BIO-6 Temporary impacts to nectar sources shall be restored in place through either broadcasting of appropriate Crotch's bumble bee seed mix[3] or by incorporating the seed mix into a hydro-mulch application. Minor vegetation trimming to preferred nectar sources, that are expected to recover naturally within one year, do not require restoration.

BIO-7 A qualified Crotch's bumble bee biologist shall attend the pre-construction meeting (see BIO-2) to educate construction staff (including supervisors, equipment operators, other site employees, and biological monitors) on all Crotch's bumble bee specific mitigation measures required by this Crotch's Bumble Bee Avoidance Plan. Training Materials (tri-fold colored pamphlet) shall be provided at the training and shall include

[2] Monitoring periods of 1 hour for 3 consecutive days shall be conducted by the qualified Crotch's bumble bee biologist and shall be determined "no longer active" if no activity has been observed and supported by lack of observation of gynes and/or males foraging.

[3] Outside of fuel modification areas, the appropriate seed mix shall include at least one annual and perennial species of preferred nectar sources, that are region-specific herbs/shrubs from the following plant list: sages (*Salvia* spp.), buckwheat (*Eriogonum* spp.), lupines (*Lupinus* spp.), legumes (Fabaceae family), owl's clover (*Orthocarpus* spp.), and milkweed (*Asclepias* spp.). Within fuel modification areas, the seed mix will contain suitable nectar sources that are consistent with the Orange County Fire Authority (OCFA) Fuel Modification Zone Plant List (see Appendix C4, Crotch's Bumble Bee Habitat Avoidance Plan, Appendix B). The plant palette should be developed in conjunction with the Crotch's bumble bee qualified biologist and the OCWR biologist and approved by CDFW to develop a seed mix that satisfies all restoration/stabilization requirements.

detailed photos[4] that can be utilized as a reference for qualified biological monitors to identify Crotch's bumble bee and implement the avoidance measures appropriately. Training Materials will assist in training contractor staff in recognizing bumble bees and inform them of potential penalties (e.g., monetary fines, project delays, jail time) for take of Crotch's bumble bee or other California Endangered Species Act (CESA) violations.

BIO-8 CDFW shall be notified at least 14 calendar days prior to initial vegetation removal and ground-disturbing activities in areas identified as potential Crotch's bumble bee nesting, foraging, or overwintering habitat, regardless of time of year. All Crotch's bumble bee detections shall be reported to CDFW via email within 24 hours of detection. A qualified biological monitor who has received the Crotch's bumble bee training and is in possession of the Training Materials shall monitor the staking of limits, clearing and grubbing, and removal of stockpiled vegetation from the site until the site no longer provides potential Crotch's bumble bee habitat. The biological monitor shall be responsible for monitoring Crotch's bumble bee when they are detected and shall ensure active foraging patches are not removed until the Crotch's bumble bee(s) leave the area on their own volition. The biological monitor, shall monitor the slow and methodical removal of vegetation in patches and by hand where necessary should Crotch's bumble bee nesting or overwintering behavior be observed (scanning the ground instead of targeting flowering resources, seen entering a burrow or disappearing into thick vegetation and not re-emerging, sitting on the open ground), until it is confirmed that a Crotch's bumble bee nest or overwintering site is not present. Should the Project result in unpermitted take of a Crotch's bumble bee individual or nest, work shall immediately halt and CDFW shall be immediately notified by the Crotch's bumble bee biologist.

CUL-1 Environmental Training – Prior to construction of the Project, a Secretary of Interior-qualified archaeologist shall be retained by Bowerman Power to serve as the Project Archaeologist. Cultural resource awareness training shall be provided by the Project Archaeologist that includes all applicable laws and penalties pertaining to disturbing cultural resources, a brief discussion of the prehistoric and historic regional context and archaeological sensitivity of the area, types of cultural resources found in the area, and instruction that Project workers shall halt construction if a cultural resource is inadvertently discovered during construction, and Project personnel contact information in the event of an inadvertent discovery.

CUL-2 Archaeological Monitoring – A qualified Archaeological monitor acceptable to the OCWR shall be retained by Bowerman Power prior to Project-related ground disturbance. The selection of the qualified professional(s) shall be subject to OCWR acceptance based on generally accepted professional qualifications and certifications, as applicable. A qualified Archaeological Monitor shall have at least a BS or BA degree

[4] Appendix C4, Crotch's Bumble Bee Habitat Avoidance Plan, Appendix C.

in anthropology, archaeology, historic archaeology, or a related field and previous monitoring experience. The monitors shall conduct on-site daily archaeological monitoring of construction ground disturbance. The Archaeological monitor will provide daily documentation of construction activity and any findings. The Archaeological monitor shall prepare a daily monitoring log and submit it daily to the Project Archaeologist via email, briefly describing the field conditions, construction progress and activities, non-compliance activities, and record any finds of archaeological material. A final report summarizing the monitoring activities shall be prepared by the Project Archaeologist.

CUL-3 Monitoring and Inadvertent Discovery Plan – Prior to the start of construction, a Secretary of Interior-qualified Project Archaeologist (retained by Bowerman Power) shall prepare a Monitoring and Inadvertent Discovery Plan (Plan) for the Project. The Plan shall be submitted to OCWR for review and approval prior to the start of construction. The Plan shall include at a minimum:

- Overview of mitigation measures and responsibility for compliance;
- Project description of construction activities and maps;
- Description of relevant laws and regulations;
- Brief cultural context information and types and description of cultural resources that could be inadvertently discovered;
- Description of how monitoring shall occur;
- The roles and responsibility of the Archaeological Monitor (e.g., authority to halt construction for an inadvertent discovery, daily monitoring, daily reporting, etc.) and Project Archaeologist (e.g., oversee monitors, response to inadvertent discovery, final reporting, etc.);
- Description of protocols in the event of an inadvertent discovery (i.e., halt work) and notification procedures and contact list; and
- Description of final monitoring report.

Stop work protocols shall be implemented in the event of an inadvertent discovery of cultural resources. If a cultural resource is encountered within the new SoCalGas pipeline route, halt work protocols shall include notifying the SoCalGas Project Archaeologist designated by SoCalGas and the OCWR Environmental Engineering Specialist designated by OCWR. Cultural resources shall not be relocated without consultation with a SoCalGas Archaeologist.

GEO-1 Worker Education Program. The project proponent shall retain a qualified paleontologist, defined as a paleontologist meeting the Society for Vertebrate Paleontology's Professional Standards (SVP 2010), to carry out all mitigation measures related to paleontological resources. The qualified paleontologist shall conduct the following:

a. Prior to the start of any ground disturbing activities, the qualified paleontologist shall conduct a Paleontological Resources Awareness Training program for all construction personnel working on the project site. A Paleontological Resources Awareness Training Guide approved by the qualified paleontologist shall be provided to all personnel. A copy of the Paleontological Resources Awareness Training Guide shall be submitted to the OCWR. The training guide may be presented in video form.

b. Paleontological Resources Awareness Training may be conducted in conjunction with other awareness training requirements.

c. The training shall include an overview of potential paleontological resources that could be encountered during ground disturbing activities to facilitate worker recognition, avoidance, and subsequent immediate notification to the qualified paleontologist for further evaluation and action, as appropriate; and penalties for unauthorized artifact collecting or intentional disturbance of paleontological resources.

d. The project operator shall ensure all new employees who have not participated in earlier Paleontological Resources Sensitivity Trainings shall meet the provisions specified above.

e. The Paleontological Resources Awareness Training Guides shall be kept available for all personnel to review and be familiar with as necessary.

GEO-2 Project Monitoring. A qualified paleontologist or designated monitor shall be onsite initially to spot-check excavations below a depth of one foot below the ground surface in areas of undetermined paleontological potential. If it is determined that sediments consist of older alluvium, then full-time paleontological monitoring shall ensue within that area. If sediments are determined to consist of Holocene Quaternary alluvium, paleontological monitoring shall not be required unless an excavation depth of 15 feet below the ground surface is reached in the area. The use of post-driving or rotary drilling shall not require monitoring.

a. The duration and timing of monitoring shall be determined by the qualified paleontologist in consultation with OCWR and shall be based on a review of geologic maps and grading plans.

b. During the course of monitoring, if the paleontologist can demonstrate based on observations of subsurface conditions that the level of monitoring should be reduced, the paleontologist, in consultation with OCWR, may adjust the level of monitoring to circumstances, as warranted.

c. Paleontological monitoring shall include inspection of exposed rock units during active excavations within sensitive geologic sediments. The qualified paleontologist shall have authority to temporarily divert excavation operations

away from exposed fossils to collect associated data and recover the fossil specimens if deemed necessary.

d. Following the completion of construction, the paleontologist shall prepare a report documenting the absence or discovery of fossil resources onsite. If fossils are found, the report shall summarize the results of the inspection program, identify those fossils encountered, recovery and curation efforts, and the methods used in these efforts, as well as describe the fossils collected and their significance. A copy of the report shall be provided to OCWR and to an appropriate repository such as the Natural History Museum of Los Angeles County.

GEO-3 Inadvertent Discoveries of Paleontological Resources — If construction staff or others observe previously unidentified paleontological resources during ground disturbing activities, they will halt work within a 200-foot radius of the find(s), delineate the area of the find with flagging tape or rope (may also include dirt spoils from the find area), and immediately notify a qualified paleontologist. Construction will halt within the flagged or roped-off area. The paleontologist shall assess the resource as soon as possible and determine appropriate next steps in coordination with OCWR. Such finds shall be formally recorded and evaluated. The resource shall be protected from further disturbance or looting pending evaluation.

TCR-1 Should evidence of human remains be discovered during project construction, the Orange County Coroner (OCC) shall be immediately notified of the discovery. Evidence of human remains requires mandatory compliance with the provisions of State Health and Safety Code Section 7050.5, which restricts further disturbance in the vicinity of the discovery, defined herein as a 50-foot radius, until the OCC has made a determination within two business days of the origin and disposition pursuant to Public Resources Code Section 5097.98. If the remains are determined to be Native American, the OCC shall notify the Native American Heritage Commission (NAHC) within 24 hours that remains have been discovered. The NAHC shall determine the identity of the Most Likely Descendant (MLD). The MLD shall complete the inspection of the remains within 48 hours of notification by the NAHC. In addition, per CR-3, SoCalGas Project Archaeologist designated by SoCalGas and the OCWR Environmental Engineering Specialist designated by OCWR will be notified of the discovery.

TCR-2 If unanticipated tribal cultural resources or deposits are discovered during earth-moving activities, the following measures shall be implemented:

- All work shall halt within a 200-foot radius of the discovery. a qualified professional archaeologist shall assess the significance of the find (if a tribal cultural monitor is not present). If the resources are Native American in origin, the OCWR shall coordinate with the Tribe regarding evaluation, treatment, curation and preservation of these resources. The archaeologist shall have the authority to modify the no-work radius as appropriate, using professional judgment in consultation with OCWR. Work shall not continue within the no-work radius until

the archaeologist conducts sufficient research, evidence and data collection to establish that the resource is either: (1) not cultural in origin; or (2) not potentially eligible for listing on the California Register of Historical Resources.

TCR-3 Tribal Cultural Resource Monitor: Prior to the issuance of any grading permit in which soil would be disturbed, Montauk shall provide evidence in the form of an executed Agreement to OCWR that they have retained a qualified Native American tribal monitor to provide third-party monitoring during excavation and grading activities and to recover and catalogue tribal resources as necessary. The tribal monitor shall be from or approved by the Kizh Nation. The agreement shall include (i) professional qualifications for the tribal cultural resource monitor(s); (ii) detailed scope of services to be provided including but not limited to pre-construction education, observation, evaluation, protection, salvage, notification, and/or curation requirements, as applicable, with final documentation/monitoring report to OCWR, as applicable; (iii) contact information; (iv) communication protocols between Contractor and Tribal Cultural Resource Monitor; (v) acknowledgment that if the Kizh Nation monitor is not available, Montauk or their contractor as designee may contract with another qualified tribal monitor acceptable to the OCWR. The selection of the qualified professional(s) shall be subject to OCWR acceptance based on generally accepted professional qualifications and certifications, as applicable. The cover sheet of the grading plans shall include a note to identify that third party tribal monitoring is required during excavation and grading activities in accordance the with the OCWR Agreement.

2.3 Project Objectives

The objectives of the Project include the following:

- Safely produce RNG from LFG that is natively created by the FRB Landfill and deliver it to SoCalGas;
- Allow for the beneficial reuse of existing and future LFG collected by FRB Landfill in a manner that furthers the long-term sustainability goals of the area;
- Provide the most feasible and cost-effective method of transporting LFG from FRB Landfill to SoCalGas;
- Assist Orange County in reducing its dependence on fossil fuels and become more sustainable and energy independent;
- Contribute to goals of the California Public Utilities Commission Renewable Gas Procurement Standard to procure RNG made by methane from organic waste from landfills and other sources;
- Reduce the amount of LFG being flared at the FRB Landfill;
- Reduce and quantify greenhouse gas (GHG) emissions from the FRB Landfill; and
- Minimize adverse environmental impacts.

2.4 Incorporation By Reference

Various technical studies, analyses, and reports were used in the preparation of this IS and are incorporated by reference in accordance with Section 15150 of the CEQA Guidelines. Information from these documents, which have been incorporated by reference, has been briefly summarized in the appropriate section(s) of this IS. The documents and other sources used in preparation of this IS are identified in Section 5.0, References.

2.5 Other Public Agencies Whose Approval Is Required

Other public agencies whose approval is expected to be required in the form of permits, financing approval, or participation agreements are as follows:

- South Coast Air Quality Management District – Permit to Construct (RNG Plant - Bowerman Power, new SoCalGas pipeline – SoCalGas), Dust Control (RNG Plant - Bowerman Power, new SoCalGas pipeline – SoCalGas), Plan Permit to Operate (RNG Plant - Bowerman Power)
- Santa Ana Regional Water Quality Control Board – Stormwater Pollution Prevention Plan for construction activities and development discharge (RNG Plant - Bowerman Power, new SoCalGas pipeline – SoCalGas)
- County of Orange – Conditional Use Permit (RNG Plant - Bowerman Power), Construction Permits (RNG Plant - Bowerman Power), Encroachment/Development Permit (new SoCalGas pipeline - SoCalGas)
- USFWS – coordination regarding NCCP (RNG Plant - Bowerman Power)
- CDFW – coordination regarding NCCP (RNG Plant - Bowerman Power)
- City of Irvine – Conditional Use Permit, Right of Way Permits, Construction Permits (new SoCalGas pipeline - SoCalGas)
- Caltrans – Encroachment Permit (SoCalGas new pipeline HDD construction- SoCalGas)
- Irvine Ranch Water District - Encroachment/Development Permit (SoCalGas new pipeline construction- SoCalGas)

2.6 Tribal Cultural Resources Consultation

In conformance with Assembly Bill 52 Tribal Consultation Requirements, OCWR notified the Native American Tribes/Tribal representatives that are traditionally and culturally affiliated with the Project area. OCWR sent Project notification to the following Tribes on August 15, 2023:

- Kizh Nation
- Juaneño Band of Mission Indians
- San Gabriel Band of Mission Indians
- Soboba Band of Luiseño Indians

One Native American Tribe, the Kizh Nation, requested consultation on this Project. Following this request, representatives from the Tribe and staff from OCWR engaged in consultation via telephone conference on October 17, 2023. OC Waste & Recycling sent the cultural resources report for the Project on May 24, 2024. The Kizh Nation representative provided comments on the report on May 28,

2024. These comments were incorporated into the cultural report and the final report was shared with the Tribe on July 8, 2024, and consultation was completed and closed out.

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 [PRC] Section 21083.3.2). Information may also be available from the California Native American Heritage Commission's (NAHC) Sacred Lands File per PRC Section 5097.94 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that PRC Section 21082.3(c) contains provisions specific to confidentiality.

3.0 ENVIRONMENTAL CHECKLIST

3.1 Environmental Factors Potentially Affected

The environmental factors checked would be potentially affected by this Project, involving impacts that are a "Potentially Significant Impact" as indicated by the checklist on the following pages.

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

3.2 Determination: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

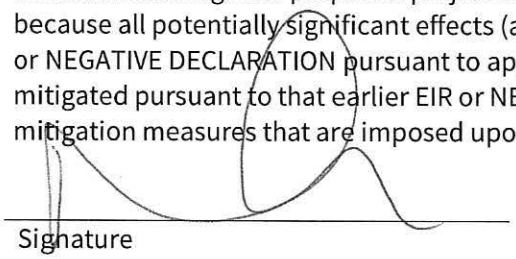
☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

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

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

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

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



Signature

8/22/2025

Date

Dagmar Barker

Print Name

3.3 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 off-site as well as on site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

(3) Once the lead agency has determined that a particular physical impact may occur, 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.

(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 (Section 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.

3.4 Environmental Impact Analysis

3.4.3 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?			X	
b.	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?			X	
c.	Expose sensitive receptors to substantial pollutant concentrations?		X	~~X~~	

An air quality impact study was conducted for the Project and is provided in Appendix B. The following summarizes the results and conclusions.

Existing Conditions:

Table 3-1 presents the maximum observed ambient background data for each pollutant and averaging time at the nearest representative monitoring station for the most recent data available. The nearest monitoring sites with available data (Central Orange County and Downtown Los Angeles) are located in an area that likely has higher ambient pollutant concentrations than the proposed Project site. The tabulated values were used to represent background levels for the indicated pollutants and averaging times in the Air Quality Impact Assessment (AQIA) to evaluate compliance with the California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS). The monitoring data indicates that air quality in the Project area complies with all NAAQS and CAAQS for NO2, CO, and SO2. However, the CAAQS and NAAQS are periodically exceeded in the Project area for PM2.5 and PM10.

Table 3-1. AQIA Background Concentrations

Pollutant	Averaging Time	Standard	Monitoring Station	Ambient Background Data (concentration units)					AAQS (concentration units)	Exceeds Standard?	Background Concentration Notes
				~~2020~~	2021	2022	2023	Summary			
NO_2 (Concentration Units = ppb)	1-Hour	California	SCAQMD; Central Orange County	~~70.9~~	67.1	53	50.9	67.1 ~~70.9~~	180	No	Highest of most recent 3 years.
	Annual	Federal	SCAQMD; Central Orange County	~~13.3~~	12.4	11.8	10.5	12.4 ~~13.3~~	53	No	Highest of most recent 3 years.
		California	SCAQMD; Central Orange County	~~13.3~~	12.4	11.8	10.5	12.4 ~~13.3~~	30	No	Highest of most recent 3 years.
CO (Concentration Units = ppm)	1-Hour	Federal	SCAQMD; Central Orange County	~~2.3~~	2.1	2.4	2.5	2.5 ~~2.4~~	35	No	Highest of most recent 3 years.
		California	SCAQMD; Central Orange County	~~2.3~~	2.1	2.4	2.5	2.5 ~~2.4~~	20	No	Highest of most recent 3 years.
	8-Hour	Federal	SCAQMD; Central Orange County	~~1.7~~	1.5	1.4	1.6	1.6 ~~1.7~~	9	No	Highest of most recent 3 years.
		California	SCAQMD; Central Orange County	~~1.7~~	1.5	1.4	1.6	1.6 ~~1.7~~	9	No	Highest of most recent 3 years.
SO_2 (Concentration Units = ppb)	1-Hour	Federal	EPA; Main St, Los Angeles	~~3~~	2	2	2	2 ~~2.3~~	75	No	The design value (=3-year average of 99th percentile of 1-hour daily max).
		California	EPA; Main St, Los Angeles	~~3.8~~	2.2	6.5	7.7	7.7 ~~6.5~~	250	No	Highest of most recent 3 years.
	24-Hour	California	EPA; Main St, Los Angeles	~~0.9~~	1.2	1.2	2.3	2.3 ~~1.2~~	40	No	Highest of most recent 3 years.
PM_{10} (Concentration Units = µg/m^3)	24-Hour	Federal	SCAQMD; Central Orange County	~~120~~	115	90	146	146 ~~120~~	150	No	Highest of most recent 3 years.
		California	SCAQMD; Central Orange County	~~120~~	115	90	146	146 ~~120~~	50	Yes	Highest of most recent 3 years.
	Annual	California	SCAQMD; Central Orange County	~~23.9~~	22.9	22.3	24	24 ~~23.9~~	20	Yes	Highest of most recent 3 years.

Pollutant	Averaging Time	Standard	Monitoring Station	Ambient Background Data (concentration units)					AAQS (concentration units)	Exceeds Standard?	Background Concentration Notes
				~~2020~~	2021	2022	2023	Summary			
$PM_{2.5}$ (Concentration Units = $\mu g/m^3$)	24-Hour	Federal	SCAQMD; Central Orange County	~~27.10~~	36.70	22.10	22.00	26.93 ~~28.63~~	35	No	The design value (=3-year average of 98th percentile of 24-hour daily max).
	Annual	Federal	SCAQMD; Central Orange County	~~11.27~~	11.4	9.87	9.07	11.4	9	Yes	Highest of most recent 3 years.
		California	SCAQMD; Central Orange County	~~11.27~~	11.4	9.87	9.07	11.4	12	No	Highest of most recent 3 years.

Notes: SCAQMD = South Coast Air Quality Management District

Discussion:

a. Would the project conflict with or obstruct implementation of the applicable air quality plans?

Less Than Significant Impact. The Project site (RNG Plant site and new SoCalGas pipeline route) is located in the South Coast Air Basin, comprising all of Orange County and the non-desert regions of Los Angeles, Riverside, and San Bernardino Counties. The South Coast Air Quality Management District (SCAQMD) is the agency primarily responsible for comprehensive air pollution control in the South Coast Air Basin and reducing emissions from area and point sources, mobile, and indirect sources. The SCAQMD prepared the 2022 Air Quality Management Plan (AQMP) to meet federal and State ambient air quality standards. The 2022 AQMP contains a comprehensive list of pollution control strategies directed at reducing emissions and achieving ambient air quality standards. These strategies are developed, in part, based on regional population, housing, and employment projections prepared by the Southern California Association of Governments (SCAG). SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial Counties and addresses regional issues relating to transportation, the economy, community development, and the environment. With regard to future growth, SCAG has prepared the 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (2020-2045 RTP/SCS), which provides population, housing, and employment projections for cities under its jurisdiction. These growth projections are based in part on projections originating under County and City General Plans. These growth projections were utilized in the preparation of the air quality forecasts and consistency analysis included in the 2022 AQMP. The 2020-2045 RTP/SCS was approved in September 2020.

The 2022 AQMP was adopted by the SCAQMD Governing Board on December 2, 2022, as a program to lead the South Coast Air Basin into compliance with several criteria pollutant standards and other federal requirements. It relies on emissions forecasts based on demographic and economic growth projections provided by SCAG's 2020-2045 RTP/SCS. SCAG is charged by California law to prepare and approve "the portions of each AQMP relating to demographic projections and integrated regional land use, housing, employment, and transportation programs, measures and strategies." Projects whose growth is included in the projections used in the formulation of the AQMP are considered to be consistent with the plan and not to interfere with its attainment. The SCAQMD recommends that, when determining whether a project is consistent with the current AQMP, a lead agency must assess whether the project would directly obstruct implementation of the plan and whether it is consistent with the demographic and economic assumptions (typically land use-related, such as resultant employment or residential units) upon which the plan is based.

A significant air quality impact may occur if a project is inconsistent with the AQMP or would in some way represent a substantial hindrance to employing the policies or obtaining the goals of that plan. As shown in Table 3-2, the incremental emissions from the proposed Project do not exceed the SCAQMD's established thresholds of potential significance for air quality impacts. The proposed Project would provide a beneficial use for the LFG generated at the landfill and would be consistent with the goals and objectives of the AQMP. Therefore, the Project would not increase the frequency or severity of an air quality standards violation or cause a new violation. Furthermore, the Project is consistent with the land use and zoning designation through development of the proposed Project.

Table 3-2. AQIA Modeling Results for Project Operations

Pollutant	Averaging Time	Federal or State Standard	Modeled Concentration[1] (Concentration Units)	Background Concentration (Concentration Units)	Modeled + Background Concentration (Concentration Units)	CEQA Threshold (Concentration Units)	Significance
NO_2 (Concentration Units = ppb)	1-Hour[F]	California[1]	16.591~~0.825~~[F]	67.1~~70.9~~	83.7~~71.7~~	180	No ~~LTS~~
	Annual[E]	Federal	0.184~~0.027~~[E]	12.4~~13.3~~	12.6~~13.3~~	53	No ~~LTS~~
		California	0.184~~0.027~~[E]	12.4~~13.3~~	12.6~~13.3~~	30	No ~~LTS~~
CO (Concentration Units = ppm)	1-Hour[F]	Federal	0.045~~0.003~~[F]	2.5~~2.4~~	2.5~~2.4~~	35	No ~~LTS~~
		California	0.045~~0.003~~[F]	2.5~~2.4~~	2.5~~2.4~~	20	No ~~LTS~~
	8-Hour[F]	Federal	0.026~~0.001~~[F]	1.6~~1.7~~	1.6~~1.7~~	9	No ~~LTS~~
		California	0.026~~0.001~~[F]	1.6~~1.7~~	1.6~~1.7~~	9	No ~~LTS~~
SO_2 (Concentration Units = ppb)	1-Hour[E]	Federal	30.37~~2.135~~[F]	2~~2.3~~	32.4~~4.4~~	75	No ~~LTS~~
		California	40.89~~2.341~~[F]	7.7~~6.5~~	48.6~~8.8~~	250	No ~~LTS~~
	24-Hour[E]	California	5.157~~0.612~~[E]	2.3~~1.2~~	7.5~~1.8~~	40	No ~~LTS~~
PM_{10} (Concentration Units = µg/m^3)	24-Hour[F]	SCAQMD CEQA Significant Change Threshold	0.913~~.068~~[E]	–	–	2.5	No ~~LTS~~
	Annual[E]		0.071~~.010~~[E]	–	–	1	
$PM_{2.5}$ (Concentration Units = µg/m^3)	24-Hour[F]		0.913~~0.068~~[E]	–	–	2.5	

Notes:

1. The modeled concentration presented is the model predicted maximum hourly value using full NO_2 conversion. ~~Superscript E indicates elevated terrain AERMOD run; superscript F indicates flat terrain AERMOD run.~~
2. "E" indicates modeled concentration was higher in Elevated Terrain modeling run and is presented here. ~~The modeled concentration presented is the model predicted maximum hourly value using full NO2 conversion.~~
3. "F" indicates modeled concentration was higher in Flat Terrain modeling run and is presented here.

Because the Project would be consistent with the City's General Plan, it is also consistent with the regional growth projections adopted in the 2022 AQMP. Air quality emissions generated by the proposed Project are considered to be evaluated in the AQMP, and Project development in accordance with the City's General Plan would not conflict with or obstruct implementation of the regional 2022 AQMP. Thus, the proposed Project is not expected to conflict with or obstruct the implementation of the AQMP and SCAQMD rules. Therefore, impacts would be less than significant, and no mitigation is required.

Mitigation Measures: No mitigation is required.

b. Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

Less Than Significant Impact. To evaluate impacts, quantitative significance criteria established by the local air quality agency, such as the SCAQMD, may be relied upon to make significance determinations based on mass emissions of criteria pollutants.

A significant impact would occur if the proposed Project would violate any air quality standard or contribute substantially to an existing or projected air quality violation. Project construction emissions were estimated using CalEEMod, the statewide land use emissions computer model designed to quantify potential criteria pollutant and GHG emissions associated with both construction and operations from land use projects. According to the CalEEMod model results, as outlined in this report, overall construction (maximum daily emissions) for the proposed Project would not exceed the SCAQMD thresholds for the criteria pollutants ROG, NOx, CO, oxides of sulfur (SOx), and respirable and fine particulate matter (PM10 and PM2.5, respectively). As shown in Table 3-3, the Project is estimated to generate less than the SCAQMD threshold of 75 pounds per day ROG, 100 pounds per day NOx, 550 pounds per day CO, 150 pounds per day SOx, 150 pounds per day PM10, and 55 pounds per day PM2.5 during the construction phase and no mitigation is needed.

Table 3-3. Construction Emissions Summary and Significance Evaluation

Criteria Pollutants	Construction Emissions (pounds/day)	Threshold (pounds/day)	Significance
ROG (VOC)	20.9~~11.1~~	75	No ~~LTS~~
NOx	56.6~~56.8~~	100	No ~~LTS~~
CO	39.0~~50.0~~	550	No ~~LTS~~
SOx	0.22~~.16~~	150	No ~~LTS~~
Total PM10	16.4~~24.9~~	150	No ~~LTS~~
Total PM2.5	4.6~~6.5~~	55	No ~~LTS~~

Sources: SCAQMD 2023, CalEEMod version 2022.1.1.29. Yorke Engineering, LLC, ~~2024~~2025, see Appendix B,
Notes: Pounds/day are winter or summer maxima for planned land use. Total PM10/PM2.5 comprises fugitive dust plus engine exhaust.

The primary sources of operations phase emissions are the three stationary sources (i.e., thermal oxidizer, flare, and Internal Combustion Engine), on-road vehicles traveling to and from the site buildings, and operational activities such as landscape equipment, consumer products, and energy use. As shown in Table 3-4, the Project is estimated to generate less than the SCAQMD threshold of 55 pounds per day ROG, 55 pounds per day NOx, 550 pounds per day CO, 150 pounds per day SOx, 150

pounds per day PM10, and 55 pounds per day PM2.5 during the operational phase. As shown in Table 3-4, line G, the proposed Project will reduce emissions of criteria pollutants as compared to existing conditions and provide a beneficial use for the LFG generated from the landfill.

Table 3-4. Operational Emissions Summary and Significance Evaluation

Emission Source		Criteria Pollutant Emissions on Peak Operating Day[8] (pounds/day)					
		VOC	NOx	CO	SOx[9]	PM10[10]	PM2.5[10]
[A]	Baseline Existing LFG Flare Emissions[1] ~~(6,000 scfm LFG)~~	84.14~~25.92~~	304.37~~108.00~~	236.73~~259.20~~	140.94~~124.01~~	138.75~~52.70~~	138.75~~52.70~~
[B]	Proposed TOU[2]	4.33~~4.34~~	25.27~~25.29~~	57.75~~57.81~~	124~~124.26~~	5.16	05.16
[C]	Proposed Flare[3]	0.01	0.14	0.14	0.001	0.01	0.01
[D]	Proposed Engine[4]	0.66~~0.11~~	4.01~~0.70~~	6.69~~1.17~~	0.02~~0.00~~	0.40~~0.07~~	0.40~~0.07~~
[E]	Proposed Miscellaneous Operational Sources[5]	0.83~~0.75~~	0.32~~0.32~~	1.59~~1.59~~	0.00	0.12	0.05
[F] = [B + C + D + E]	**Proposed Project[6]**	**5.83~~5.22~~**	**29.74~~26.46~~**	**66.17~~60.72~~**	**124.28~~124.27~~**	**5.69~~5.37~~**	**5.62~~5.29~~**
[G] = [F] - [A]	**Proposed Project - Baseline Existing LFG Flare Emissions**	**-78.31~~-20.70~~**	**-274.63~~-81.54~~**	**-170.56~~-198.48~~**	**-16.65~~0.25~~**	**-133.07~~-47.34~~**	**-133.07~~-47.34~~**
[H]	SCAQMD Mass Daily Thresholds for Operation[7]	55	55	550	150	150	150
[G] > [H]?	Significance?	No ~~LTS~~	No ~~LTS~~	No ~~LTS~~	No ~~LTS~~	No ~~LTS~~	No ~~LTS~~

[1] Baseline is calculated as the emissions associated with the highest daily LFG consumption at the FRB Landfill's flare station for the prior two calendar years (2023 and 2024). Engines located at the existing Bowerman Power Plant are not affected by the proposed Project, and thus are not included in the baseline. ~~Baseline is calculated as the emissions from flaring 6,000 scfm LFG (~180 mmBtu/hr) for 24 hours at the Flare I-6 emission factors.~~

[2] Proposed TOU: 2,309 scfm Tail Gas 1 (~6.3 mmBtu/hr) + 883 scfm Tail Gas 2 (~6.1 mmBtu/hr) + 280 scfm Supplemental Fuel (~17.6 mmBtu/hr), 24 hours. Further information regarding tail gas compositions and fuel heat ratings are provided in Appendix B. ~~Proposed Time of Use (TOU): 2,315 scfm Tail Gas 1 (~6.4 mmBtu/hr) + 885 scfm Tail Gas 2 (~6.1 mmBtu/hr) + 280 scfm Supplemental Fuel (~17.6 mmBtu/hr), 24 hours. Note: RNG Plant inlet compression removes approximately 400 scfm moisture from the incoming LFG. The RNG Plant is projected to generate on the order of 2,400 scfm RNG. Tail Gas 1 + Tail Gas 2 + RNG = 2,315 scfm + 885 scfm + 2,400 scfm = 5,600 scfm. RNG Plant Inlet – Moisture Removal = 6,000 scfm – 400 scfm = 5,600 scfm.~~

[3] Proposed Flare: ~1.6 scfm Supplemental Fuel for natural gas pilot light (0.1 mmBtu/hr), 24 hours.

[4] Proposed Engine: Engine is natural gas fired and has a maximum permitted daily usage of 24 hours per day (including maintenance and testing and emergency use). ~~used for maintenance and testing.~~

[5] Proposed Miscellaneous Operational Sources: Includes Mobile, Area, and Energy sources from CalEEMod.

[6] Proposed Project: Proposed TOU + Proposed Flare + Proposed Engine + Proposed Miscellaneous Operational Sources.

[7] Source: SCAQMD (2023).

[8] Peak operating day with emergency engine usage is shown here. A typical day would not involve emergency generator usage. ~~, which is limited to maintenance and testing hours only.~~

[9] SOx EF is based on daily/hourly Best Available Control Technology (BACT) basis (85 ppm or 14.354 lb/mmscf). Proposed TOU SOx emissions include 100 percent of the Landfill Tail Gas SOx emissions + SOx from supplemental fuel. Proposed Flare SOx emissions include SOx from supplemental fuel.

[10] Total PM10 / PM2.5 comprises fugitive dust plus engine exhaust.

The proposed Project site is approximately 4.2 acres in SRA Zone 19 – Saddleback Valley. As a conservative estimate, the 2-acre screening lookup tables were used to evaluate NOx, CO, PM10, and PM2.5 impacts on nearby receptors. The nearest receptor is approximately 50 meters (165 feet) away from the proposed RNG facility. Therefore, the impact evaluation was performed using the closest distance within SCAQMD LST tables of 50 meters for construction. As shown in Table 3-5, on-site emissions from construction would meet the less than significant threshold passing criteria at the

nearest receptors (50 meters). ~~The nearest receptor is approximately 1,300 meters (4,200 feet) away from the proposed RNG Plant. Therefore, the impact evaluation was performed using the closest distance within SCAQMD Localized Significance Threshold (LST) tables of 500 meters for construction. As shown in in Table 3-5, on-site emissions from construction would meet the LST passing criteria at the nearest receptors (500 meters).~~

Table 3-5. Construction Localized Significance Threshold Evaluation

Criteria Pollutants	Construction Emissions (pounds/day)	Threshold (pounds/day)	Significant?
NOx	56.6~~56.8~~	127~~233~~	No
CO	39.0~~50.0~~	1,227~~8,454~~	No
PM10	16.4~~24.9~~	18~~129~~	No
PM2.5	4.6~~6.5~~	~~674~~	No

Sources: SCAQMD 2008a, CalEEMod version 2022.1.1.29.
Notes: SRA: Zone 19 – Saddleback Valley. 2-acre area, 50~~0~~ meters to receptor.

Additionally, the AQIA conducted shows that operational activities would not cause an exceedance of the NO2, SO2, or CO NAAQS or CAAQS. Furthermore, the model-predicted PM10 and PM2.5 concentrations from the operational sources would not exceed the 24-hour and annual significant change thresholds (see Table 3-2~~6~~). Thus, the proposed Project would not cause a violation of the NAAQS or CAAQS or contribute substantially to an existing air quality violation, and therefore, the proposed Project would have a less than significant impact on air quality.

SCAQMD Guidance

The SCAQMD's 2003 guidance on addressing cumulative impacts for air quality is as follows: "As Lead Agency, the SCAQMD uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in an Environmental Assessment or EIR [Environmental Impact Report]. […] Projects that exceed the project- specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant" (SCAQMD 2003).

CEQA Guidelines

As referenced above, the SCAQMD cumulative air quality significance thresholds are the same as the project-specific air quality significance thresholds. Because the criteria pollutant mass emissions impacts shown in Tables 3-2~~3~~ through 3-5~~6~~ would not be expected to exceed any of the SCAQMD air quality significance thresholds, cumulative air quality impacts from comparable development projects would also be expected to be less than significant. Therefore, potential adverse impacts from implementing the proposed Project would not be "cumulatively considerable" as defined by CEQA Guidelines Section 15064(h)(1) for air quality impacts. Per CEQA Guidelines Section 15064(h)(4), the mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed Project's incremental effects would be cumulatively considerable.

As shown in Tables 3-23 through 3-56, the proposed Project would result in a less than significant impact related to regional emissions, and no mitigation is required.

Table 3-6. AQIA Modeling Results for Project Operations

Pollutant	Averaging Time	Federal or State Standard	Modeled Concentration/1 (Concentration Units)	Background Concentration (Concentration Units)	Modeled + Background Concentration (Concentration Units)	CEQA Threshold (Concentration Units)	Significance
NO2 (Concentration Units = ppb)	1 Hour[F]	California/1	00.825[F]	070.9	071.7	180	No LTS
	Annual[E]	Federal	00.027[E]	013.3	013.3	53	No LTS
		California	00.027[E]	013.3	013.3	30	No LTS
CO (Concentration Units = ppm)	1 Hour[F]	Federal	00.003[F]	02.4	02.4	35	No LTS
		California	00.003[F]	02.4	02.4	20	No LTS
	8 Hour[E]	Federal	00.001[F]	01.7	01.7	9	No LTS
		California	00.001[F]	01.7	01.7	9	No LTS
SO2 (Concentration Units = ppb)	1 Hour[E]	Federal	02.135 [F]	02.3	04.4	75	No LTS
		California	02.341[F]	06.5	08.8	250	No LTS
	24 Hour[E]	California	00.612[E]	01.2	01.8	40	No LTS
PM10 (Concentration Units = µg/m^3)	24 Hour[F]	SCAQMD CEQA Significant Change Threshold	00.068[E]	–	–	2.5	No LTS
	Annual[E]		00.010[E]	–	–	1	
PM2.5 (Concentration Units = µg/m^3)	24 Hour[F]		00.068[E]	–	–	2.5	

/1 Superscript E indicates elevated terrain air quality dispersion modeling run; superscript F indicates flat terrain air quality dispersion modeling run.
/2 The modeled concentration presented is the model predicted maximum hourly value using full NO2 conversion.

Mitigation Measures: No mitigation is required.

c. Would the project expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant Impact with Mitigation Incorporated. A significant impact would occur if the proposed Project were to expose sensitive receptors to pollutant concentrations. The SCAQMD identifies the following as sensitive receptors: long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, childcare centers, and athletic facilities. There are residential land uses approximately 0.87 mile west of the Project site. The Project would be subject to grading and construction standards to mitigate air pollution and dust impacts. In addition, the Project would implement the mitigation measure MM AQ-1.

A Health Risk Assessment (HRA) was conducted for Project, see Section 4.0 of Appendix B. The construction HRA results predict that all health risk factors impacts would be less than the CEQA significance thresholds at all actual receptors. The operational HRA results predict that all health risk factors would be less than the CEQA significance thresholds at all actual receptors. As demonstrated

by the HRA, the Project is not expected to substantially contribute to pollutant concentrations or expose surrounding residences and other sensitive receptors during construction or operation. The Project is required to meet SCAQMD Rule 403 requirements for controlling fugitive dust, as well as the City's requirements for grading and construction related to air pollution. Therefore, with implementation of the proposed mitigation measure MM AQ-1, construction and operation of the Project would result in a less than significant impact for both localized and regional air pollution emissions~~, and no mitigation is required~~.

Mitigation Measures: ~~No mitigation is required.~~

MM AQ-1: Construction equipment greater than 350 HP for the trenching and pipeline construction phase must be equipped with Tier 4 Final engines.

3.4.4 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?		X		

A biological resources report, ~~and~~ wetlands delineation report, Crotch's bumble bee (*Bombus crotchii*) survey report, and Crotch's bumble bee avoidance plan, were conducted for the Project and are provided in Appendix C. The following summarizes the results and conclusions.

Existing Conditions:

Readily available information, including relevant literature, databases, agency web sites, various previously completed reports and management plans, GIS data, topographic maps, aerial imagery from public sources, and in-house records were reviewed to:

1. Assess habitats, special-status plant and wildlife species, jurisdictional waters, Critical Habitat, and wildlife corridors that may occur in and near the Project site; and
2. Identify local or regional plans, policies, and regulations that may apply to the Project.

The following data sources were accessed during the literature review.

- **California Department of Fish and Wildlife**
  - California Natural Diversity Database (CNDDB; CDFW 2025~~3~~a).
  - Biogeographic Information and Observation System (CDFW 2025~~3~~b).
- **U.S. Fish and Wildlife Service**
  - Critical Habitat Portal (USFWS 2023a).

  - National Wetlands Inventory and Wetlands Mapper (USFWS 2023b).
- **California Native Plant Society**
  - Rare Plant Inventory (CNPS 2023).
- **Other**
  - County of Orange Municipal Codes.
  - Natural Community Conservation Plan/Habitat Conservation Plan for the Central/Coastal Subregion of Orange County (County of Orange 1996).
  - iNaturalist (iNaturalist 2025)

A biological field survey and jurisdictional wetlands delineation were conducted at the Project site on June 19 and 20, 2023, which included the proposed Project RNG Plant, Fuel Modification Area, and the proposed SoCalGas pipeline. Although imported soil for the RNG Plant pad will come from the existing stockpile area on the FRB Landfill, this area was not surveyed in 2023. This area is already disturbed, and impacts have been analyzed by a separate project. No new biological impacts are anticipated from obtaining soil from the existing stockpile. Crotch's bumble bee surveys of the Project site (proposed Project RNG Plant, Fuel Modification Area, and the proposed SoCalGas pipeline) were also performed on March 19, April 22, and May 7, 2025.

The proposed Project RNG Plant and Fuel Modification Area is covered primarily by sagebrush scrub, with bands of coast live oak (*Quercus agrifolia*) habitat present. Sagebrush scrub covers about 73 percent of the Project RNG Plant and Fuel Modification Area. The dominant shrub within this habitat is California sagebrush (*Artemisia californica*). There is minimal to no tree canopy within this habitat. Coast live oak trees dominate along the slopes with an understory comprising non-native grasses. Within the sagebrush scrub and along the margins of the coast live oak habitat are populations of a California rare plant, intermediate mariposa lily (*Calochortus weedii* var. *intermedius*). In addition, within the bounds of the RNG Plant is an approximately 35-foot-wide, unvegetated concrete channel. Multiple smaller concrete-lined channels of approximately one-foot width run downslope from the existing Landfill Gas to Energy plant or Bee Canyon Road into the wider concrete channel. Soils covered in natural vegetation were generally loose and gravelly within the Project RNG Plant and vicinity, and small mammal burrows were sparse due to dense vegetation coverage.

The proposed pipeline impact area will be limited to the existing developed roads. Directly outside of the proposed pipeline area are some naturally occurring (i.e., sagebrush scrub) or naturalized habitats (i.e., eucalyptus [*Eucalyptus* sp.] grove), as well as artificial (i.e., ornamental trees) and disturbed habitats. Ornamental trees included typical roadside species such as acacias (*Acacia* spp.) and conifers (*Pinus* spp.).

One raptor species, red-tailed hawk (*Buteo jamaicensis*), was observed during the surveys, as well as other common bird species that may nest in the Project RNG Plant, Fuel Modification Area, or in the vicinity of the proposed pipeline such as Anna's hummingbird (*Calypte anna*), common raven (*Corvus corax*), northern mockingbird (*Mimus polyglottos*), and song sparrow (*Melospiza melodia*). However, no nests were observed during the survey. One reptile, western fence lizard (*Sceloporus occidentalis*), and

various common invertebrates were also observed such as honeybees (*Apis* sp.) and tarantula hawks (*Pepsis* sp.).

One queen Crotch's bumble bee was observed foraging in the landscaped plants along the landfill entry road during the March 19, 2025, survey. During the survey, it was determined that the entire Project site supports moderate to high quality foraging habitat for Crotch's bumble bee and potential nesting habitat. During the survey on April 22, 2025, no Crotch's bumble bee individuals were observed. During the May 7, 2025 survey, a second queen Crotch's bumble bee was observed foraging on a black sage (*Salvia mellifera*), approximately 50 feet from the RNG Plant site, along the proposed SoCalGas pipeline. Both Crotch's bumble bee individuals were not collecting or carrying pollen. No Crotch's bumble bee workers, males, or nests were detected during 2025 focused surveys.

Discussion:

a. Would the project 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 the U.S. Fish and Wildlife Service?

Less Than Significant With Mitigation Incorporated. A query of the CDFW CNDDB and CNPS Rare Plant Inventory was conducted to determine known occurrences of candidate, sensitive, or special-status species or habitats within the Project site or vicinity (CDFW 2025~~3~~a; CNPS 2023). The species presented in Table 3-6~~7~~ are those with potential of occurring within or adjacent to the site. Species that do not have habitat in the Project site, such as freshwater marsh and open water habitats, have not been included in the table.

Table 3-6~~7~~. Special-Status Species with Potential to Occur

Scientific Name	Common Name	Federal Status / State Status	Other Status
Plants			
Calochortus weedii var. *intermedius**	Intermediate mariposa-lily*	None / None	CRPR 1B.2, NCCP/HCP
Dudleya multicaulis	Many-stemmed dudleya	None / None	CRPR 1B.2
Lepidium virginicum var. *robinsonii*	Robinson's pepper-grass	None / None	CRPR 4.3
Monardella hypoleuca ssp. *intermedia*	Intermediate monardella	None / None	CRPR 1B.3
Amphibians			
Spea hammondii	Western spadefoot	None / SSC	NCCP/HCP
Reptiles			
Aspidoscelis hyperythra	Orange-throated whiptail	None / WL	NCCP/HCP
Crotalus ruber	Red-diamond rattlesnake	None / SSC	NCCP/HCP
Phrynosoma blainvillii	Coast horned lizard	None / SSC	None
Salvadora hexalepis virgultea	Coast patch-nosed snake	None / SSC	None
Birds			
Campylorhynchus brunneicapillus sandiegensis	Coastal cactus wren	None / SSC	NCCP/HCP
Icteria virens	Yellow-breasted chat	None / SSC	None
Polioptila californica californica	Coastal California gnatcatcher	FT / SSC	NCCP/HCP

Scientific Name	Common Name	Federal Status / State Status	Other Status
Vireo bellii pusillus	Least Bell's vireo	FE / SE	NCCP/HCP
Invertebrates			
Bombus crotchii	***Crotch's bumble bee***	***None / SC***	***None***

Notes:
* Intermediate mariposa-lily was observed during the biological survey within the Project RNG Plant in 2023.
FE = Federally Listed Endangered SSC = CDFW Species of Special Concern
FT = Federally Threatened WL = CDFW Watch List
SC = State Candidate SE = State Listed Endangered
NCCP/HCP = Central Coastal Subregion Natural Community Conservation Plan and Habitat Conservation Plan
California Native Plant Society, California Rare Plant Rank (CRPR)
1B = Plants Rare, Threatened, or Endangered in California and elsewhere
4 = Watch List: Plants of limited distribution
0.2 = Moderately threatened in California (20-80% occurrences threatened)
0.3 = Not very threatened in California (less than 20% of occurrences threatened)
Sources: CDFW 2025~~3~~a, CNPS 2023.

The biological field survey conducted in June 2023 assessed habitats and potential occurrence of candidate, sensitive, or special-status species. One special-status species, intermediate mariposa lily, was found during the survey. Intermediate mariposa lily is a CNPS California Rare Plant Rank 1B.2 species and Conditionally Covered Species under the Central Coastal Subregion NCCP/HCP. A population of this species with a total of 17 individuals occurred within the center of the proposed RNG Plant. In addition, a population with two individuals was found outside the RNG Plant and Fuel Modification Area near the existing Landfill Gas to Energy plant and flare station. The individuals within the RNG Plant would likely be impacted during Project construction. No other rare plants were found during the survey.

The western spadefoot (*Spea hammondii*) is a CDFW Species of Special Concern (SSC) and an Identified Species under the NCCP/HCP that has been previously documented about 0.3 mile south of the RNG Plant (CDFW 2025~~3~~a). The closest documented breeding habitat is about 1.5 miles northwest of the RNG Plant (CDFW 2025~~3~~a). Although there are no pools within the RNG Plant and Fuel Modification Area that would allow for breeding, upland habitat is present that may support transient individuals moving from breeding habitat to estivating habitat. This species is unlikely to occur in all habitats within the proposed pipeline area.

Orange-throated whiptail (*Aspidoscelis hyperythra*) is a CDFW Watch List species and is a Target Species under the NCCP/HCP. This species has been previously recorded less than about 0.1 miles of the RNG Plant (CDFW 2025~~3~~a). Preferred habitat characteristics for this species, including loose soils and coastal sage scrub and oak habitats, are present within the RNG Plant and Fuel Modification Area. This species may also occur adjacent to the proposed pipeline in sagebrush scrub areas.

Red-diamond rattlesnake (*Crotalus ruber*) is a CDFW SSC and an Identified Species under the NCCP/HCP. This species has been previously recorded about 2 miles northeast of the RNG Plant (CDFW 2025~~3~~a). Preferred habitats for this species are present within the RNG Plant and Fuel Modification Area including sagebrush scrub and oak habitats, and adjacent to the proposed pipeline in sagebrush scrub areas.

Coast horned lizard (*Phrynosoma blainvillii*) is a CDFW SSC that has been recorded about 2 miles northeast of the RNG Plant (CDFW 2025~~3~~a). Given the dense vegetation present throughout the RNG

Plant and Fuel Modification Area, the lack of ants and other insect prey species, and that no visible burrows or burrowing species were observed, coast horned lizard is unlikely to occur.

The coast patch-nosed snake (*Salvadora hexalepis virgultea*) is a CDFW SSC that has been recorded about 2 miles northwest of the RNG Plant (CDFW 2025~~3~~a). Preferred habitat characteristics for this species, including semi-arid brushy areas, are present within the RNG Plant, Fuel Modification Area, and adjacent to the proposed pipeline.

Special-status bird species that have been previously recorded within 2 miles of the RNG Plant include the following (CDFW 2025~~3~~a): coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*), yellow-breasted chat (*Icteria virens*), coastal California gnatcatcher (*Polioptila californica californica*), and least Bell's vireo (*Vireo bellii pusillus*). Minimal nesting habitat for coastal cactus wren occurs in the Project site but the species could forage on-site. Yellow-breasted chat and least Bell's vireo are unlikely to occur on-site since preferred habitat in proximity to water is not present. The coastal California gnatcatcher could nest and forage in the Project site and vicinity.

Crotch's bumble bee is a CDFW candidate for listing under the CESA; it is not a covered species under the NCCP/HCP. The species has been recently discovered near the landfill in Round Canyon, less than a mile east of the Project site, in April 2024 (however, no records less than a mile from the Project site were in the CNDDB prior to the records search and surveys conducted in 2023). Crotch's bumble bee has also been previously recorded within 5 miles to the east of the RNG Plant (CDFW 2025a) and along Bee Canyon Access Road and just north of this road, which is along the proposed pipeline route and west of the proposed RNG Plant (iNaturalist 2025). Preferred food plant genera include snapdragon, phacelia, clarkia, tree poppy, poppy, and buckwheat (Koch et al. 2012). Nuttall's snapdragon (*Antirrhinum nuttallianum*), Parry's phacelia (*Phacelia parryi*), California poppy (*Eschscholzia californica*), and California buckwheat (*Eriogonum fasciculatum*), which were observed at the Project site during the field surveys in June 2023, March 2025, and April 2025, are plant resources for Crotch's bumble bee. Crotch's bumble bee nesting habitat includes bare ground, abandoned rodent burrows or bird nests, thatched grasses, brush piles, rock piles, and fallen logs. Due to the dense vegetation, no bare ground or rodent burrows were observed in the proposed RNG Plant during the field survey in June 2023. Rock outcrops were present at the top of the steep slopes in the sagebrush scrub bordering the existing facility to the west. Overwintering habitat for Crotch's bumble bee may include leaf litter and woody forest edge but little is known about Crotch's bumble bee overwintering behavior. Leaf litter was observed in the Eucalyptus vegetation community along the pipeline route and may be present in the oak woodland understory at the proposed RNG Plant. Therefore, the Project site provides moderate to high quality foraging habitat for the Crotch's bumble bee, and Crotch's bumble bee may nest and/or overwinter in the Project site and vicinity.

The special-status species listed in Table 3-6~~7~~ could be impacted by Project construction activities including ground disturbance or vegetation clearing if present on-site. Intermediate mariposa lily was found on-site and is covered in the NCCP/HCP. Per requirements in the NCCP/HCP, if less than 20 individuals of intermediate mariposa lily are observed in the impact area, no mitigation would be required. If more than 20 individuals are observed, mitigation would be required. Mitigation Measure **BIO-1** would assume presence of 20 intermediate mariposa lily individuals and require an in-lieu fee to be paid via minor amendment to the NCCP/HCP and installation of silt fencing or flagging. Wildlife

species that have potential to occur at the Project site and vicinity that qualify as Target Species or Identified Species under the NCCP/HCP include western spadefoot, orange-throated whiptail, red-diamond rattlesnake, coastal cactus wren, coastal California gnatcatcher, and least Bell's vireo. Mitigation Measure **BIO-2** would require implementation of the Construction Minimization Measures required by the NCCP/HCP to minimize impacts to these species. Adhering to the requirements of the NCCP policies and procedures ensures no further mitigation is necessary. In addition, Mitigation Measure **BIO-3** would be implemented to protect raptors and nesting birds. Mitigation Measures BIO-4 through BIO-8 would be implemented to protect Crotch's bumble bee and avoid impacts to Crotch's bumble bee during Project construction activities. Therefore, with implementation of mitigation measures **BIO-1, BIO-2,** ~~and~~ **BIO-3**, BIO-4, BIO-5, BIO-6, BIO-7, and BIO-8**,** Project impacts to candidate, sensitive, or special-status species would be reduced to less than significant.

Mitigation Measures:

BIO-1 To address potential Project impacts to intermediate mariposa lily, an in-lieu fee shall be paid via minor amendment to the NCCP/HCP, as approved by USFWS and CDFW. The in-lieu fee will contribute to a management and monitoring program for rare plants in the Nature Reserve of Orange County.

Silt fencing or flagging shall be installed under the guidance of a biological monitor along the limits of coastal sage scrub areas that are immediately outside of the grading/impact limits. The silt fencing/flagging shall be used to minimize impacts to sensitive natural resources including special-status plant species and native plant communities outside and immediately adjacent to the grading limits. Construction activities and personnel will be restricted within these adjacent coastal sage scrub areas and a biological monitor will be present during the silt fence/flagging installation and removal.

BIO-2 Impacts to coastal sage scrub habitat shall occur outside the breeding and nesting season of the coastal California gnatcatcher (February 15 through July 15) to the extent practicable.

A pre-construction survey shall be conducted within the Project site and Fuel Modification Area to determine the presence/absence of coastal California gnatcatcher and coastal cactus wren prior to clearing or grading activities. The survey shall include a 100-foot buffer around the grading limits. Any coastal California gnatcatcher or coastal cactus wren observations shall be recorded and marked on the construction/grading plans.

All coastal sage scrub habitat outside of the Project impact area shall be fenced or marked with flagging materials prior to the commencement of grading. No construction access, parking, or storage of equipment or materials will be allowed within these areas.

A qualified biologist shall conduct and document a pre-construction meeting to educate construction staff (including supervisors, equipment operators, and other site employees) on all mitigation measures required for the Project.

A qualified biologist shall monitor the clearing of coastal sage scrub and oak woodland. USFWS/CDFW shall be notified at least 7 calendar days (preferably 14 calendar days) prior to clearing habitat occupied by Target/Identified Species, if observed. The qualified biologist shall ensure that clearing activities and earth-moving equipment do not harm coastal California gnatcatchers or coastal cactus wren. The biologist shall also ensure that these activities do not harm other species that may occur, including western spadefoot, orange-throated whiptail, red-diamond rattlesnake, and coast patch-nosed snake.

The access road(s) shall be sprayed with water on occasion to reduce dust accumulation on the leaves of coastal sage scrub species, as overseen by the biological monitor.

BIO-3 Avoid ground-disturbing and vegetation removal activities during the nesting bird season (February 15 to September 15). If these activities must occur during the nesting season, a pre-construction nesting bird survey shall be conducted by a qualified biologist on and within 300 feet of the Project construction area. The survey shall be conducted no more than 10 days prior to initiation of ground-disturbance, vegetation clearing, or construction activities and repeated between delays of greater than 10 days during the nesting season.

If an active nest is found, an appropriate no-disturbance buffer for the species shall be visibly established in the field by a qualified biologist (e.g., flagging, staking, caution tape). No ground-disturbing or vegetation removal activities shall occur within the buffer until the nesting season has ended or the nest is vacated and juveniles have fledged, as determined by the qualified biologist. At the discretion of a qualified biologist, limited encroachment into the buffer may occur for non-listed bird species but no disturbance of active nests or nesting activities is allowed per the Migratory Bird Treaty Act.

BIO-4 For work occurring during the Crotch's bumble bee nesting season between March 15 through September 15 where potential nesting habitat occurs, a pre-construction nesting survey shall occur prior to ground disturbing or vegetation trimming activities within the Project's work area and a 50-foot buffer. A qualified Crotch's bumble bee biologist, whose resume has been submitted and approved by CDFW, will conduct a nest clearance survey within two weeks of ground-disturbing construction activities. Surveys shall be conducted during daylight hours when ambient temperatures are between 60 °F and 90 °F. In the event that a bumble bee nest is suspected (i.e. bumble bee was observed to have entered a burrow or tree cavity, or disappeared under a shrub or into thatch), the suspected nest location will be passively observed for at least 20 minutes to confirm the presence/absence of a nest. A minimum 50-foot no

disturbance buffer will be established and visibly flagged for avoidance if a nest location is discovered and the discovery shall be reported to CDFW by the qualified Crotch's bumble bee biologist within 24 hours of discovery. If Crotch's bumble bee and/or Crotch's bumble bee nests are detected, surveys should record the location of the nest, nest substrate, slope, aspect, and distance to nearest active foraging areas (if known), number of Crotch's bumble bee observed, and vegetation used by individuals. During active construction, the Crotch's bumble bee biologist will monitor the nest on a weekly basis and will update the buffer size as necessary and in coordination with CDFW to ensure protection. Construction activities will not occur within the buffer until the nest is no longer active as determined by the qualified Crotch's bumble bee biologist[5] and CDFW will be notified prior to deactivation of the avoidance buffer and commencement of construction activities in this area. The Crotch's bumble bee qualified biologist shall submit results of preconstruction surveys to CDFW prior to start of vegetation removal activities and shall provide a weekly status update should a Crotch's bumble bee nest no disturbance buffer be established and until the nest is determined to be no longer active.

BIO-5 Herbicide and insecticide use shall be limited to spot spraying individual plants that are not in bloom and avoiding all rodent burrows to the greatest extent possible within suitable Crotch's bumble bee nesting areas. The qualified Crotch's bumble bee biologist will review the proposed spray areas with OCWR and contractor to ensure burrows and nectar sources are avoided to the greatest extent possible.

BIO-6 Temporary impacts to nectar sources shall be restored in-place through either broadcasting of appropriate Crotch's bumble bee seed mix[6] or by incorporating the seed mix into a hydro-mulch application. Minor vegetation trimming to preferred nectar sources, that are expected to recover naturally within one year, do not require restoration.

BIO-7 A qualified Crotch's bumble bee biologist shall attend the pre-construction meeting (see BIO-2) to educate construction staff (including supervisors, equipment operators, other site employees, and biological monitors) on all Crotch's bumble bee specific mitigation measures required by this Crotch's Bumble Bee Avoidance Plan. Training materials (tri-fold colored pamphlet) shall be provided at the training and shall include detailed photos[7] that can be utilized as a reference for qualified biological

[5] Monitoring periods of 1 hour for 3 consecutive days shall be conducted by the qualified Crotch's bumble bee biologist and a determination of "no longer active" shall be rendered if no activity has been observed and supported by lack of observation of gynes and/or males foraging.

[6] Outside of fuel modification areas, the appropriate seed mix shall include at least one annual and perennial species of preferred nectar sources, that are region-specific herbs/shrubs from the following plant list: sages (*Salvia* spp.), buckwheat (*Eriogonum* spp.), lupines (*Lupinus* spp.), legumes (Fabaceae family), owl's clover (*Orthocarpus* spp.), and milkweed (*Asclepias* spp.). Within fuel modification areas, the seed mix will contain suitable nectar sources that are consistent with the Orange County Fire Authority (OCFA) Fuel Modification Zone Plant List (see Appendix C4, Crotch's Bumble Bee Habitat Avoidance Plan, Appendix B). The plant palette should be developed in conjunction with the Crotch's bumble bee qualified biologist and the OCWR biologist and approved by CDFW to develop a seed mix that satisfies all restoration/stabilization requirements.

[7] Appendix C4, Crotch's Bumble Bee Habitat Avoidance Plan, Appendix C.

monitors to identify Crotch's bumble bee and implement the avoidance measures appropriately. Training Materials will assist in training contractor staff in recognizing bumble bees and inform them of potential penalties (e.g., monetary fines, project delays, jail time) for take of Crotch's bumble bee or other CESA violations.

BIO-8 CDFW shall be notified at least 14 calendar days prior to initial vegetation removal and ground disturbing activities in areas identified as potential Crotch's bumble bee nesting, foraging, or overwintering habitat, regardless of time of year. All Crotch's bumble bee detections shall be reported to CDFW via email within 24 hours of detection. A qualified biological monitor that has received the Crotch's bumble bee training and is in possession of the Training Materials shall monitor the staking of limits, clearing and grubbing, and removal of stockpiled vegetation from the site until the site no longer provides potential Crotch's bumble bee habitat. The biological monitor shall be responsible for monitoring Crotch's bumble bee when they are detected and shall ensure active foraging patches are not removed until the Crotch's bumble bee(s) leave the area on their own volition. The biological monitor, shall monitor the slow and methodical removal of vegetation in patches and by hand where necessary should Crotch's bumble bee nesting or overwintering behavior be observed (scanning the ground instead of targeting flowering resources, seen entering a burrow or disappearing into thick vegetation and not re-emerging, sitting on the open ground), until it is confirmed that a Crotch's bumble bee nest or overwintering site is not present. Should the project result in unpermitted take of a Crotch's bumble bee individual or nest, work shall immediately halt and CDFW shall be immediately notified by the Crotch's bumble bee biologist.

3.4.8 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?			X	

A greenhouse gas emissions impact study was conducted for the Project and is provided in Appendix B. The following summarizes the results and conclusions.

Existing Conditions:

GHGs – primarily CO2, methane (CH4), and nitrous oxide (N2O), collectively reported as carbon dioxide equivalents (CO2e) – are directly emitted from stationary source combustion of natural gas in equipment such as water heaters, boilers, process heaters, and furnaces. GHGs are also emitted from mobile sources, such as on-road vehicles and off-road construction equipment, burning fuels such as

gasoline, diesel, biodiesel, propane, or natural gas (compressed or liquefied). Indirect GHG emissions result from electric power generated elsewhere (i.e., power plants) used to operate process equipment, lighting, and utilities at a facility. Also, included in GHG quantification is electric power used to pump the water supply (e.g., aqueducts, wells, pipelines) and disposal and decomposition of municipal waste in landfills (CARB 2022a).

Discussion:

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

Less Than Significant Impact. Using CalEEMod, direct on-site and off-site GHG emissions were estimated for construction and operation of the Project, and indirect off-site GHG emissions were estimated to account for electric power used by the proposed Project, water conveyance, and solid waste disposal. In addition, stationary source emission calculations were performed for the RNG thermal oxidizer and the RNG flare, ~~as well as~~ emergency generator usage, fugitive emissions, as well as product gas combustion. ~~All CO2 derived from LFG is considered biogenic (i.e., are part of the natural biological/physical carbon cycle) and does not result in a net increase in atmospheric CO2. Therefore, for the tail gas streams, only the combustion byproducts of CH4 and N2O (i.e., anthropogenic GHGs) are included in this analysis.~~

The SCAQMD has officially adopted an industrial facility mass emissions threshold of 10,000 metric tons (MT) CO2e per year. Table 3-7 shows the incremental GHG emissions and evaluates them against SCAQMD significance thresholds. Operational measures incorporate typical code-required energy and water conservation features. Off-site traffic impacts are included in these emissions estimates, along with construction emissions amortized over 30 years.

Table 3-7. Greenhouse Gas Emissions Device Breakdown and Significance Evaluation

Emission Source		CO_2	CH_4	N_2O	R	Total CO_{2e}
[A]	Baseline Existing LFG Flare Station Emissions[1]	135,768	1.39	0.14	–	135,844
[B]	TOU/Flare[2] (from Tail Gas)	66,681	0.11	0.01	–	66,687
[C]	Off-site Combustion of Product Gas[3]	69,061	1.28	0.13	–	69,132
[D] = [B] + [C]	**Total GHGs associated with Proposed Landfill Gas Usage[4]**	**135,742**	**1.39**	**0.14**	**–**	**135,818**
[E]	TOU[2] (from Pilot Gas)	8,195	0.15	0.02	–	8,204
[F]	Flare[5] (from Pilot Gas)	46	0.00	0.00	–	46.51
[G]	Emergency Engine[6]	18	0.00	0.00	–	18.45
[H]	Fugitive Emissions[7]	1	12.23	–	–	306.44
[I]	Construction[8]	40	0.00	0.00	0.02	40.70
[J]	Miscellaneous Operational Sources[9]	148	0.46	0.01	0.98	162.17
[K] = [B + C + E + F + G + H + I + J]	**Proposed Project**	**144,191**	**14.23**	**0.16**	**1.00**	**144,596**
[L] = [K] – [A]	Proposed Project – Baseline Existing LFG Flare Emissions	**8,423**	**12.85**	**0.02**	**1.00**	**8,752**
[M]					SCAQMD GHG Threshold	10,000
Is [L] > [M]?					**Significant?**	**No**

Sources: SCAQMD 2008b, Yorke Engineering, LLC, 2025 (Appendix B), CalEEMod version 2022.1.1.29.

Notes:

[1] Baseline existing flare station emissions are based on total inlet flow rate of 6,000 scfm, the equivalent fuel rate being directed to the proposed RNG facility (Yorke Engineering, LLC, 2025, Appendix B), Continuous operation. The total inlet flow rate was separated into CO_2 and CH_4 components in the stream, with CO_2 emissions directly emitted from the flare and CH_4 combustion estimated using natural gas GHG emission factors.

[2] Proposed TOU: 2,309 scfm Process Gas 1 (~6.3 mmBtu/hr) + 883 scfm Process Gas 2 (~6.1 mmBtu/hr) + 280 scfm Supplemental Fuel (~17.6 mmBtu/hr), Continuous operation. The control of process gas is exclusively through the thermal oxidizer or the flare. Maximum GHG emissions results from the combustion of process gas from the TOU and Flare were evaluated in Appendix B. The combustion from the TOU, representing the maximum potential GHG emissions and normal operations is shown in this table.

[3] Off-site Combustion of Product Gas is based on 2,412 scfm product gas stream flowrate from PFD (Yorke Engineering LLC, 2025, Appendix B), Continuous operation.

[4] Note that the total GHGs associated with Proposed LFG usage is roughly equivalent to the GHGs from baseline LFG Flare Station

[5] Proposed Flare: ~1.6 scfm Supplemental Fuel (0.1 mmBtu/hr), Continuous operation. Off-Spec Flare Gas is not included since the flare will not be used concurrently with the Thermal Oxidizer, under which condition, only pilot gas consumption would occur at flare. Off-Spec Flare will only be operated in case of a system upset or if RNG is off-spec.

[6] Proposed Engine: Engine is natural gas fired and used for maintenance and testing.

[7] Fugitive Emissions: Component counts from Tent Engineering and SoCalGas, using SCAQMD Guidelines for Reporting VOC Emissions from Component Leaks, Continuous Leaking (SCAQMD 2015)

[8] Construction emissions shown in Appendix B (Yorker Engineering LLC) Table 3-9 (1,221 MT CO2e), amortized over 30 years.

[9] Miscellaneous Operational Sources: Include Mobile, Area, and Energy sources from CalEEMod.

~~**Table 3-8. Greenhouse Gas Emissions Summary and Significance Evaluation**~~

~~GHGs~~	~~Baseline (MT/yr)[1]~~	~~Construction (MT/yr)~~	~~Operation (MT/yr)~~ [2]	~~Total[2] (MT/yr)~~	~~Expected Net Change in Emissions (MT/yr)~~	~~Threshold (MT/yr)~~	~~Significance~~
~~Anthropogenic CO2~~	~~0~~	~~1,174.70~~	~~199.10~~	~~238.26~~	~~238.26~~	~~–~~	~~–~~
~~CH4~~	~~6~~	~~0.06~~	~~0.74~~	~~0.75~~	~~-4.80~~	~~–~~	~~–~~
~~N2O~~	~~1~~	~~0.06~~	~~0.06~~	~~0.06~~	~~-1.03~~	–	–
~~R~~	~~0~~	~~0.4~~	~~0.98~~	~~0.99~~	~~0.99~~	~~–~~	~~–~~
~~Anthropogenic Total (as CO2e)~~	~~464~~	~~1,194~~	~~236.89~~	~~276.70~~	~~-188~~	~~10,000~~	~~LTS~~

~~Sources: SCAQMD 2008b, Yorke 2024 (Appendix B), CalEEMod version 2022.1.1.26.~~

~~[1]All CO2 derived from LFG is considered biogenic and does not result in a net increase in atmospheric CO2. All CH4 and N2O emissions are anthropogenic and result in net increases in atmospheric GHG. Thus, the combustion byproducts of CH4 and N2O are included in this analysis.~~

~~[2]Total CO2e emissions comprises annual operational emissions plus construction emissions amortized over 30 years.~~

The proposed Project would provide a beneficial use and as shown in Table 3-~~8~~7, incremental GHG emissions would be below the proposed GHG significance threshold for land use projects.

Additionally, the Project will contribute to California Public Utility Commission's Renewable Gas Program to procure RNG made by methane from organic waste from landfills and other sources. By processing LFG into RNG and delivering it to SoCalGas, the Project will reduce the volume of LFG being flared and the associated GHG emissions from the flares. ~~reduce the volume of LFG being flared, and help reduce greenhouse gas (GHG) emissions from the FRB Landfill~~ The annual CH_4 emissions avoided from 6,000 scfm of LFG is equivalent to 30,051.4 metric tons of CH_4 per year. Based on 2020 Bowerman Landfill GHG data, the 2020 disposable quantity of 1,998,625 metric tons of waste resulted in 14,179.32 metric tons of CH_4. Based on this ratio and the Bowerman Landfill permitted capacity of 8,000 tons per day or 2.9 million metric tons per year, the 6,000 scfm of LFG collected and sent into the SCE pipeline would reduce the equivalent amount of CH_4 from waste collected at the landfill for an approximately 1.5-year period. ~~The RNG plant will have the capacity to process 6,000 standard cubic feet per minute of LFG which is equivalent to avoiding the GHG emissions from 60,196 tons of landfilled waste each year.~~ Thus, impacts would be less than significant.

Mitigation Measures: No mitigation is required.

3.4.19 Utilities and Service Systems

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project: Require or result in the relocation or construction of new or expanded water, wastewater				

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a.	treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?			X	

Existing Conditions:

Reclaimed water is supplied to the FRB Landfill by an Irvine Ranch Water District (IRWD) reclaimed water line that feeds into a 100,000-gallon reclaimed water tank, located adjacent to the FRB landfill administration building (about 400 feet north of the Project RNG site). Potable water is supplied by an IRWD potable water line that currently supplies water to the Bowerman Power Plant and the FRB Landfill site operations building and crew quarters. Sewage from the FRB landfill administration and crew quarters buildings currently goes to an on-site septic system and leach field. The Bowerman Power Plant is served by a separate on-site septic system and leach field.

Stormwater runoff generated within the FRB Landfill boundary is contained in concrete sedimentation basins owned, operated, and maintained by OCWR. Stormwater contained in the concrete detention basins discharge to the Bee Canyon Retarding Basin owned by the OCFCD via Bee Canyon Wash.

Electrical power service is provided by SCE and natural gas will be provided by SoCalGas. SCE, SoCalGas, and local telecommunications companies operate and maintain transmission and distribution infrastructure in the Project area.

Discussion:

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

Less Than Significant Impact. A Water Infrastructure and Availability Study was prepared for the Project; see Appendix D. The FRB Landfill is contractually obligated to provide non-potable water to Bowerman Power; therefore, it is assumed that the FRB Landfill's non-potable water use assumptions consider the demands of Bowerman Power. The RNG Plant will tie into the existing non-potable water system. Non-potable water demands will include handwashing stations and toilet flushing in the bathroom facilities. The bathroom facilities at Bowerman Power Plant utilize an on-site disinfection system. Non-potable water is pumped to a tank on top of the building housing the bathroom facilities and treated for potable use. Non-potable water used at the RNG Plant will be treated the same way. Due to the small number of employees, the limited hours of occupation, and the minimal demand for non-potable water in the RNG Plant bathroom facilities, the Project is anticipated to have minimal impacts on IRWD-owned non-potable water systems.

New on-site distribution lines will be needed for both potable and non-potable water systems, as well as a new collection line for the wastewater system (an on-site septic process) for the RNG Plant. Neither addition will cause significant changes in the volumes of water consumed or treatment capacity needs of the FRB landfill operations. No changes will be needed to the existing sediment basins within the FRB landfill, though a site-specific bioretention basin will be provided on the proposed Project site. Other utilities and service systems would require only minor connection modifications, which will all meet design and construction code requirements for the RNG Plant. The environmental effects associated with these necessary on-site utilities and service systems improvements will be in compliance with established regulatory requirements. Therefore, any environmental effects from the proposed utility improvements would be less than significant.

Mitigation Measures: No mitigation is required.

3.4.21 Mandatory Findings of Significance

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Mandatory Findings of Significance					
a.	Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?		X		
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.)			X	
c.	Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?		X	~~X~~	

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 Impact with Mitigation Incorporated. As discussed in Section 3.4.4, Biological Resources, with adherence to Mitigation Measures **BIO-1, BIO-2, ~~and~~ BIO-3, BIO-4, BIO-5, BIO-6,**

BIO-7, and BIO-8, the proposed Project would not have the potential to substantially degrade the quality of the existing environment, reduce habitat of fish or wildlife species, threaten plant or animal communities, and/or reduce the number or restrict the range of rare plants or animals.

In addition, as discussed in Section 3.4.5, Cultural Resources and 3.4.7, Geology and Soils, development of the FRB Landfill and associated infrastructure has disturbed the natural surface and subsurface deposits of the Project site and pipeline route. Intact cultural material may exist within undisturbed deposits. Adherence to Mitigation Measures **CUL-1, CUL-2, CUL-3**, **GEO-1, TCR-1, TCR-2, and TCR-3** would be required in the event unexpected resources are uncovered during the grading and excavation process. With implementation of recommended mitigation, the proposed Project is not expected to eliminate important examples of the major periods of California history or prehistory, and impacts would be less than significant.

Mitigation Measures: Mitigation Measures **BIO-1, BIO-2, BIO-3, BIO-4, BIO-5, BIO-6, BIO-7, BIO-8, CUL-1, CUL-2, CUL-3, GEO-1, TCR-1, TCR-2, and TCR-3.**

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 Impact. The Project would enable fuller utilization of the LFG gas generated at FRB Landfill that would otherwise be burned in the flares. The Project would not result in substantial population growth within the area, either directly or indirectly. Although the Project may incrementally affect other resources at a less than significant level, the Project's contribution to these effects is not considered "cumulatively considerable," in consideration of the relatively nominal impacts of the Project and the mitigation measures provided to lessen impacts. In addition, the proposed project will help reduce greenhouse gas emissions in the long-term by converting landfill gas that is currently flared into electricity, thereby utilizing a renewable energy resource. Therefore, cumulative impacts would be considered less than significant.

Mitigation Measures: No additional mitigation is required beyond what is already included previously.

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

Less than Significant Impact with Mitigation Incorporated. Previous sections of this Initial Study/Mitigated Negative Declaration reviewed the proposed Project's potential impacts related to aesthetics, air quality, geology and soils, greenhouse gases, hydrology/water quality, noise, hazards and hazardous materials, traffic, and other issues. As concluded in these previous discussions, with the implementation of mitigation measure **AQ-1**, the proposed Project would result in less than significant environmental impacts; therefore, the proposed Project would not result in environmental impacts that would cause substantial adverse effects on human beings and impacts would be less than significant.

Mitigation Measures: No mitigation is required.

4.0 LIST OF PREPARERS

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FIGURES

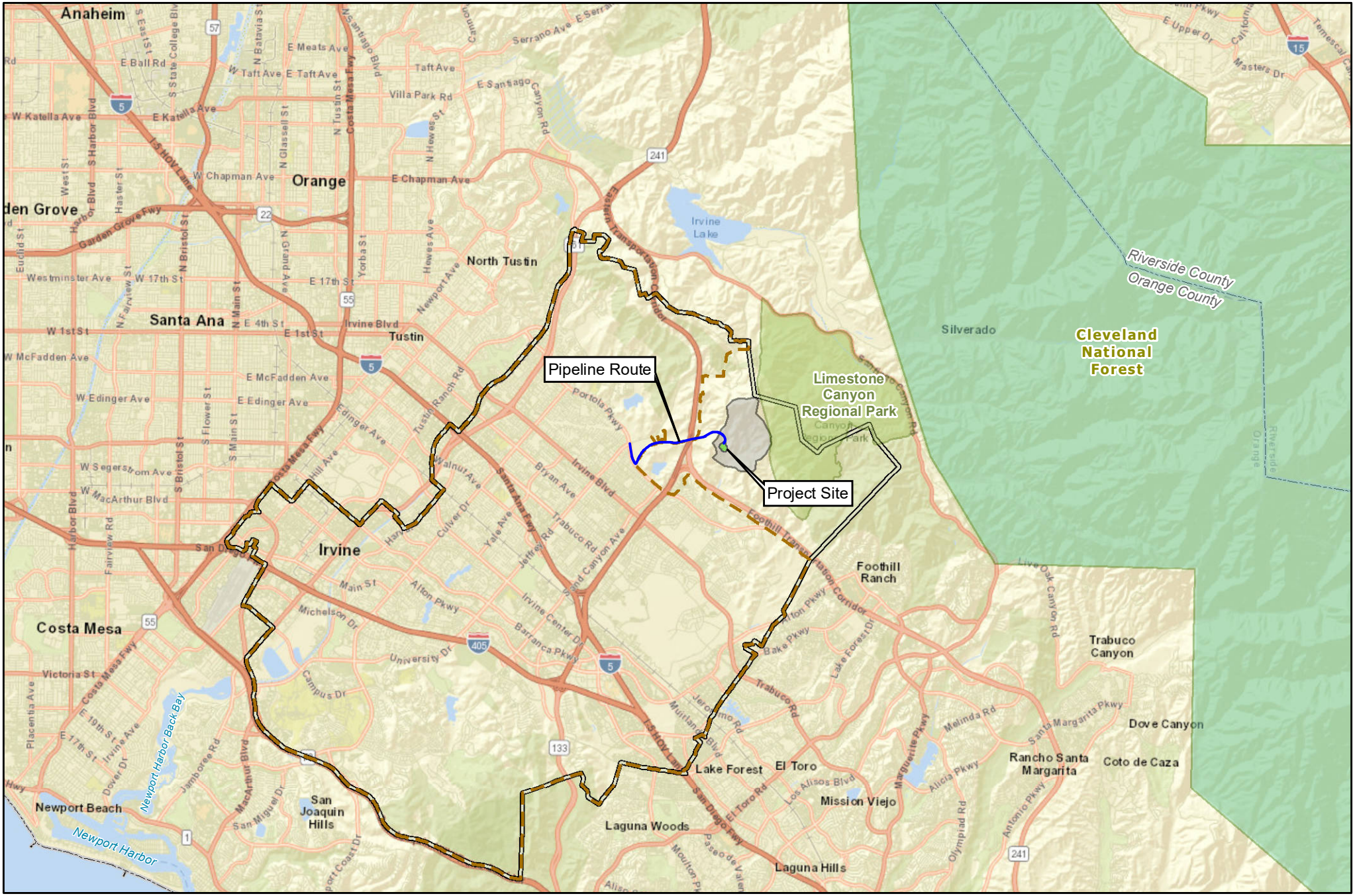
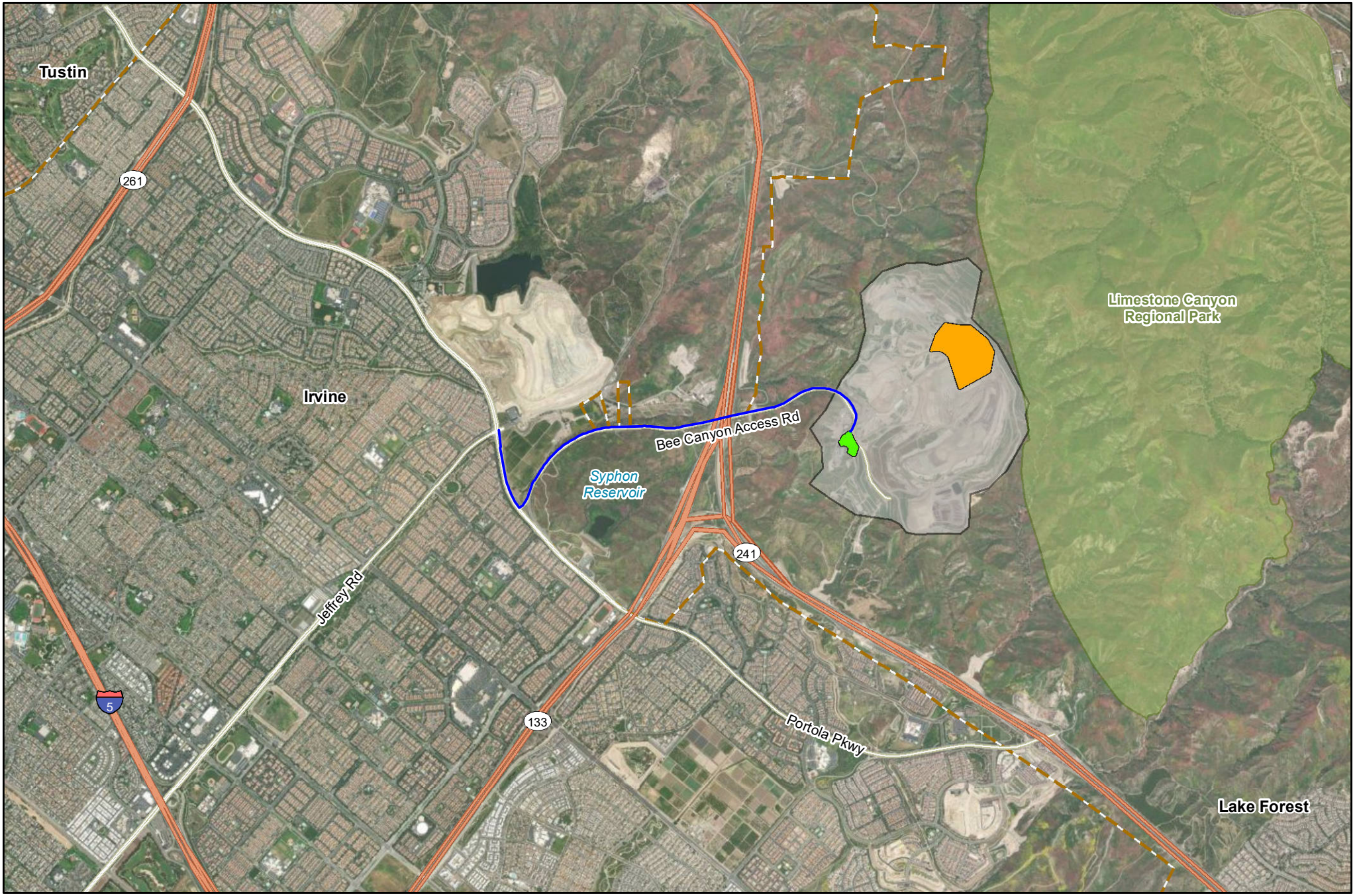


Figure 2-1
Project Vicinity

Bowerman Power RNG Plant Project
Orange County, CA



NOT FOR CONSTRUCTION

Figure 2-2
Project Location

Bowerman Power RNG Plant Project
Orange County, CA





Project Lease Boundary
Project Site
Pipeline Route

Bowerman Landfill
Bowerman Landfill Soil Stockpile Area

Disturbed Area for Grading Replanted for Fire Fuel Modification
Fuel Modification Area
Temporary Disturbed Area for Trenching
Fire Water Line

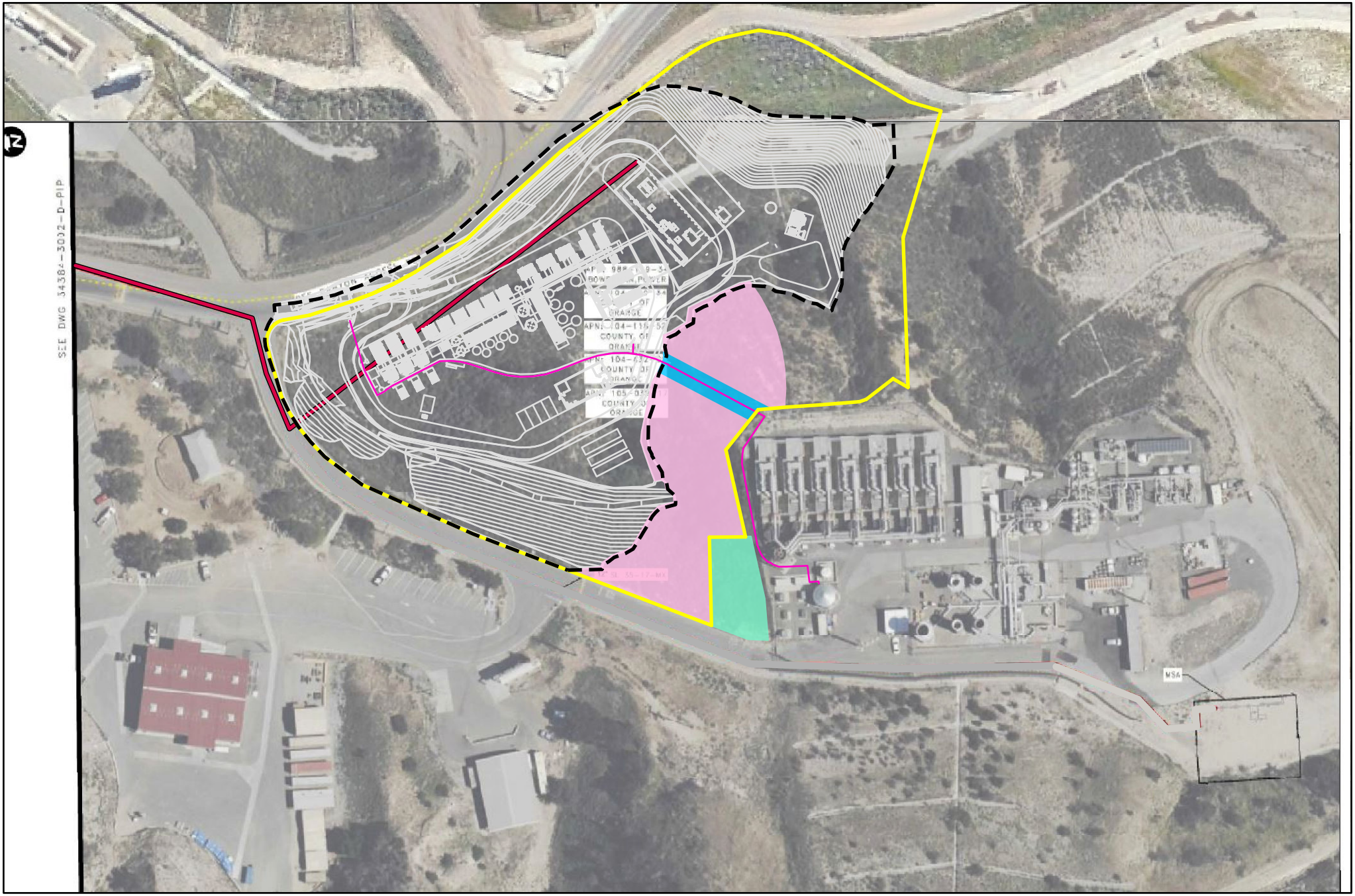
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NOT FOR CONSTRUCTION

Figure 2-3
Project RNG Plant Site and Borrow Area Locations

Bowerman Power RNG Plant Project
Orange County, CA





Pipeline Route (underground)

Project Lease Boundary

Project Site

NOT FOR CONSTRUCTION

Fire Water Line (underground)

Disturbed Area for Grading Replanted for Fire Fuel Modification

Fuel Modification Area

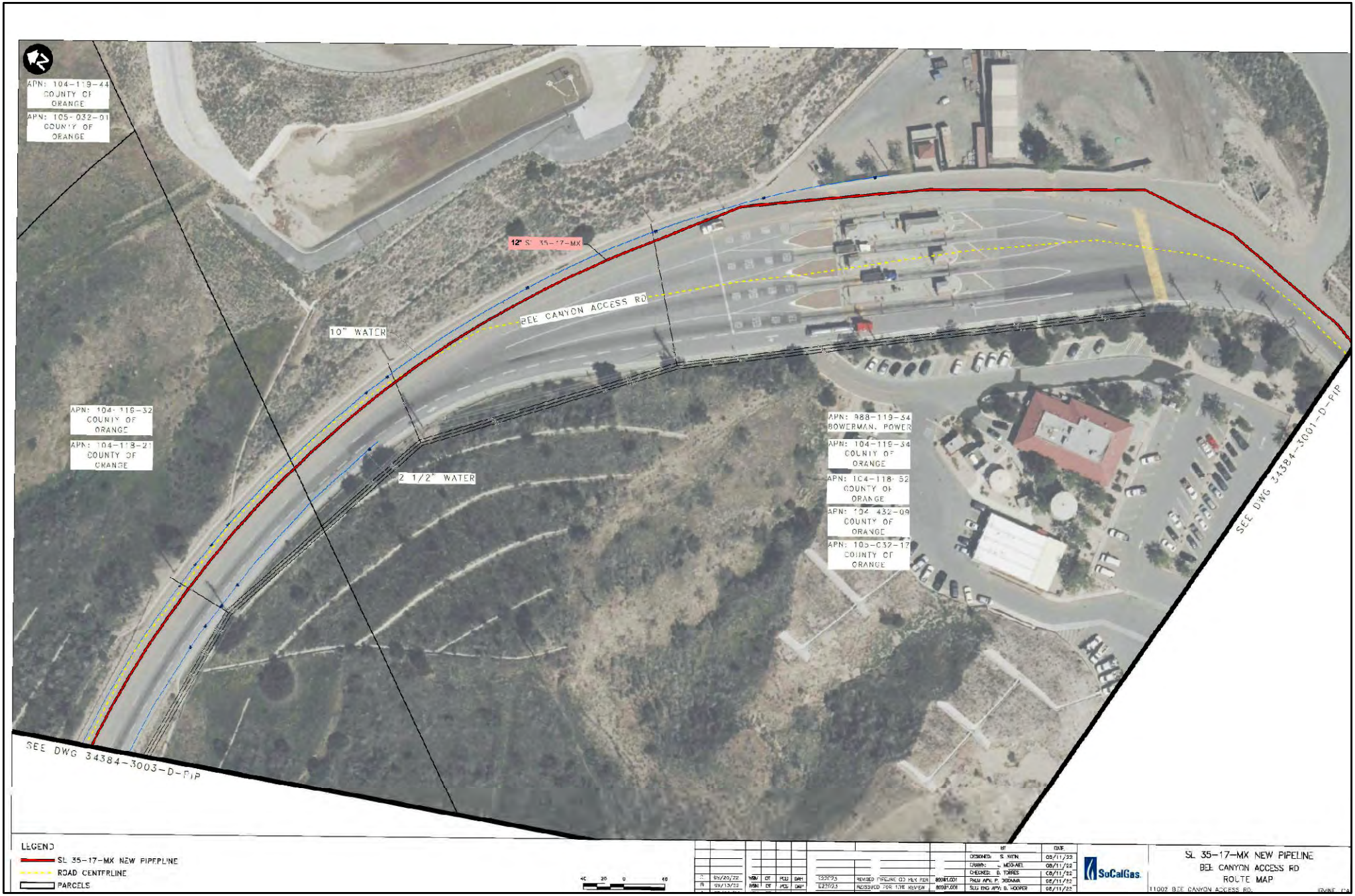
Temporary Disturbed Area for Trenching

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Figure 2-4.1
Pipeline Route
Sheet 1 of 12

Bowerman Power RNG Plant Project
Orange County, CA





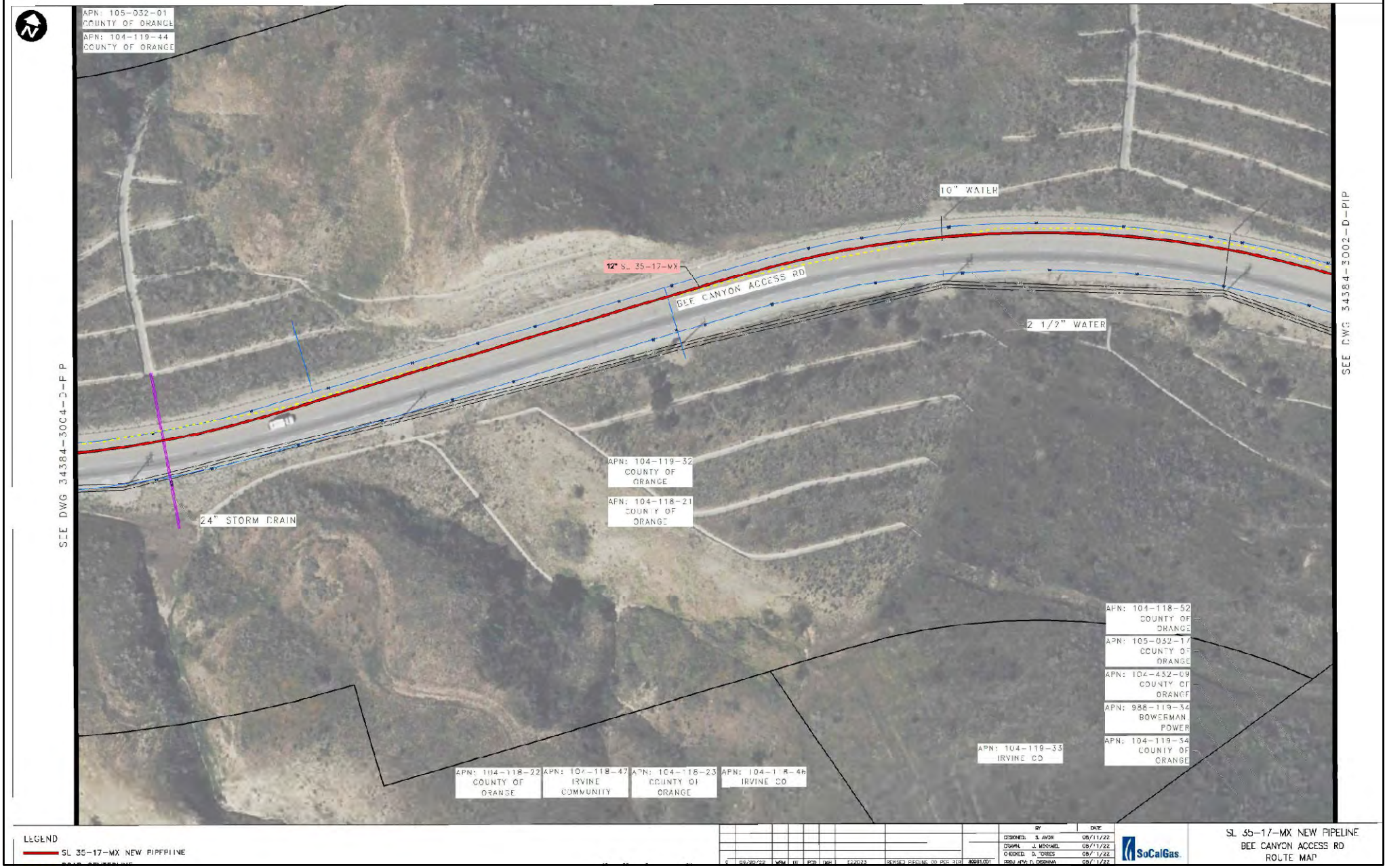
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Figure 2-4.2
Pipeline Route
Sheet 2 of 12

Bowerman Power RNG Plant Project
Orange County, CA





Pipeline Route (underground)

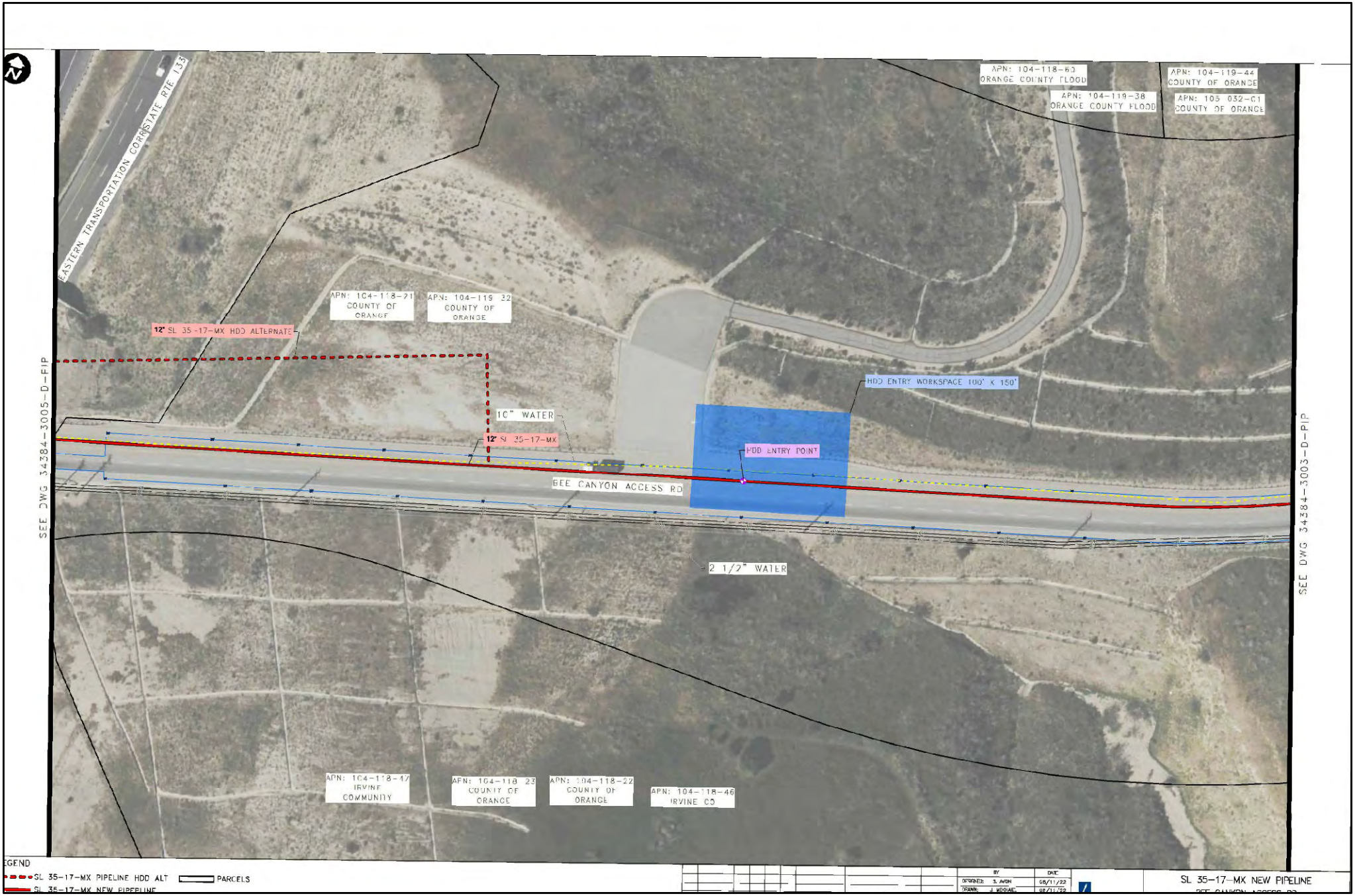
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Figure 2-4.3
Pipeline Route
Sheet 3 of 12

Bowerman Power RNG Plant Project
Orange County, CA





Pipeline Route (underground)

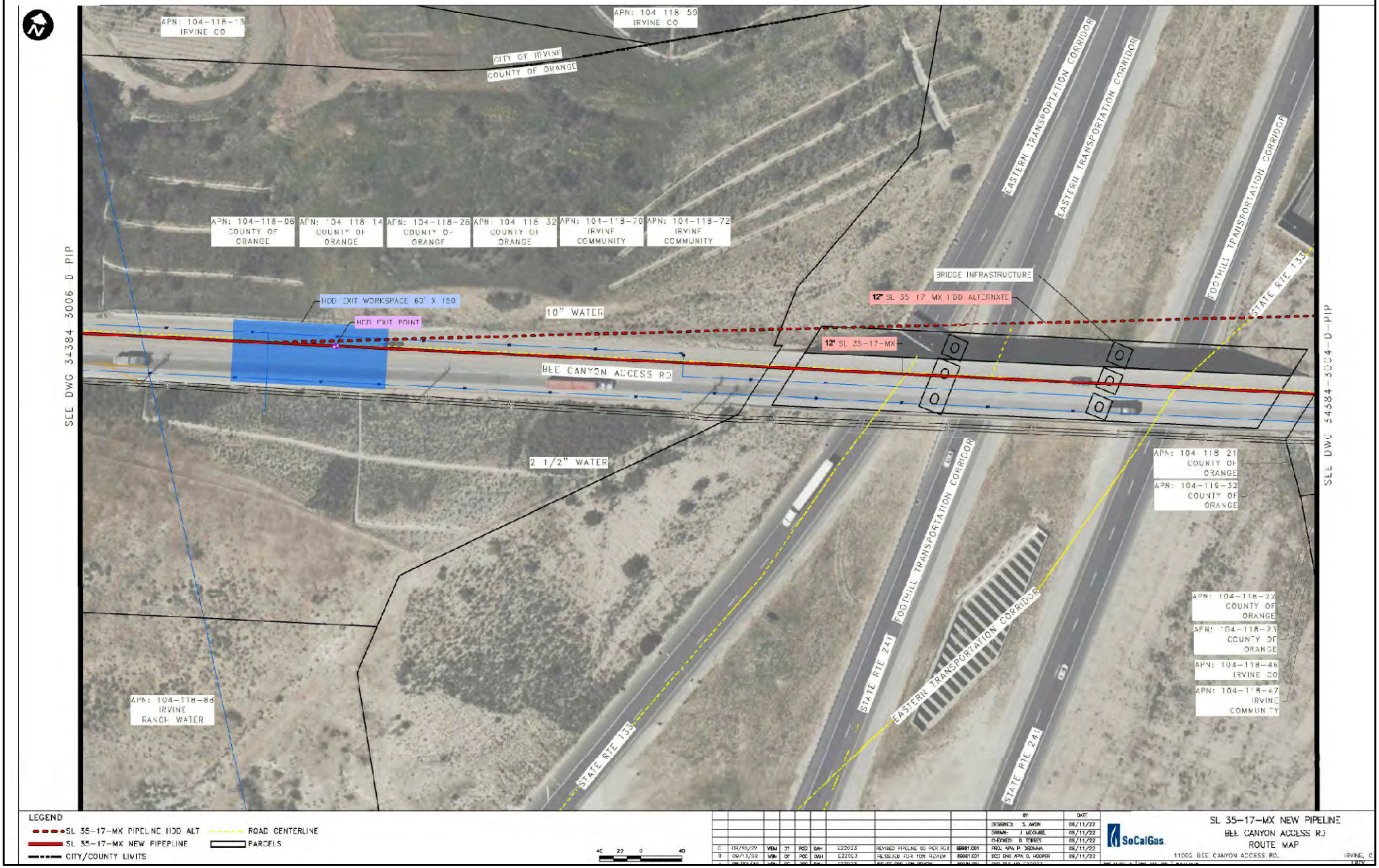
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Figure 2-4.4
Pipeline Route
Sheet 4 of 12

Bowerman Power RNG Plant Project
Orange County, CA





Pipeline Route (underground)

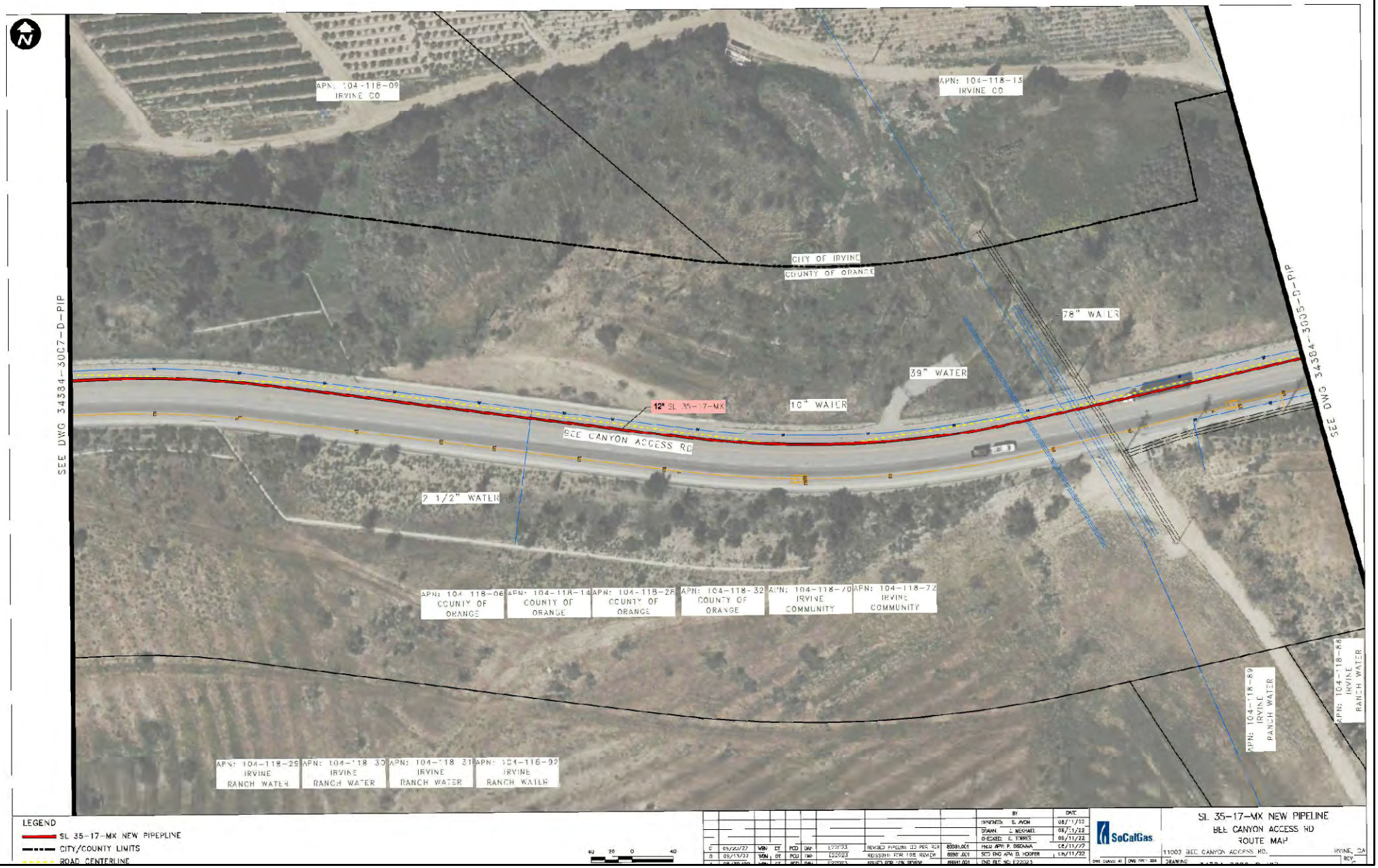
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Figure 2-4.5
Pipeline Route
Sheet 5 of 12

Bowerman Power RNG Plant Project
Orange County, CA





Pipeline Route (underground)

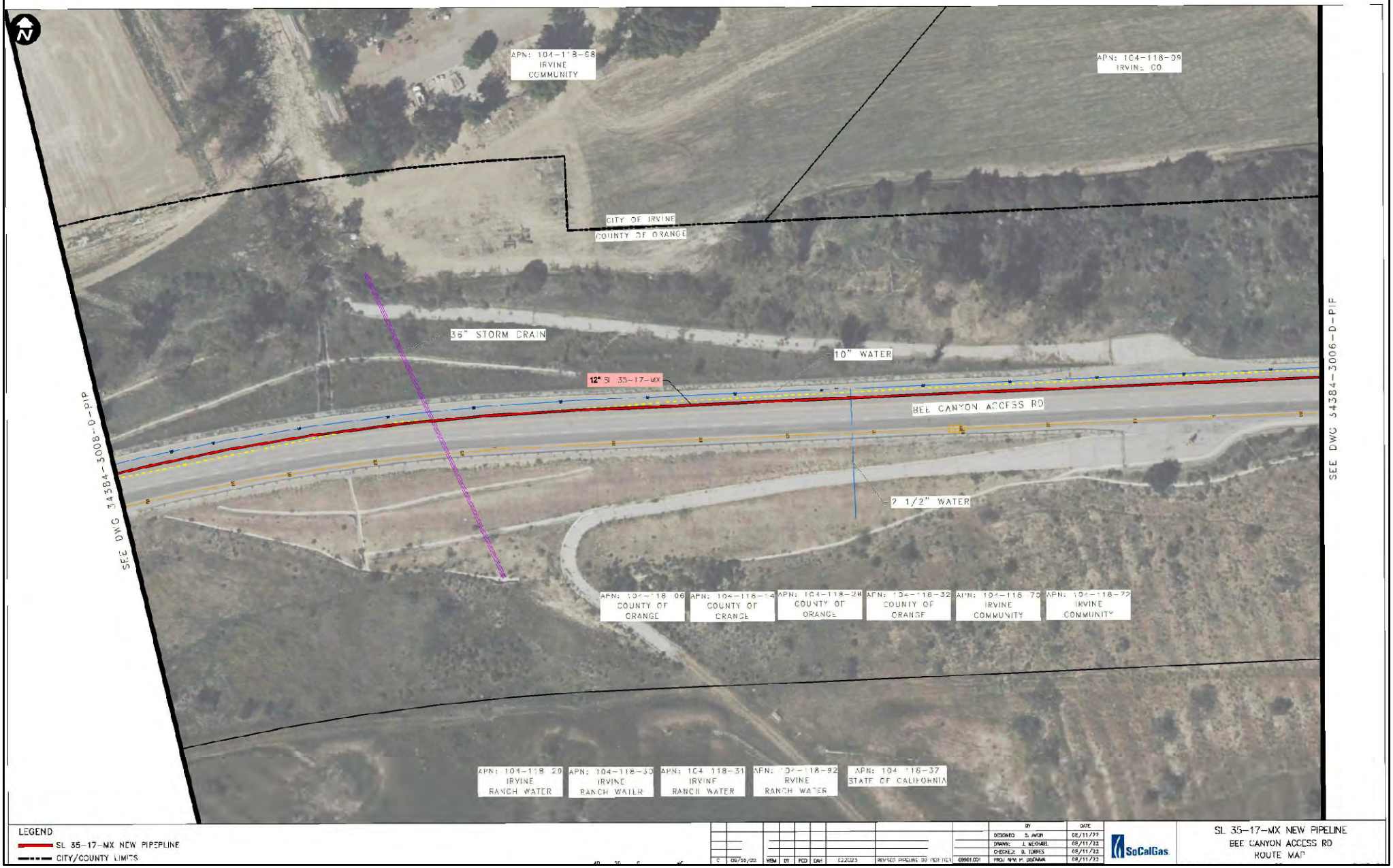
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Figure 2-4.6
Pipeline Route
Sheet 6 of 12

Bowerman Power RNG Plant Project
Orange County, CA





Pipeline Route (underground)

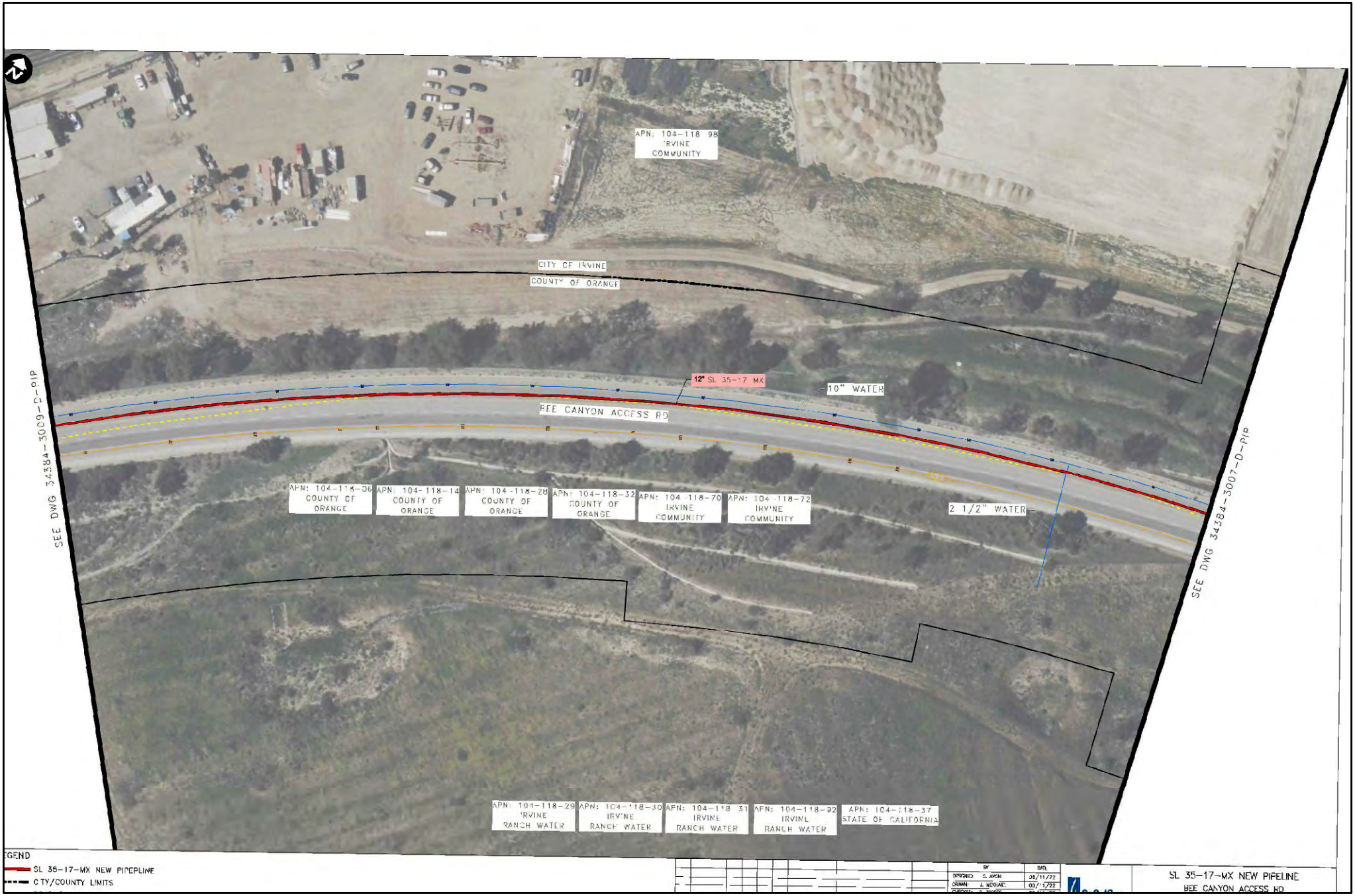
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Figure 2-4.7
Pipeline Route
Sheet 7 of 12

Bowerman Power RNG Plant Project
Orange County, CA





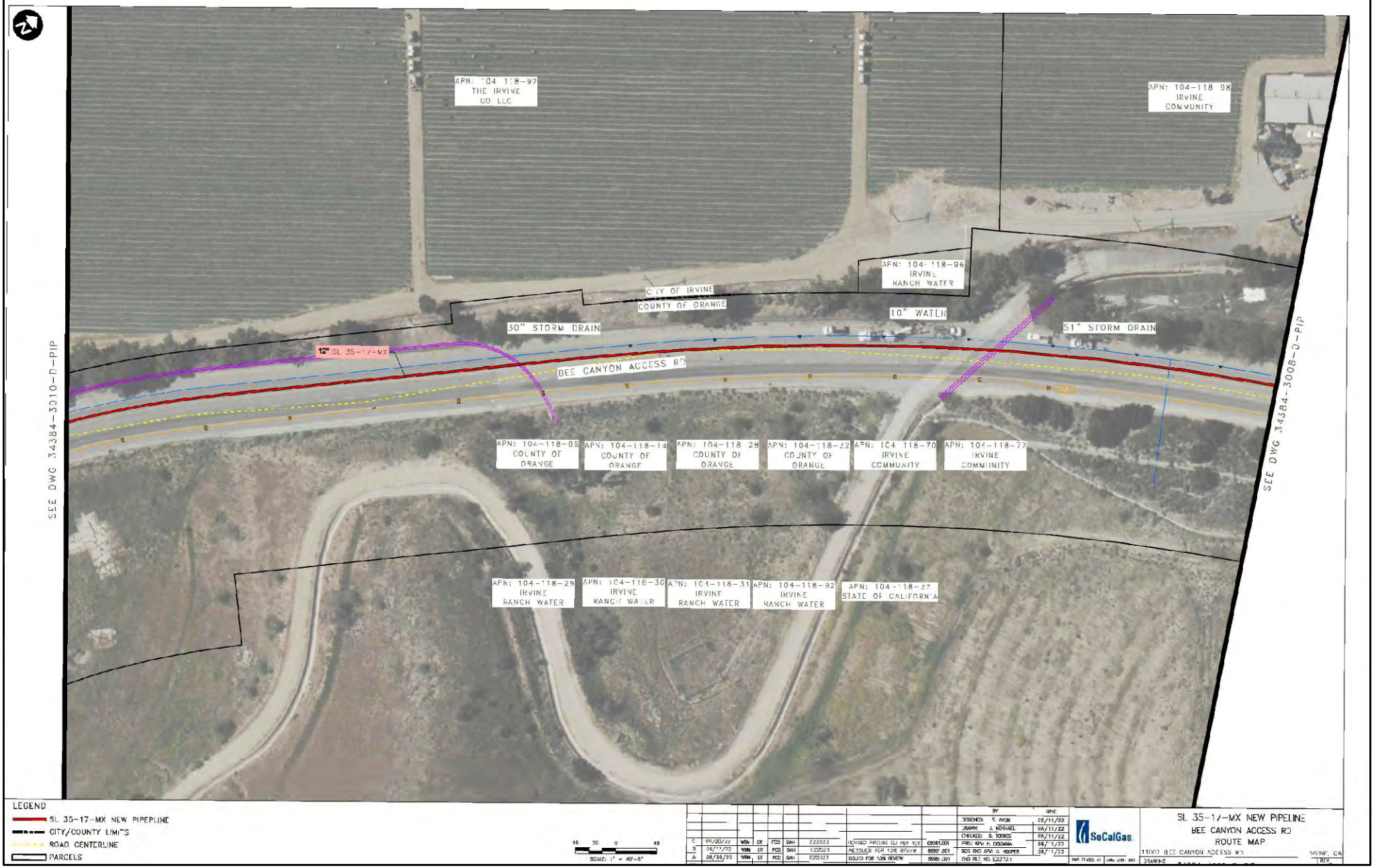
Pipeline Route (underground)

0 25 50 100 Feet

NOT FOR CONSTRUCTION

Figure 2-4.8
Pipeline Route
Sheet 8 of 12

Bowerman Power RNG Plant Project
Orange County, CA





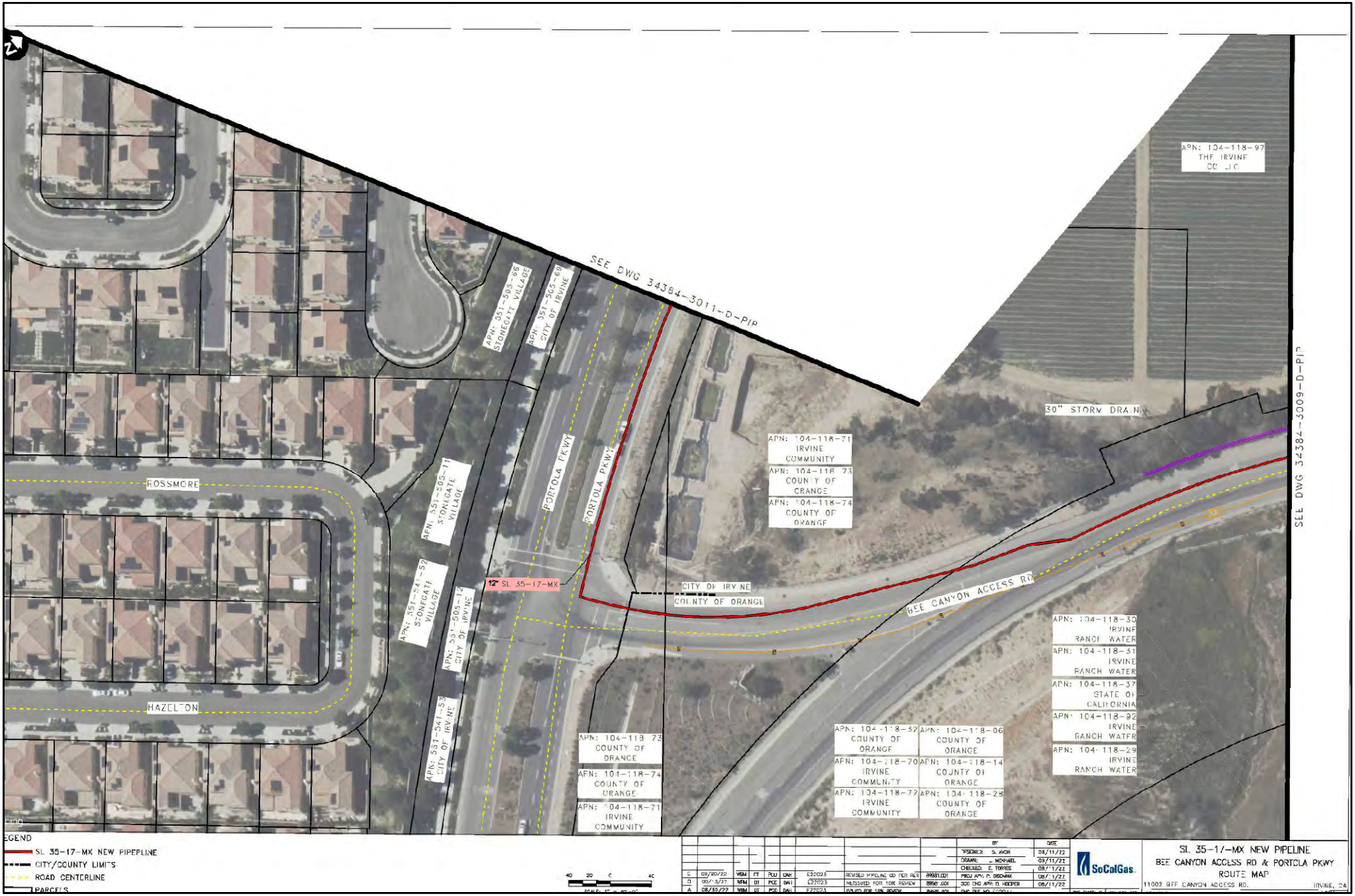
Pipeline Route (underground)

0 25 50 100 Feet

NOT FOR CONSTRUCTION

Figure 2-4.9
Pipeline Route
Sheet 9 of 12

Bowerman Power RNG Plant Project
Orange County, CA





Pipeline Route (underground)

0 25 50 100 Feet

NOT FOR CONSTRUCTION

Figure 2-4.10
Pipeline Route
Sheet 10 of 12

Bowerman Power RNG Plant Project
Orange County, CA





Pipeline Route (underground)

N

0 25 50 100 Feet

NOT FOR CONSTRUCTION

Figure 2-4.11
Pipeline Route
Sheet 11 of 12

Bowerman Power RNG Plant Project
Orange County, CA





Pipeline Route (underground)

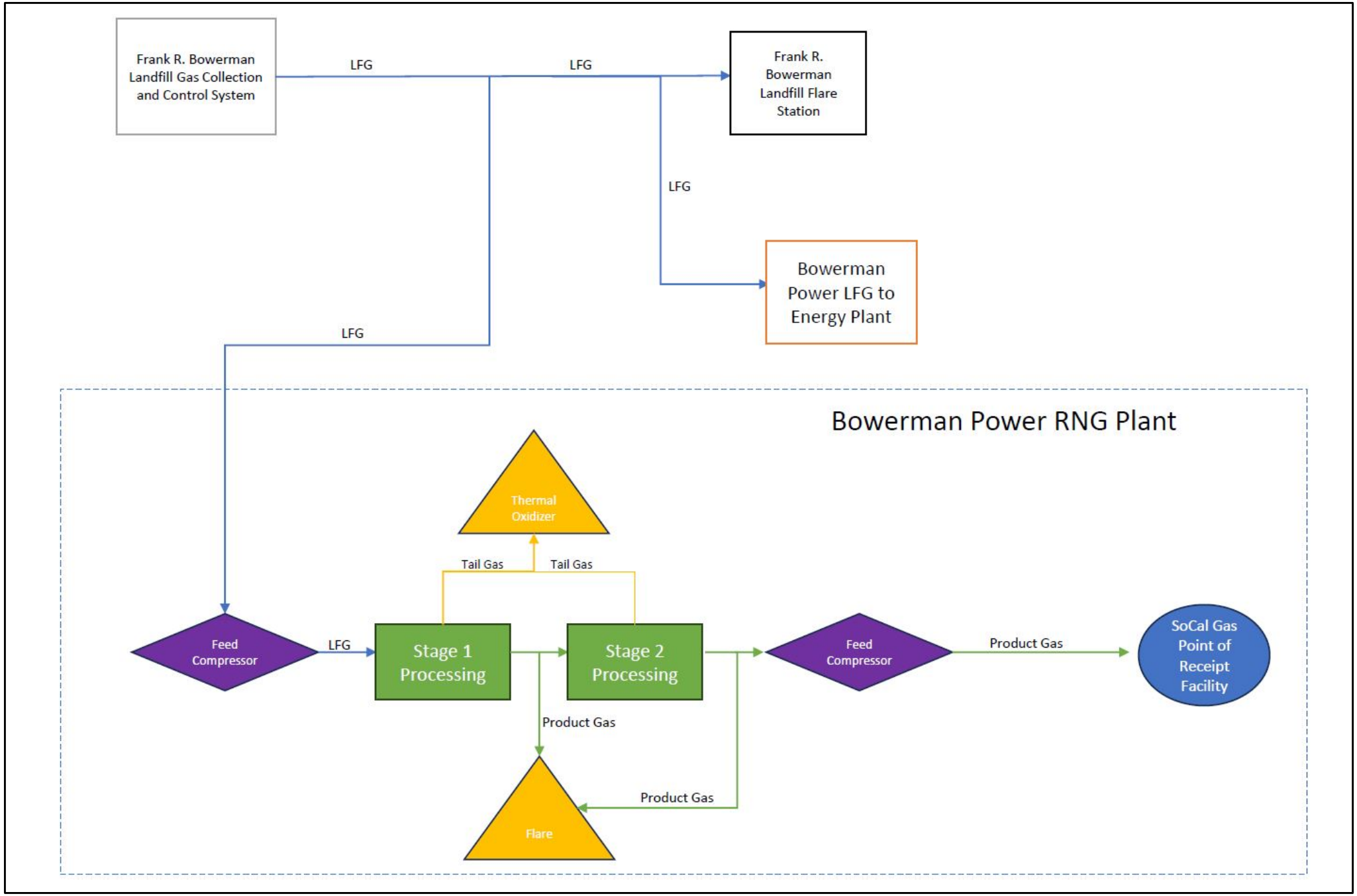
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0 25 50 100 Feet

NOT FOR CONSTRUCTION

Figure 2-4.12
Pipeline Route
Sheet 12 of 12

Bowerman Power RNG Plant Project
Orange County, CA





NOT FOR CONSTRUCTION

Figure 2-5
RNG Process Design Flow

Bowerman Power RNG Plant Project
Orange County, CA

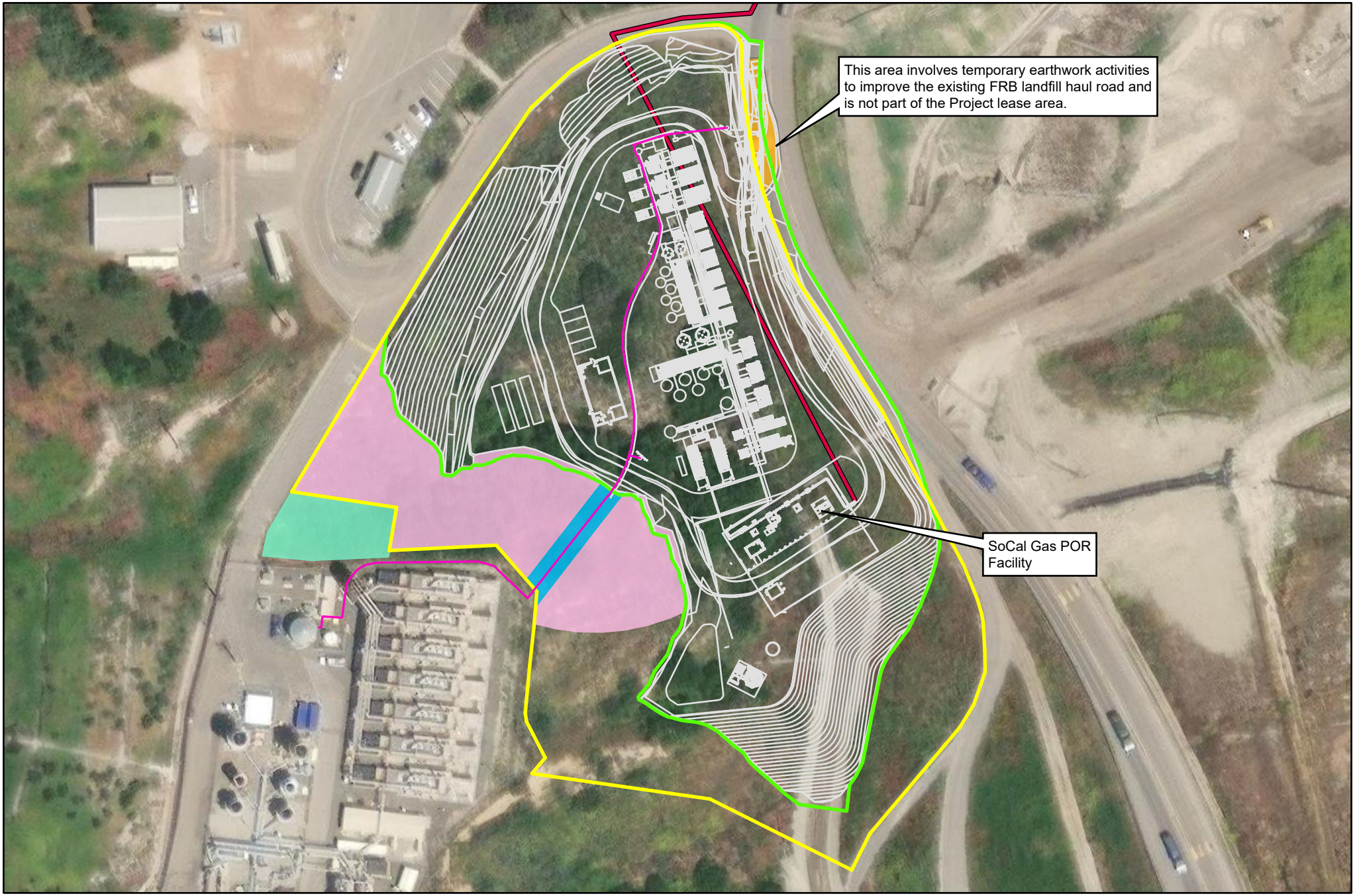
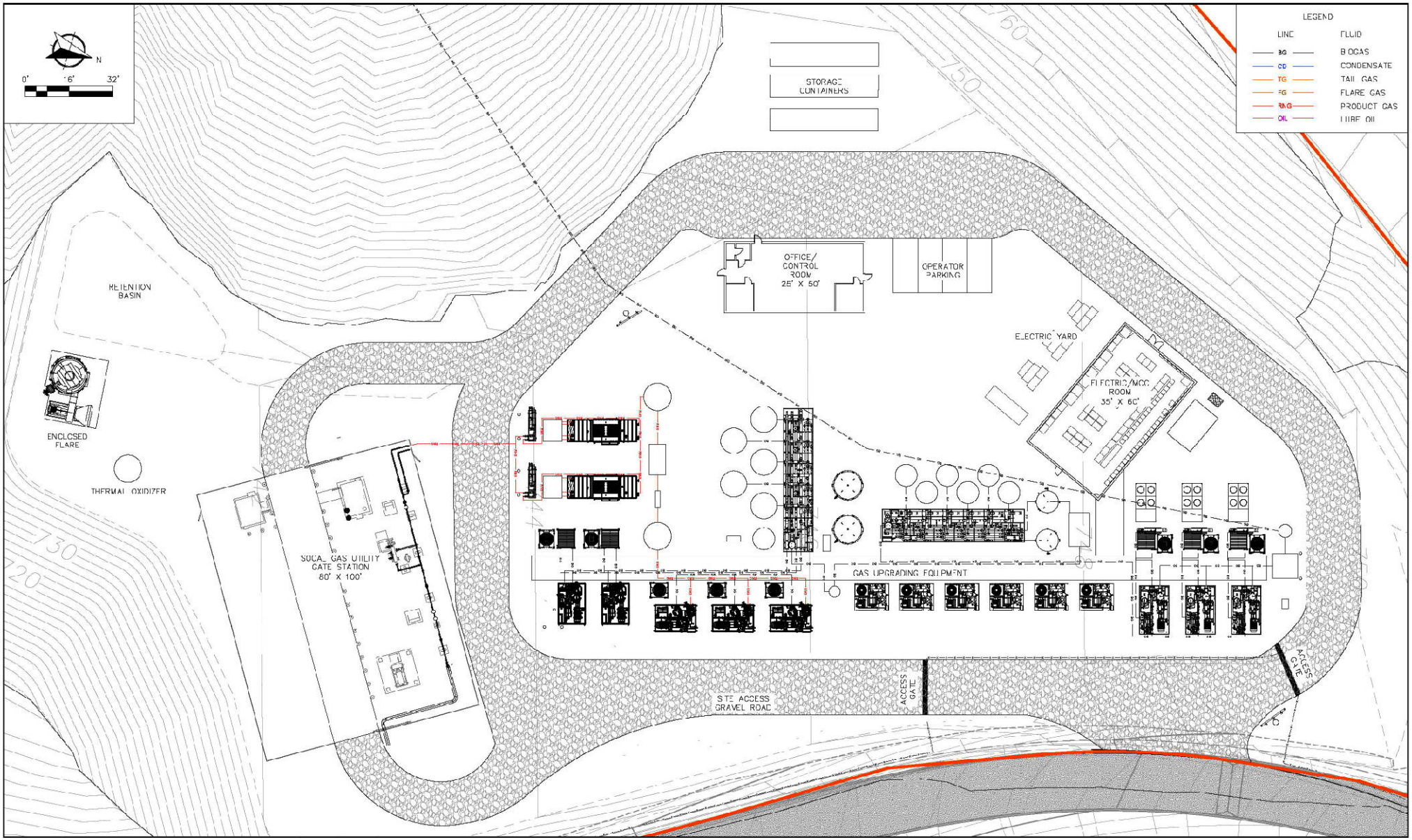


Figure 2-6
Project Site Plan

Bowerman Power RNG Plant Project
Orange County, CA

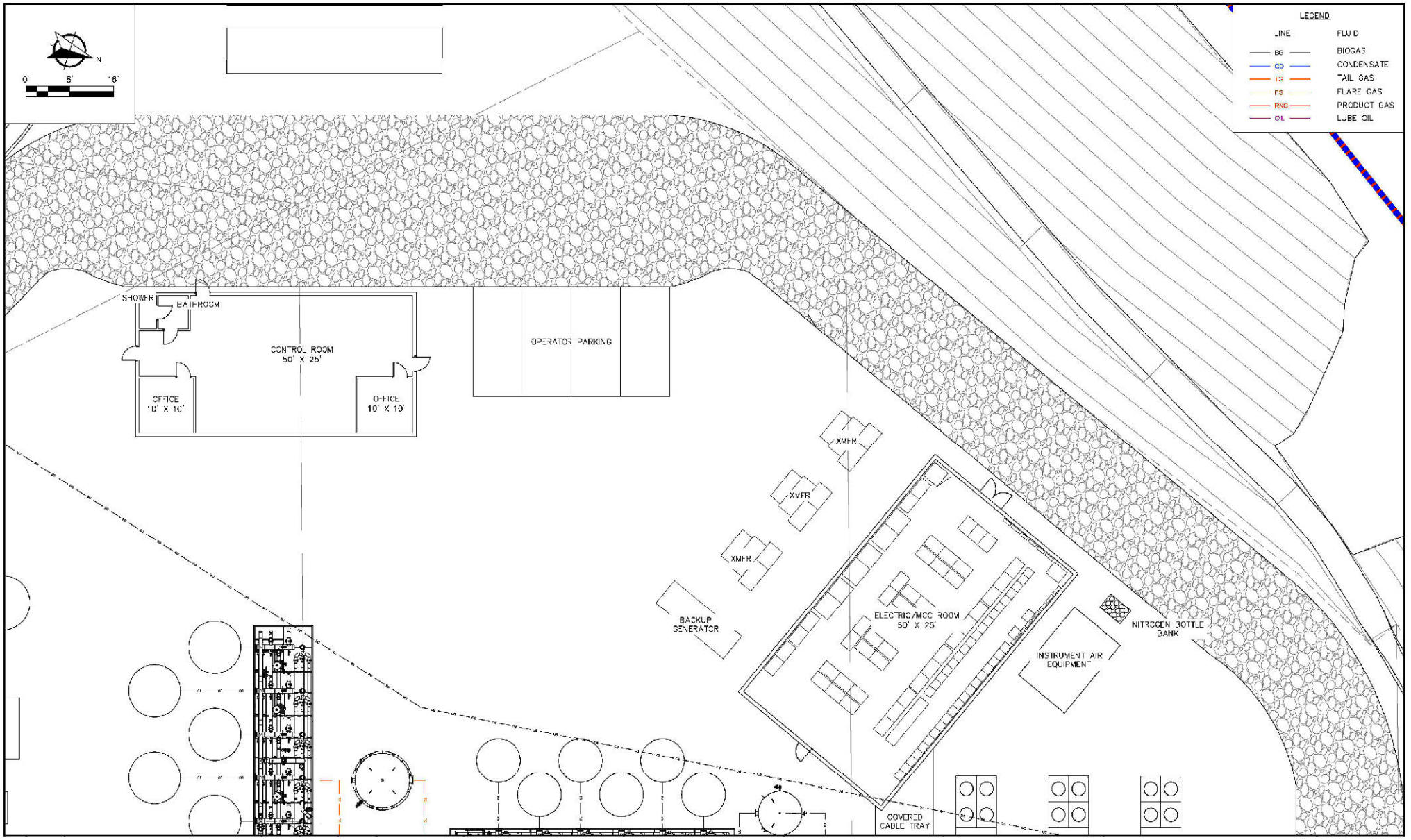




NOT FOR CONSTRUCTION

Figure 2-7
Process Equipment Layout

Bowerman Power RNG Plant Project
Orange County, CA

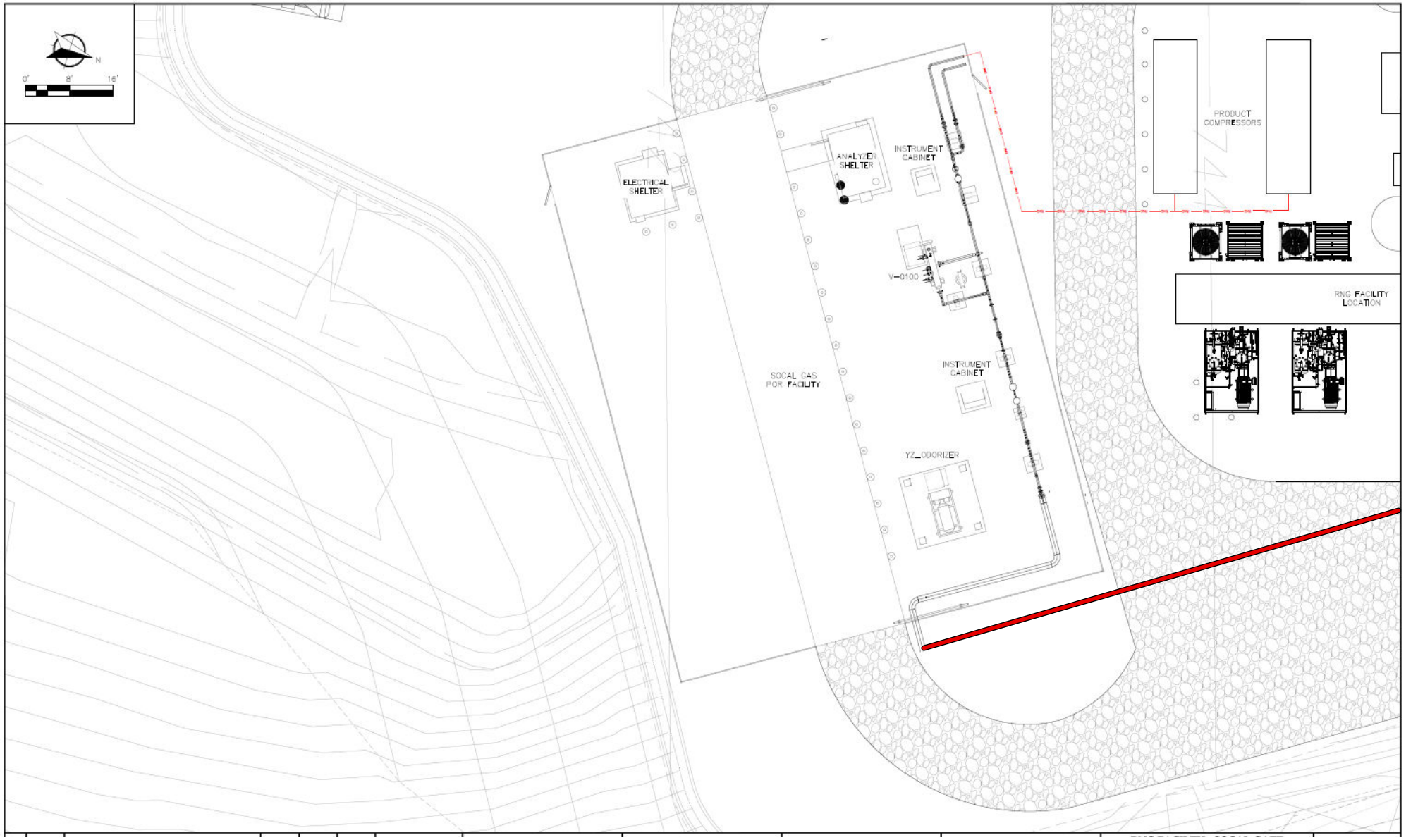




NOT FOR CONSTRUCTION

Figure 2-8
RNG Control / Electric Buildings Layout

Bowerman Power RNG Plant Project
Orange County, CA





Pipeline Route (underground)

NOT FOR CONSTRUCTION

Figure 2-9
Point of Receipt Facility

Bowerman Power RNG Plant Project
Orange County, CA

RNG Plant Construction

Equipment Type	Quantity
Dump Truck	10-15
Trackhoe	2
Bulldozer	2
Street Sweeper	1
Water Truck	1
Mixer	1
40 Ton Crane	1
100 Ton Crane	1
Extended Boom Forklift	1
Man Lift	1
Skid Steer Loader	1
Grader	1

Pipeline Construction

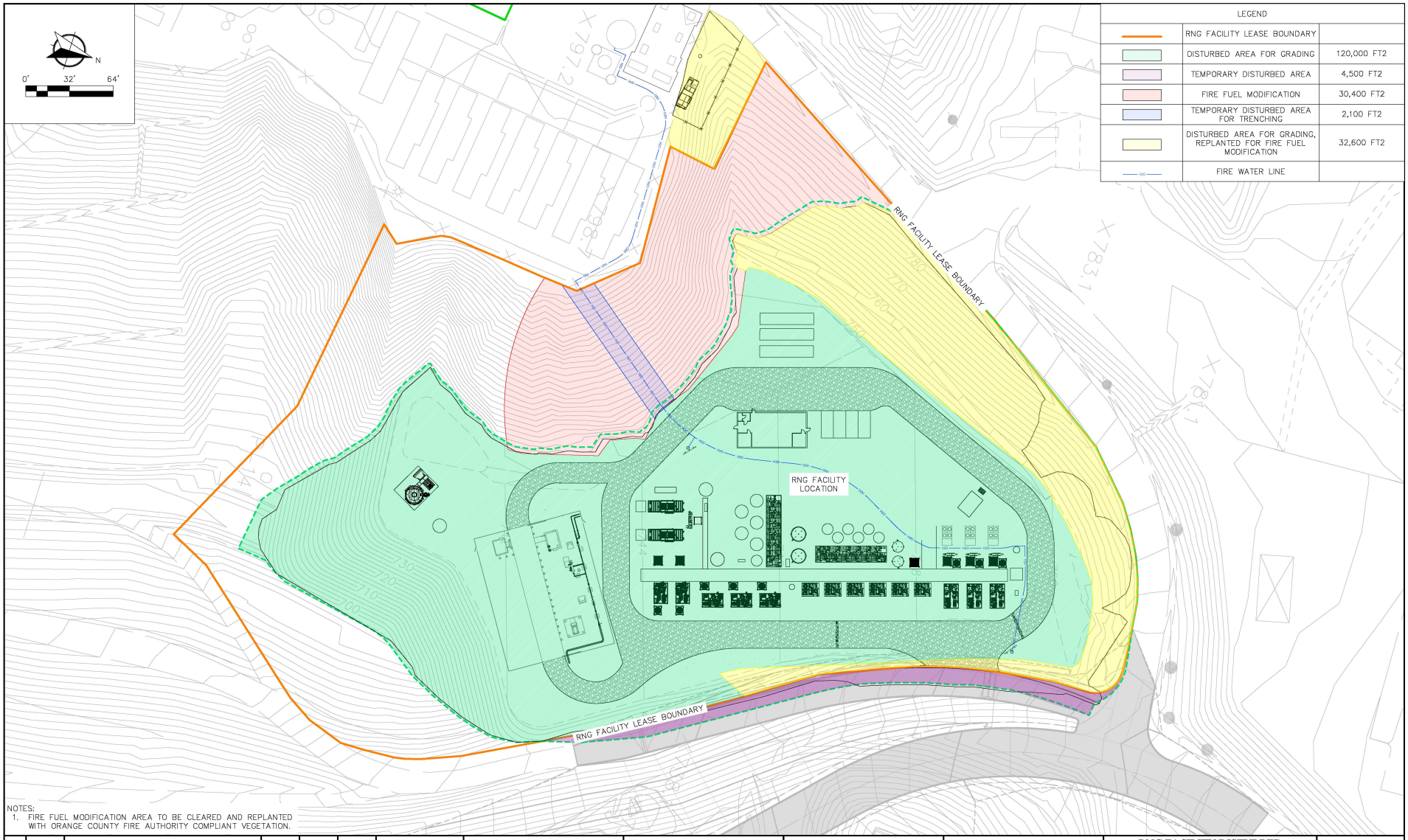
Equipment Type	Quantity
Boring Machine	1
Trackhoe	1
Bulldozer	1
Backhoe	1
Crane	1
Motor Grader	1
Pneumatic Hammer	1
Air Compressor	1
Side Boom Tractor	1
Tractor Tailer	1
Paver	1
Paving Equipment	1
Roller	1
Cement Mixer	1

RNG Plant Operation

Equipment Type	Quantity	Inside Enclosure (Yes/No)
Feed Compressors	3	No
Feed Compressors Aftercoolers	3	No
Feed Compressors Oil Coolers	3	No
Glycol Circulation Pumps	3	No
CO_2 Removal Vacuum Compressors	6	No
RNG Product Gas Cooler	1	No
N_2 Removal Vacuum Compressors	3	No
N_2 Removal Vacuum Compressors Oil Coolers	3	No
N_2 Removal Recycle Compressors	2	No
N_2 Removal Recycle Compressors Aftercoolers	2	No
N_2 Removal Recycle Compressors Oil Coolers	2	No
Product Gas Cooler from EQ PSA	1	No
Product Compressors	2	No
Product Compressors Aftercoolers	2	No
Thermal Oxidizer	1	No
Thermal Oxidizer Blower	1	No
Thermal Oxidizer Combustion Air Blower	1	No
Off-spec gas Flare	1	No
Off-spec gas Flare Combustion Blower	1	No
Instrument Air Compressors	2	No
Ventilation Fans	6	No
Back Up Generator	1	No
PSA Vessels	1	No
CO_2 Removal Vacuum Oil Coolers	3	No
H2S Removal Vessel	1	No

Figure 2-10
Equipment List

Bowerman Power RNG Plant Project
Orange County, CA



NOTES:
1. FIRE FUEL MODIFICATION AREA TO BE CLEARED AND REPLANTED WITH ORANGE COUNTY FIRE AUTHORITY COMPLIANT VEGETATION.

REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	05/03/24	ISSUED FOR CEQA	MV	-	JF

MONTAUK RENEWABLES
5313 Campbells Run Road,
Pittsburgh, PA 15205

TENT ENGINEERING
452 NE Greenwood Ave.
Bend, OR 97701
www.tentengr.com

RNG FACILITY DISTURBED AREA

Bowerman RNG Facility
Bowerman Power LFG, LLC
11006 Bee Canyon Access Road,
Irvine, CA 92602

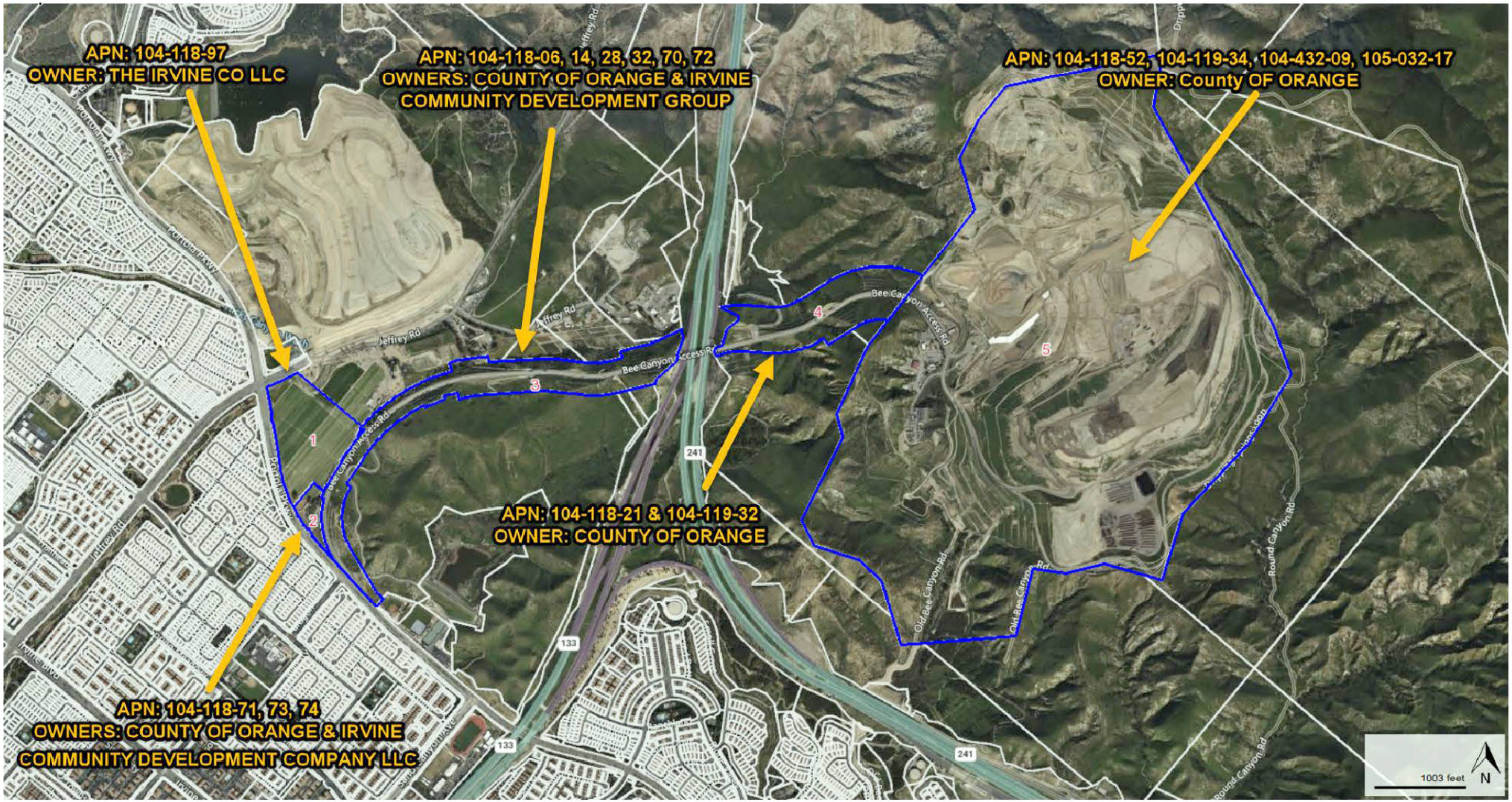
DRAWING NO.
G1.12
PROJECT NO.
164.02



NOT FOR CONSTRUCTION

Figure 2-11
Disturbed Area

Bowerman Power RNG Plant Project
Orange County, CA





NOT FOR CONSTRUCTION

Figure 2-12
Project Site Parcels

Bowerman Power RNG Plant Project
Orange County, CA

APPENDIX A: MITIGATION MONITORING AND REPORTING PLAN

OC Waste & Recycling
Bowerman Renewable Natural Gas Plant Project

MITIGATION MONITORING AND REPORTING PROGRAM

Prepared For:

OC Waste & Recycling
601 N. Ross Street, 5th Floor
Santa Ana, CA 92701

MITIGATION MONITORING AND REPORTING PROGRAM

Public Resources Code, Section 21081.6 (Assembly Bill 3180) requires that mitigation measures identified in environmental review documents prepared in accordance with California Environmental Quality Act (CEQA) are implemented after a project is approved. Therefore, this Mitigation Monitoring and Reporting Program (MMRP) has been prepared to ensure compliance with the adopted mitigation measures during the Bowerman Renewable Natural Gas Plant Project (Project). The OC Waste & Recycling (OCWR) is the agency responsible for implementation of the mitigation measures identified in the Initial Study/Mitigated Negative Declaration.

This MMRP provides OCWR with a convenient mechanism for quickly reviewing all the mitigation measures including the ability to focus on select information such as timing. The MMRP includes the following information for each mitigation measure:

- The phase of the project during which the required mitigation measure must be implemented;
- The phase of the project during which the required mitigation measure must be monitored; and
- The monitoring agency.

The MMRP includes a checklist to be used during the mitigation monitoring period. The checklist will verify the name of the monitor, the date of the monitoring activity, and any related remarks for each mitigation measure.

MITIGATION MONITORING AND REPORTING PROGRAM						
Permit Name/Regulatory Condition	**Mitigation Measure**	**Implementation Phase**	**Monitoring Phase**	**Monitoring Agency**	**Compliance Verification**	
					Initial	**Date**
SCAQMD – Permit to Construct, Dust Control	**AQ-1:** Construction equipment greater than 350 HP for the trenching and pipeline construction phase must be equipped with Tier 4 Final engines.	Construction	Construction	OCWR		
NCCP/HCP	**BIO-1:** To address potential Project impacts to intermediate mariposa lily (*Calochortus weedii* var. *intermedius*), an in-lieu fee shall be paid via minor amendment to the NCCP/HCP, as approved by USFWS and CDFW. The in-lieu fee will contribute to a management and monitoring program for rare plants in the Nature Reserve of Orange County. Silt fencing or flagging shall be installed under the guidance of a biological monitor along the limits of coastal sage scrub areas that are immediately outside of the grading/impact limits. The silt fencing/flagging shall be used to minimize impacts to sensitive natural resources including special-status plant species and native plant communities outside	Pre-Construction	Pre-Construction	OCWR		

MITIGATION MONITORING AND REPORTING PROGRAM						
Permit Name/Regulatory Condition	**Mitigation Measure**	**Implementation Phase**	**Monitoring Phase**	**Monitoring Agency**	**Compliance Verification**	
					Initial	**Date**
	and immediately adjacent to the grading limits. Construction activities and personnel will be restricted within these adjacent coastal sage scrub areas and a biological monitor will be present during the silt fence/flagging installation and removal.					
Special Status Species	**BIO-2:** Impacts to coastal sage scrub habitat shall occur outside the breeding and nesting season of the coastal California gnatcatcher (February 15 through July 15) to the extent practicable. A pre-construction survey shall be conducted within the Project site to determine the presence/absence of coastal California gnatcatcher and coastal cactus wren prior to clearing or grading activities. The survey shall include a 100-foot buffer around the grading limits. Any coastal California gnatcatcher or coastal cactus wren observations shall be recorded and marked on the construction/grading plans. All coastal sage scrub habitat outside of the Project impact area shall be fenced or marked with flagging materials prior to the commencement of grading. No construction access, parking, or storage of equipment or materials will be allowed within these areas. A qualified biologist shall conduct and document a pre-construction meeting to educate construction staff (including supervisors, equipment operators, and other site employees) on all mitigation measures required for the Project. A qualified biologist shall monitor the clearing of coastal sage scrub and oak woodland. USFWS/CDFW shall be notified at least 7 calendar days (preferably 14 calendar days) prior to clearing habitat occupied by Target/Identified Species, if observed. The qualified biologist will ensure that clearing activities and earth-moving equipment do not harm coastal California gnatcatchers or coastal cactus wren. The biologist will also ensure that these activities do not harm other species that may occur, including western spadefoot, orange-	Pre-Construction, Construction	Pre-Construction, Construction	OCWR		

MITIGATION MONITORING AND REPORTING PROGRAM						
Permit Name/Regulatory Condition	**Mitigation Measure**	**Implementation Phase**	**Monitoring Phase**	**Monitoring Agency**	**Compliance Verification**	
					Initial	**Date**
	throated whiptail, red-diamond rattlesnake, and coast patch-nosed snake. The access road(s) shall be sprayed with water on occasion to reduce dust accumulation on the leaves of coastal sage scrub species, as overseen by the biological monitor.					
Special Status Species	**BIO-3:** Avoid ground-disturbing and vegetation removal activities during the nesting bird season (February 15 to September 15). If these activities must occur during the nesting season, a pre-construction nesting bird survey would be conducted by a qualified biologist on and within 300 feet of the Project construction area. The survey would be conducted no more than 10 days prior to initiation of ground-disturbance, vegetation clearing, or construction activities and repeated between delays of greater than 10 days during the nesting season. If an active nest is found, an appropriate no-disturbance buffer for the species would be developed by a qualified biologist. No ground-disturbing or vegetation removal activities would occur within the buffer until the nesting season has ended or the nest is vacated, and juveniles have fledged, as determined by the qualified biologist. At the discretion of a qualified biologist, encroachment into the buffer may occur for non-listed bird species.	Pre-Construction, Construction	Pre-Construction, Construction	OCWR		
Special Status Species	**BIO-4:** For work occurring during the Crotch's bumble bee nesting season between March 15 through September 15 where potential nesting habitat occurs, a pre-construction nesting survey shall occur prior to ground-disturbing or vegetation-trimming activities within the Project's work area and a 50-foot buffer. A qualified Crotch's bumble bee biologist, whose resume has been submitted and approved by CDFW, will conduct a nest clearance survey within 2 weeks of ground-disturbing construction activities. Surveys shall be conducted during daylight hours when ambient temperatures are between 60 degrees Fahrenheit (°F) and 90 °F. In the event that a bumble bee nest is suspected (i.e.g., bumble bee was	Pre-Construction, Construction	Pre-Construction, Construction	OCWR		

MITIGATION MONITORING AND REPORTING PROGRAM						
Permit Name/Regulatory Condition	**Mitigation Measure**	**Implementation Phase**	**Monitoring Phase**	**Monitoring Agency**	**Compliance Verification**	
					Initial	**Date**
	observed to have entered a burrow or tree cavity, or disappeared under a shrub or into thatch), the suspected nest location will be passively observed for at least 20 minutes to confirm the presence/absence of a nest. A minimum 50-foot no disturbance buffer will be established and visibly flagged for avoidance if a nest location is discovered and the discovery shall be reported to CDFW by the qualified Crotch's bumble bee biologist within 24 hours of discovery. If Crotch's bumble bee and/or Crotch's bumble bee nests are detected, surveys should record the location of the nest, nest substrate, slope, aspect, and distance to nearest active foraging areas (if known), number of Crotch's bumble bee observed, and vegetation used by individuals. During active construction, the Crotch's bumble bee biologist will monitor the nest on a weekly basis and will update the buffer size as necessary and in coordination with CDFW to ensure protection. Construction activities will not occur within the buffer until the nest is no longer active as determined by the qualified Crotch's bumble bee biologist and CDFW will be notified prior to deactivation of the avoidance buffer and commencement of construction activities in this area. The Crotch's bumble bee qualified biologist shall submit results of preconstruction surveys to CDFW prior to start of vegetation removal activities and shall provide a weekly status update should a Crotch's bumble bee nest no disturbance buffer be established and until the nest is determined.					
Special Status Species	**BIO-5:** Herbicide and insecticide use shall be limited to spot spraying individual plants that are not in bloom and avoiding all rodent burrows to the greatest extent possible within suitable Crotch's bumble bee nesting areas. The qualified Crotch's bumble bee biologist will review the proposed spray areas with OCWR and contractor to ensure burrows and nectar sources are avoided to the greatest extent possible.	Construction, Operation	Construction, Operation	OCWR		
Special Status Species	**BIO-6:** Temporary impacts to nectar sources shall be restored in place through either broadcasting of appropriate Crotch's bumble bee seed mix or by incorporating the seed mix into a	Construction, Operation	Construction, Operation	OCWR		

MITIGATION MONITORING AND REPORTING PROGRAM						
Permit Name/Regulatory Condition	**Mitigation Measure**	**Implementation Phase**	**Monitoring Phase**	**Monitoring Agency**	**Compliance Verification**	
					Initial	**Date**
	hydro-mulch application. Minor vegetation trimming to preferred nectar sources, that are expected to recover naturally within one year, do not require restoration.					
Special Status Species	**BIO-7:** A qualified Crotch's bumble bee biologist shall attend the pre-construction meeting (see BIO-2) to educate construction staff (including supervisors, equipment operators, other site employees, and biological monitors) on all Crotch's bumble bee specific mitigation measures required by this Crotch's Bumble Bee Avoidance Plan. Training Materials (tri-fold colored pamphlet) shall be provided at the training and shall include detailed photos that can be utilized as a reference for qualified biological monitors to identify Crotch's bumble bee and implement the avoidance measures appropriately. Training Materials will assist in training contractor staff in recognizing bumble bees and inform them of potential penalties (e.g., monetary fines, project delays, jail time) for take of Crotch's bumble bee or other California Endangered Species Act (CESA) violations.	Pre-Construction, Construction	Pre-Construction, Construction	OCWR		
Special Status Species	**BIO-8:** CDFW shall be notified at least 14 calendar days prior to initial vegetation removal and ground-disturbing activities in areas identified as potential Crotch's bumble bee nesting, foraging, or overwintering habitat, regardless of time of year. All Crotch's bumble bee detections shall be reported to CDFW via email within 24 hours of detection. A qualified biological monitor who has received the Crotch's bumble bee training and is in possession of the Training Materials shall monitor the staking of limits, clearing and grubbing, and removal of stockpiled vegetation from the site until the site no longer provides potential Crotch's bumble bee habitat. The biological monitor shall be responsible for monitoring Crotch's bumble bee when they are detected and shall ensure active foraging patches are not removed until the Crotch's bumble bee(s) leave the area on their own volition. The biological monitor, shall monitor the slow and methodical removal of vegetation in patches and by hand where necessary should Crotch's bumble bee nesting or	Pre-Construction, Construction	Pre-Construction, Construction	OCWR		

MITIGATION MONITORING AND REPORTING PROGRAM						
Permit Name/Regulatory Condition	**Mitigation Measure**	**Implementation Phase**	**Monitoring Phase**	**Monitoring Agency**	**Compliance Verification**	
					Initial	**Date**
	overwintering behavior be observed (scanning the ground instead of targeting flowering resources, seen entering a burrow or disappearing into thick vegetation and not re-emerging, sitting on the open ground), until it is confirmed that a Crotch's bumble bee nest or overwintering site is not present. Should the Project result in unpermitted take of a Crotch's bumble bee individual or nest, work shall immediately halt and CDFW shall be immediately notified by the Crotch's bumble bee biologist.					
Archaeological Resources	**CUL -1:** Environmental Training – Prior to construction of the Project, a Secretary of Interior-qualified archaeologist shall be retained by Bowerman Power to serve as the Project Archaeologist. Cultural resource awareness training will be provided by the Project Archaeologist that includes all applicable laws and penalties pertaining to disturbing cultural resources, a brief discussion of the prehistoric and historic regional context and archaeological sensitivity of the area, types of cultural resources found in the area, and instruction that Project workers will halt construction if a cultural resource is inadvertently discovered during construction, and Project personnel contact information in the event of an inadvertent discovery.	Pre-Construction, Construction	Pre-Construction, Construction	OCWR		
Archaeological Resources	**CUL -2:** Archaeological Monitoring – A qualified Archaeological monitor acceptable to the OCWR shall be retained by Bowerman Power prior to Project-related ground disturbance. The selection of the qualified professional(s) shall be subject to OCWR acceptance based on generally accepted professional qualifications and certifications, as applicable. A qualified Archaeological Monitor will have at least a BS or BA degree in anthropology, archaeology, historic archaeology, or a related field and previous monitoring experience. The monitors will conduct on-site daily archaeological monitoring of construction ground disturbance. The Archaeological monitor will provide daily documentation of construction activity and any findings. The Archaeological monitor will prepare a daily monitoring log	Pre-Construction, Construction	Pre-Construction, Construction	OCWR		

MITIGATION MONITORING AND REPORTING PROGRAM						
Permit Name/Regulatory Condition	**Mitigation Measure**	**Implementation Phase**	**Monitoring Phase**	**Monitoring Agency**	**Compliance Verification**	
					Initial	**Date**
	and submit it daily to the Project Archaeologist via email, briefly describing the field conditions, construction progress and activities, non-compliance activities, and record any finds of archaeological material. A final report summarizing the monitoring activities will be prepared by the Project Archaeologist.					
Archaeological Resources	**CUL -3:** Monitoring and Inadvertent Discovery Plan – Prior to the start of construction, a Secretary of Interior-qualified Project Archaeologist (retained by Bowerman Power) shall prepare a Monitoring and Inadvertent Discovery Plan (Plan) for the Project. The Plan will be submitted to OCWR for review and approval prior to the start of construction. The Plan shall include at a minimum: • Overview of mitigation measures and responsibility for compliance; • Project description of construction activities and maps; • Description of relevant laws and regulations; • Brief cultural context information and types and description of cultural resources that could be inadvertently discovered; • Description of how monitoring shall occur; • The roles and responsibility of the Archaeological Monitor (e.g., authority to halt construction for an inadvertent discovery, daily monitoring, daily reporting, etc.) and Project Archaeologist (e.g., oversee monitors, response to inadvertent discovery, final reporting, etc.); • Description of protocols in the event of an inadvertent discovery (i.e., halt work) and notification procedures and contact list; and • Description of final monitoring report. Stop work protocols shall be implemented in the event of an inadvertent discovery of cultural resources. If a cultural resource is encountered within the new SoCalGas pipeline	Pre-Construction, Construction	Pre-Construction, Construction	OCWR		

MITIGATION MONITORING AND REPORTING PROGRAM						
Permit Name/Regulatory Condition	**Mitigation Measure**	**Implementation Phase**	**Monitoring Phase**	**Monitoring Agency**	**Compliance Verification**	
					Initial	**Date**
	route, halt work protocols shall include notifying the SoCalGas Project Archaeologist designated by SoCalGas and the OCWR Environmental Engineering Specialist designated by OCWR. Cultural resources shall not be relocated without consultation with a SoCalGas Archaeologist.					
Paleontological Resources	**GEO-1:** Worker Education Program. The project proponent shall retain a qualified paleontologist, defined as a paleontologist meeting the Society for Vertebrate Paleontology's Professional Standards (SVP 2010), to carry out all mitigation measures related to paleontological resources. The qualified paleontologist shall conduct the following: a. Prior to the start of any ground disturbing activities, the qualified paleontologist shall conduct a Paleontological Resources Awareness Training program for all construction personnel working on the project site. A Paleontological Resources Awareness Training Guide approved by the qualified paleontologist shall be provided to all personnel. A copy of the Paleontological Resources Awareness Training Guide shall be submitted to the OCWR. The training guide may be presented in video form. b. Paleontological Resources Awareness Training may be conducted in conjunction with other awareness training requirements. c. The training shall include an overview of potential paleontological resources that could be encountered during ground disturbing activities to facilitate worker recognition, avoidance, and subsequent immediate notification to the qualified paleontologist for further evaluation and action, as appropriate; and penalties for unauthorized artifact collecting or intentional disturbance of paleontological resources. d. The project operator shall ensure all new employees who have not participated in earlier Paleontological Resources	Pre-Construction, Construction	Pre-Construction, Construction	OCWR		

MITIGATION MONITORING AND REPORTING PROGRAM						
Permit Name/Regulatory Condition	**Mitigation Measure**	**Implementation Phase**	**Monitoring Phase**	**Monitoring Agency**	**Compliance Verification**	
					Initial	**Date**
	Sensitivity Trainings shall meet the provisions specified above. e. The Paleontological Resources Awareness Training Guides shall be kept available for all personnel to review and be familiar with as necessary.					
Paleontological Resources	**GEO-2:** Project Monitoring. A qualified paleontologist or designated monitor shall be onsite initially to spot-check excavations below a depth of one foot below the ground surface in areas of undetermined paleontological potential. If it is determined that sediments consist of older alluvium, then full-time paleontological monitoring shall ensue within that area. If sediments are determined to consist of Holocene Quaternary alluvium, paleontological monitoring shall not be required unless an excavation depth of 15 feet below the ground surface is reached in the area. The use of post-driving or rotary drilling shall not require monitoring. a. The duration and timing of monitoring shall be determined by the qualified paleontologist in consultation with OCWR and shall be based on a review of geologic maps and grading plans. b. During the course of monitoring, if the paleontologist can demonstrate based on observations of subsurface conditions that the level of monitoring should be reduced, the paleontologist, in consultation with OCWR, may adjust the level of monitoring to circumstances, as warranted. c. Paleontological monitoring shall include inspection of exposed rock units during active excavations within sensitive geologic sediments. The qualified paleontologist shall have authority to temporarily divert excavation operations away from exposed fossils to collect associated data and recover the fossil specimens if deemed necessary. d. Following the completion of construction, the paleontologist shall prepare a report documenting the absence or discovery of fossil resources onsite. If fossils are found, the report shall summarize the results of the	Construction	Construction	OCWR		

MITIGATION MONITORING AND REPORTING PROGRAM						
Permit Name/Regulatory Condition	**Mitigation Measure**	**Implementation Phase**	**Monitoring Phase**	**Monitoring Agency**	**Compliance Verification**	
					Initial	**Date**
	inspection program, identify those fossils encountered, recovery and curation efforts, and the methods used in these efforts, as well as describe the fossils collected and their significance. A copy of the report shall be provided to OCWR and to an appropriate repository such as the Natural History Museum of Los Angeles County.					
Paleontological Resources	**GEO-3:** Inadvertent Discoveries of Paleontological Resources — If construction staff or others observe previously unidentified paleontological resources during ground disturbing activities, they will halt work within a 200-foot radius of the find(s), delineate the area of the find with flagging tape or rope (may also include dirt spoils from the find area), and immediately notify a qualified paleontologist. Construction will halt within the flagged or roped-off area. The paleontologist will assess the resource as soon as possible and determine appropriate next steps in coordination with OCWR. Such finds will be formally recorded and evaluated. The resource will be protected from further disturbance or looting pending evaluation.	Construction	Construction	OCWR		
Tribal Cultural Resources	**TCR-1:** Should evidence of human remains be discovered during project construction, the Orange County Coroner (OCC) shall be immediately notified of the discovery. Evidence of human remains requires mandatory compliance with the provisions of State Health and Safety Code Section 7050.5, which restricts further disturbance in the vicinity of the discovery, defined herein as a 50-foot radius, until the OCC has made a determination within two business days of the origin and disposition pursuant to Public Resources Code Section 5097.98. If the remains are determined to be Native American, the OCC shall notify the Native American Heritage Commission (NAHC) within 24 hours that remains have been discovered. The NAHC shall determine the identity of the Most Likely Descendant (MLD). The MLD shall complete the inspection of the remains within 48 hours of notification by the NAHC. In addition, per CR-3, SoCalGas Project Archaeologist designated by SoCalGas and the OCWR	Construction	Construction	OCWR		

MITIGATION MONITORING AND REPORTING PROGRAM						
Permit Name/Regulatory Condition	**Mitigation Measure**	**Implementation Phase**	**Monitoring Phase**	**Monitoring Agency**	**Compliance Verification**	
					Initial	**Date**
	Environmental Engineering Specialist designated by OCWR will be notified of the discovery.					
Tribal Cultural Resources	**TCR-2:** If unanticipated tribal cultural resources or deposits are discovered during earth-moving activities, the following measures shall be implemented: • All work shall halt within a 200-foot radius of the discovery. a qualified professional archaeologist shall assess the significance of the find (if a tribal cultural monitor is not present). If the resources are Native American in origin, the OCWR shall coordinate with the Tribe regarding evaluation, treatment, curation and preservation of these resources. The archaeologist shall have the authority to modify the no-work radius as appropriate, using professional judgment in consultation with OCWR. Work shall not continue within the no-work radius until the archaeologist conducts sufficient research, evidence and data collection to establish that the resource is either: (1) not cultural in origin; or (2) not potentially eligible for listing on the California Register of Historical Resources.	Construction	Construction	OCWR		
Tribal Cultural Resources	**TCR-3:** Tribal Cultural Resource Monitor: Prior to the issuance of any grading permit in which soil would be disturbed, Montauk shall provide evidence in the form of an executed Agreement to OCWR that they have retained a qualified Native American tribal monitor to provide third-party monitoring during excavation and grading activities and to recover and catalogue tribal resources as necessary. The tribal monitor shall be from or approved by the Kizh Nation. The agreement shall include (i) professional qualifications for the tribal cultural resource monitor(s); (ii) detailed scope of services to be provided including but not limited to pre-construction education, observation, evaluation, protection, salvage, notification, and/or curation requirements, as applicable, with final documentation/monitoring report to OCWR, as applicable; (iii) contact information; (iv) communication protocols between Contractor and Tribal Cultural Resource	Pre-Construction, Construction	Pre-Construction, Construction	OCWR		

MITIGATION MONITORING AND REPORTING PROGRAM						
Permit Name/Regulatory Condition	**Mitigation Measure**	**Implementation Phase**	**Monitoring Phase**	**Monitoring Agency**	**Compliance Verification**	
					Initial	**Date**
	Monitor; (v) acknowledgment that if the Kizh Nation monitor is not available, Montauk or their contractor as designee may contract with another qualified tribal monitor acceptable to the OCWR. The selection of the qualified professional(s) shall be subject to OCWR acceptance based on generally accepted professional qualifications and certifications, as applicable. The cover sheet of the grading plans shall include a note to identify that third party tribal monitoring is required during excavation and grading activities in accordance the with the OCWR Agreement.					

APPENDIX B: AIR QUALITY, GHG, HRA, AND LST STUDY

Air Quality, GHG, HRA, AQIA, and LST Study for a Renewable Natural Gas Facility in Irvine, CA

Bowerman Power LFG, LLC

11006 Bee Canyon Access Road Irvine, CA 92602

July 2025

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List of Acronyms and Abbreviations

AB	Assembly Bill
ADMRT	Air Dispersion Modeling and Risk Tool
AERMOD	AMS/EPA Regulatory Model
AMS	American Meteorological Society
AQIA	Air Quality Impact Analysis
AQMP	Air Quality Management Plan
BAAQMD	Bay Area Air Quality Management District
BMP	Best Management Practice
BPIPPRM	Building Profile Input Program for Prime
CAAP	Climate Action and Adaptation Plan
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
DPM	Diesel Particulate Matter
FRB	Frank R. Bowerman
GHG	Greenhouse Gas
GLC	Ground-Level Concentration
HAP	Hazardous Air Pollutant
HARP2	Hotspots Analysis and Reporting Program, Version 2
HFC	Hydrofluorocarbon
HIA	Acute Hazard Index
HIC	Chronic Hazard Index
HRA	Health Risk Assessment
HVAC	Heating, Ventilation, and Air Conditioning
ICE	Internal Combustion Engine
LFG	Landfill Gas
LST	Localized Significance Threshold
LTS	Less Than Significant
MEIR	Maximally Exposed Individual Resident
MEIW	Maximally Exposed Individual Worker
mph	Mile Per Hour
MPO	Metropolitan Planning Organization
MT	Metric Ton

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N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Dataset
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
OCWR	Orange County Waste & Recycling
OEHHA	Office of Environmental Health Hazard Assessment
PFD	Process Flow Diagram
POR	Point of Receipt
PM_{10}	Particulate Matter Less Than 10 Microns in Size
$PM_{2.5}$	Particulate Matter Less Than 2.5 Microns in Size
ppb	Parts per Billion
ppm	Parts per Million
REL	Reference Exposure Level
RELOOC	Regional Landfill Options for Orange County
RMP	Risk Management Policy
RNG	Renewable Natural Gas
ROG	Reactive Organic Gases
RTP	Regional Transportation Plan
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
scfm	Standard Cubic Feet per Minute
SCS	Sustainable Communities Strategy
SJVAPCD	San Joaquin Valley Air Pollution Control District
SoCalGas	Southern California Gas Company
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxides
SRA	Source-Receptor Area
TAC	Toxic Air Contaminant
U.S. EPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
$\mu g/m^3$	Micrograms per Cubic Meter
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound

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Air Quality, GHG, HRA, AQIA, and LST Study for a Renewable Natural Gas Facility in Irvine, CA

1.0 INTRODUCTION

This technical report includes air quality, greenhouse gas (GHG), health risk assessment (HRA), air quality impact analysis (AQIA), and localized significance threshold (LST) analyses for the construction and operation of a new renewable natural gas (RNG) facility that will be located at an existing landfill in Irvine, CA, which is within the jurisdiction of the County of Orange (the County) and the South Coast Air Quality Management District (SCAQMD).

1.1 Project Description

The Frank R. Bowerman (FRB) Landfill is a state-of-the-art, Class III, municipal solid waste facility owned by the County of Orange and operated and maintained by Orange County Waste & Recycling (OCWR). The FRB Landfill opened in 1990 and is the ninth largest landfill in the United States. The property spans approximately 725 acres of hillside with 534 acres allocated for waste disposal. It is permitted for 11,500 tons per day maximum with an annual average of 8,500 tons per day. The FRB Landfill is currently receiving approximately 8,000 tons of refuse per day. The FRB Landfill has enough projected capacity to serve residents and businesses until approximately 2053. The current permitted capacity is 266 million cubic yards, of which approximately 105.7 million cubic yards have been placed as of June 2022.

The Regional Landfill Options for Orange County (RELOOC) defines the permitted vertical and horizontal expansions for the Master Development Plan of the FRB Landfill (County of Orange 2006). The permitted vertical and horizontal expansions are implemented in phases to provide for sufficient landfill operation areas and not disturb all parts of the landfill at once. The Master Development Plan includes three Phase VIII subareas (VIII A, B, and C). The FRB Master Development Plan also includes several on-site stockpile locations for soil excavated as part of landfill phase development and operations. All soil stockpiles are within the landfill property. The soil is used for daily and intermediate cover, liner, road construction, and other related uses. Excavations are currently underway for the development of Phase VIIIA1. Soils excavated from the development of Phase VIIIA1 are stockpiled in the soil stockpile area.

The landfill gas (LFG) currently natively created is managed via a gas collection and control system, which includes vertical and horizontal gas extraction wells, a collection pipe system, and a flare station complex comprised of six flares. The Bowerman Power Plant, an existing 19.6-megawatt LFG-to-energy facility, was opened in 2016 and is an award-winning, public-private partnership producing enough electricity for the City of Anaheim to power 26,000 homes. Bowerman Power currently owns and operates the Bowerman Power Plant. It is located adjacent to the flare station and processes approximately 8,350 standard cubic feet per minute (scfm) of raw LFG to remove moisture and contaminants. The LFG not processed by the Bowerman Power Plant is incinerated at the flare station. California law specifically encourages the production and use of RNG. SB 1440 directs the California Public Utilities Commission to evaluate establishing goals or targets for RNG purchases by California gas utilities. The California Air Resource Board's

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2022 Scoping Plan for Achieving Carbon Neutrality emphasizes the importance of relying on RNG to reduce emissions for hard-to-electrify end uses.

Bowerman Power is working with OCWR to develop an RNG Plant at the FRB Landfill. The RNG Plant will be designed to process a portion of the excess LFG that has not been processed at the Bowerman Power Plant and would otherwise require incineration at the existing adjacent flare station and then deliver the processed RNG to Southern California Gas Company (SoCalGas) via a pipeline. The Project does not include the storage of RNG. The RNG Plant layout will be comprised of two areas: the process equipment area and the control and electrical buildings.

The RNG Plant will be designed to process a maximum of 6,000 scfm of raw LFG at the inlet. The process will remove moisture, nitrogen, oxygen, carbon dioxide, hydrogen sulfide, volatile organic chemicals, hydrogen sulfide, and other minor impurities to meet the gas specifications of SoCalGas. The RNG plant was sized based on the available capacity of the existing SoCalGas pipeline system, as provided by SoCalGas. A simplified PFD of the process is shown in Figure 1-2 and details on the breakdown and flow of each component of the raw LFG are shown in Appendix B.

Excavation is currently underway for the development of FRB Landfill Phase VIIIA1. The soils removed during the excavation are stockpiled within the FRB Landfill's boundaries. The RNG Plant pad is expected to require approximately 93,190 cubic yards of fill material. This fill material will be extracted from within the soil stockpile area and trucked to the RNG Plant site for development of the RNG Plant foundation pad.

SoCalGas will develop a point of receipt (POR) station that will receive RNG from the plant, odorize it, compress it, and insert the RNG into its pipeline. A 250-gallon odorant tank will be installed in the POR station. SoCalGas will construct a new 12-inch diameter pipeline to convey the RNG from the POR on the Project site to the existing SoCalGas pipeline at the corner of Portola Parkway and Jeffrey Road, in the City of Irvine. The new SoCal Gas pipeline will be approximately 2.0 miles in length along Bee Canyon Access Road and approximately 0.4 miles in length along Portola Parkway, for a total of 2.4 miles.

The proposed RNG systems are intended to support continuous operation with appropriate equipment and components. To support minimal staffing, the RNG Plant will be automated to allow station operations. Under normal conditions, maintenance personnel will be on-site for site inspections and maintenance only as needed, and typically only during daylight hours.

The RNG Plant will be supplied with LFG from the existing flare station for processing into pipeline quality gas (i.e., Product Gas). The RNG Plant will be designed to produce RNG that meets the Product Gas Composition requirements as set forth pursuant to SoCalGas's Rule Number 30 requirements.

The RNG Plant will have two buildings: an electrical building, which is planned to be unoccupied, and a Control Building, which will be occupied by the operational staff. The process equipment will be placed outside on the RNG Plant pad. The Control Building will house the Control Center (computer stations) and lavatories, and the Electric Building will house the electrical room.

The SoCalGas POR station located on the RNG Plant site will be 8,000 square feet and include an electrical shelter, analyzer shelter, automated control valve(s), filter separator, meter, odorant skid, aboveground piping and pipe supports, bollards, fencing, roadways, and gates. The POR's equipment and their function are briefly described below:

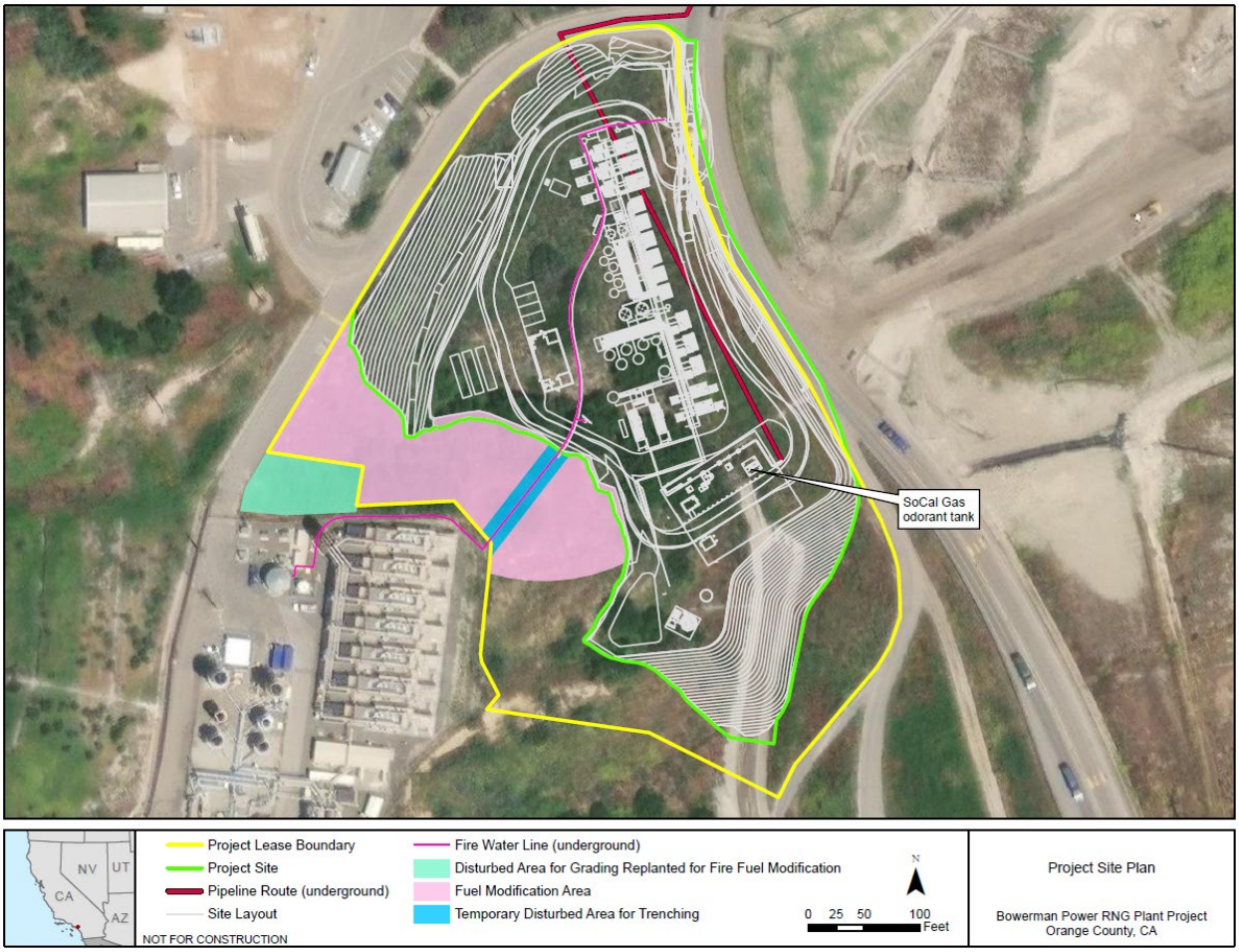
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- Electrical Shelter: The electrical shelter provides power to the POR's electrical equipment, gas instrumentation, and communication controls.
- Analyzer Shelter (or Gas Analyzer System): The analyzer shelter samples and analyzes incoming RNG, from the RNG Plant, to evaluate gas composition and quality. If inlet gas qualities deviate from the allowable limits, the analyzer shelter will trigger the overpressure protection valve to close and rejected gas will be routed back to the RNG Plant for re-processing or flaring. Once permissible gas composition and quality are confirmed by the analyzer shelter, the overpressure production valve will open, and gas will be allowed into the POR station.
- Automated Control Valve(s): The control valves regulate the gas pressure of the RNG that is injected into SoCalGas' existing natural gas infrastructure.
- Filter Separator: The filter separator separates incoming particulates, entrained liquids, and RNG entering the POR station and allows for dry gas to flow into the flow meter.
- Metering (or Flow Metering): The flow meter calculates the corrected gas flow of the RNG entering the POR station.
- Odorant Skid (or Odorizing System): The odorizing system injects odorant *(mercaptan)* into the RNG stream prior to injection into SoCalGas' existing natural gas infrastructure. Odorant is injected as a safety provision to make a gas leak readily detectable by sense of smell. The odorant skid contains a 250-gallon odorant storage tank, two expansion tanks, two injection pumps, two verometers, and four odorant filters.
- Above-Ground Piping and Pipe Supports: The above-ground piping and pipe supports transport the RNG through the POR station and allow for SoCalGas personnel to perform future maintenance on the pipelines.
- Bollards, Fencing, Roadways, and Gates: The bollards, fencing, roadways, and gates protect the POR station from vehicle collision and unauthorized access.

Normal operational power will be provided by Southern California Edison (SCE) service. In case of SCE power outage, a natural gas emergency generator will be on-site to power critical facility safety and control systems. The generator will be used for temporary backup power only. An aerial schematic of the RNG project site is shown in Figure 1-1 below.

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Figure 1-1: RNG Project Site Schematic



1.2 Process Description

The RNG Plant will consist of four main processes:

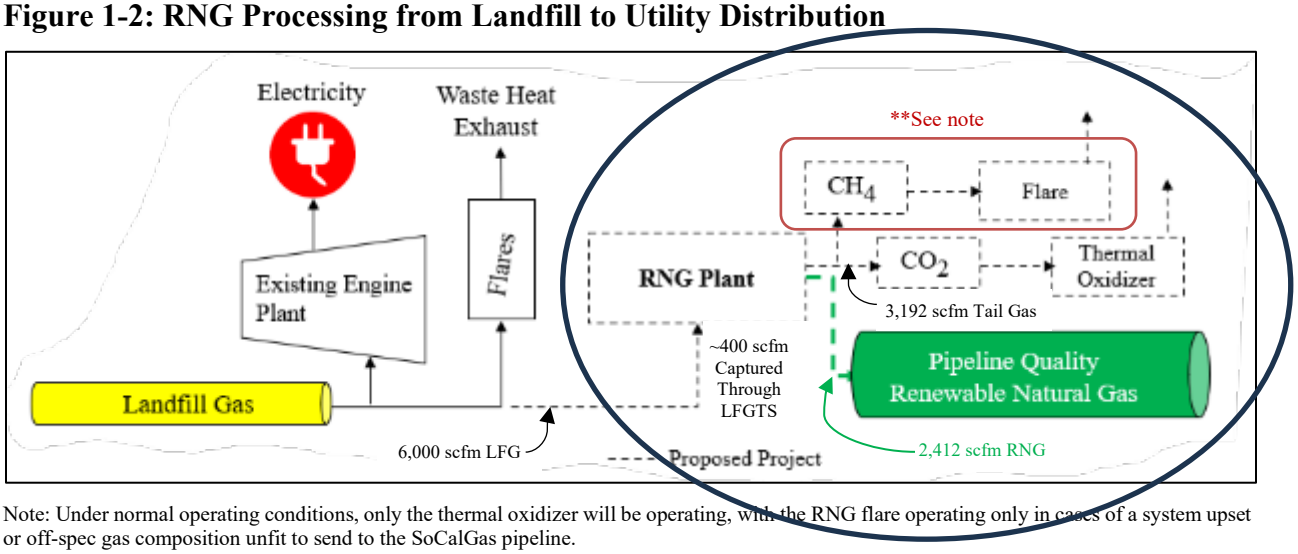
- A Landfill Gas Treatment System (LFGTS) comprised of subsystems to compress the influent LFG; remove particles, water, Volatile Organic Compounds (VOC), siloxanes, Hydrogen Sulfide (H_2S), Carbon Dioxide (CO_2), Oxygen (O_2), and Nitrogen (N_2); and process the resulting gas by dehydration and compression; all to meet SoCalGas sales gas specifications. The LFGTS does not have its own direct emissions to atmosphere.
- A 32.9 Million British Thermal Units (MMBTU)/hr (at High Heating Value or HHV) Low-Nitrogen Oxides (NOx) thermal oxidizer, also referred to herein as a Thermal Oxidizer Unit (TOU), to continuously destroy streams of low-BTU tail gases that are produced from LFGTS; with up to 280 scfm natural gas as supplemental fuel.
- A 120.0 MMBTU/hr flare to destroy off-specification (off-spec) product and process gases, as well as gases vented during initial and periodic start-up operations and plant depressurization associated with shutdown operations; with a 0.10 MMBTU/hr pilot, fueled by natural gas, and operating continuously to allow for intermittent lower and higher heating value streams to be routed to the flare for disposal.

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- A Caterpillar DG 150 generator set, driven by a 253 horsepower (hp) natural gas-fueled emergency Internal Combustion Engine (ICE), to provide backup power when grid power is unavailable.

Figure 1-2 presents a simplified Process Flow Diagram (PFD) for the RNG facility. A detailed version of the PFD is shown in Appendix B, page 8. Permit applications for the aforementioned equipment were submitted to the SCAQMD on May 21, 2024.

Figure 1-2: RNG Processing from Landfill to Utility Distribution



Note: Under normal operating conditions, only the thermal oxidizer will be operating, with the RNG flare operating only in cases of a system upset or off-spec gas composition unfit to send to the SoCalGas pipeline.

1.3 Facility Location

The proposed site is located at 11006 Bee Canyon Access Road in Irvine, CA, which is within the jurisdiction of the County of Orange (the County). The facility is located in the unincorporated General Agricultural, Citrus Rural District (A1) zone. The nearest residential receptors are homes located in the City of Irvine, Portola Springs neighborhood, generally south of the Project site, on the south side of State Route (SR) 241 and east of SR 133. The nearest worker receptor is located at Jimni Systems Inc., located west of State Route 133.

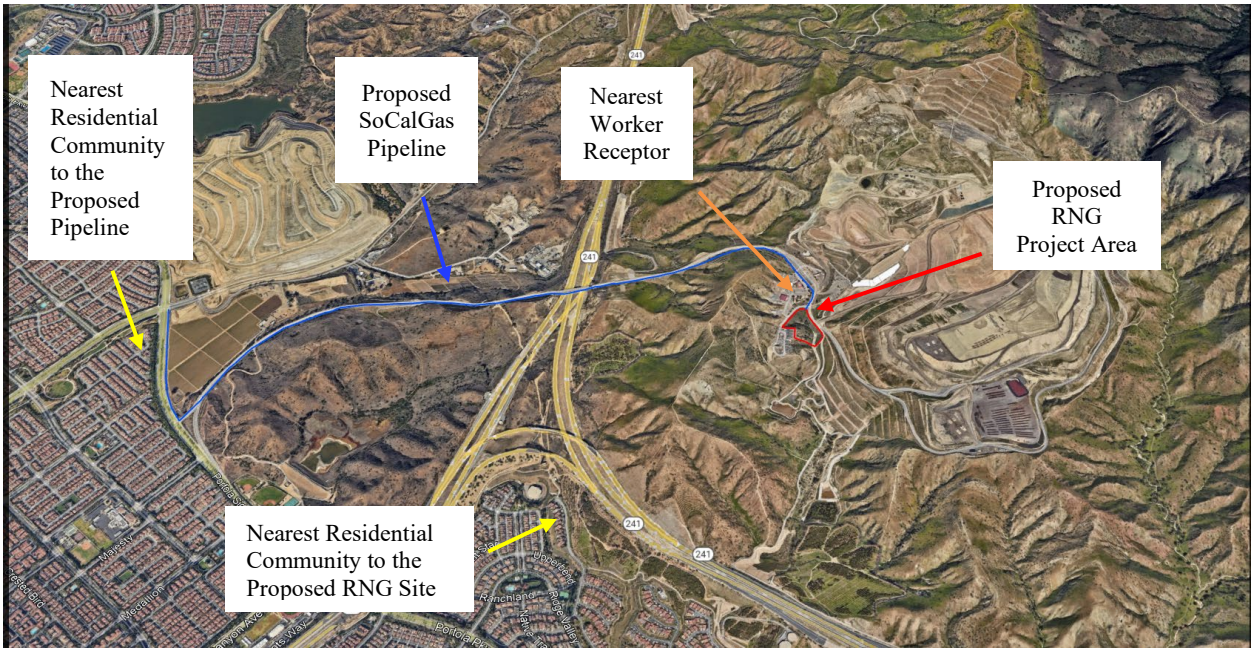
The new SoCalGas pipeline will run from the point of interconnect within RNG Project Area, down Bee Canyon Access Road to the existing SoCalGas pipeline on the corner of Portola Parkway and Jeffery Road. The new SoCal Gas pipeline will be approximately 2.0 miles in length along Bee Canyon Access Road and approximately 0.4 miles in length along Portola Parkway, for a total of 2.4 miles.

Figure 1-3 is satellite imagery showing the location of the proposed facility, SoCalGas pipeline, the surrounding area, highways, and the nearest receptors.

The Project will be located in unincorporated Orange County within the sphere of influence of the City of Irvine, except for a small portion of the new SoCal Gas pipeline, which will be located within the City of Irvine.

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Figure 1-3: Proposed SoCalGas Location Diagram



2.0 ASSUMPTIONS

The following sources of information were used in developing the emissions estimates for the proposed Project using the California Emissions Estimator Model® (CalEEMod). CalEEMod default settings that have a particularly important impact on the Project are listed below.

- The Applicant defined:
  - Basic Project design features, including size of building features, parking spaces, number of units, landscaping, etc.;
  - Low VOC paints will be used in compliance with SCAQMD rules;
  - During construction, any exposed soil and unpaved access roads will be watered a minimum of three times a day, as required by the SCAQMD;
  - Paved roads outside access points to the parcel will be swept daily during the construction, site preparation, and grading phases to control track-out;
  - All construction equipment greater than 350 horsepower (HP) for the Trenching and Pipeline Construction phase (i.e., Phase 6) were assumed to use Tier 4 engines; and
  - The Control Building will meet the 2022 Title 24 Building Envelope Energy Efficiency Standards.
- CalEEMod defaults were used for:
  - Construction equipment load factors;
  - Fleet average age for the proposed RNG project;
  - Architectural coating areas; and

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- Average vehicle trip distances.

- Mitigation Measures:
  - Construction equipment greater than 350 HP for the Trenching and Pipeline Construction phase (i.e., Phase 6) will be equipped with Tier 4 Final engines.

3.0 AIR QUALITY AND GREENHOUSE GAS IMPACTS ANALYSES

In order to evaluate the potential for air quality and GHG impacts from a proposed project, quantitative significance criteria established by the local air quality agency, such as the SCAQMD, may be relied upon to make significance determinations based on mass emissions of criteria pollutants and GHGs, as presented in this report. As shown below, approval of the Project would not result in any significant effects relating to air quality or GHGs.

3.1 CEQA Thresholds of Significance

3.1.1 Criteria Pollutants, Toxic Air Contaminants, and Odors

The Air Quality section of Appendix G of the CEQA Guidelines (Environmental Checklist Form) contains four air quality significance criteria. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

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

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

c) Expose sensitive receptors to substantial pollutant concentrations?

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

The SCAQMD air quality significance thresholds for construction and operation to evaluate local and regional impacts are presented in Table 3-1.

3.1.2 Greenhouse Gases

The Greenhouse Gas Emissions section of Appendix G of the CEQA Guidelines contains two GHG significance criteria. 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?

The SCAQMD CEQA threshold of significance for GHGs for industrial facilities is 10,000 MT per year CO_2e (Table 3-1). This threshold accounts for operational emissions as well as emissions generated during construction amortized over a 30-year projected project lifetime.

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Table 3-1: SCAQMD CEQA Thresholds of Significance

Pollutant	Project Construction (lbs/day)	Project Operation (lbs/day)
ROG (VOC)	75	55
NO_x	100	55
CO	550	550
SO_x	150	150
PM_{10}	150	150
$PM_{2.5}$	55	55
$PM_{2.5}$ 24-hour Average	10.4 µg/m^3	2.5 µg/m^3
PM_{10} 24-hour Average	10.4 µg/m^3	2.5 µg/m^3
PM_{10} Annual Average	1.0 µg/m^3	
NO_2 1-hour Average	0.18 ppm (state)	
NO_2 Annual Arithmetic Mean	0.03 ppm (state) & 0.0534 ppm (federal)	
SO_2 1-hour Average	0.25 ppm (state) and 0.075 ppm (federal – 99th percentile)	
SO_2 24-hour Average	0.04 ppm (state)	
Sulfate 24-hour Average	25 µg/m^3 (state)	
CO 1-hour Average	20 ppm (state) and 35 ppm (federal)	
CO 8-hour Average	9.0 ppm (state/federal)	
Toxic Air Contaminants (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥10 in one million	
	Cancer Burden >0.5 excess cancer cases (in areas ≥1 in one million)	
	Chronic and Acute Hazard Index ≥1.0 (project increment)	
Odor	Project creates an odor nuisance pursuant to Rule 402	
GHGs	10,000 MT/yr CO_2e for industrial facilities	
	3,000 MT/yr CO_2e for land use projects (draft proposal)	

Source: SCAQMD 2023, 2008b.

3.2 Project Emissions Estimation

The land use construction and operation analyses were performed using CalEEMod version 2022.1.1.29, the official statewide land use computer model designed to provide a uniform platform for estimating potential criteria pollutant and GHG emissions associated with both construction and operations of land use projects under the California Environmental Quality Act (CEQA). The model quantifies direct emissions from construction and operations (including vehicle use), as well as indirect emissions, such as GHG emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use. The mobile source emission factors used in the model – published by the California Air Resources Board (CARB) – include the Pavley standards and Low Carbon Fuel standards. The model also identifies Project design features, regulatory measures, and control measures to reduce criteria pollutant and GHG emissions along

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with calculating the benefits achieved from the selected measures. CalEEMod was developed by the California Air Pollution Control Officers Association (CAPCOA) in collaboration with the SCAQMD, the Bay Area Air Quality Management District (BAAQMD), the San Joaquin Valley Air Pollution Control District (SJVAPCD), and other California air districts. Default land use data (e.g., emission factors, trip lengths, meteorology, source inventory, etc.) were provided by the various California air districts to account for local requirements and conditions. As the official assessment methodology for land use projects in California, CalEEMod is relied upon herein for construction and land use operational (i.e., mobile, energy and water use, etc.) emissions quantification, which forms the basis for the impact analysis.

The stationary equipment that would contribute to the emissions of criteria pollutants, TACs, and GHGs during the operational phase are described in Section 1.2 and include:

- The thermal oxidizer;
- The off-spec flare pilot (the rationale for excluding gas disposed in the flare is described in Section 3.2.2);
- The generator set ICE;
- Fugitive emissions; and
- GHGs associated with product gas combustion.

Emissions from combustion for each of these sources along with fugitive emissions were calculated separately and entered into CalEEMod under the "User Defined" category. These emissions are summarized in Sections 3.5 and 4.3, Tables 3-10, and 4-7 to 4-10. Detailed emission calculations are included Appendix D.

3.2.1 Construction

Based on information received from the Applicant, representative land use data for the proposed Project activities that were used for CalEEMod input are presented in Table 3-2. The Project is expected to require up to approximately 1.5 years of planned work activities (i.e., from mobilization to substantial completion) comprising six construction phases:

1. Site preparation;
2. Grading;
3. Building construction;
4. Paving;
5. Architectural coating; and
6. Trenching and pipeline construction.

A preliminary construction schedule is shown in Table 3-3. The proposed list of offroad equipment for each construction phase is shown in Table 3-4. CalEEMod defaults were used for the nonroad construction equipment load factor and HP. A mitigation measure was included to use only construction equipment greater than 350 HP that meet the U.S. Environmental Protection Agency (EPA) Tier 4 emissions standards for nonroad vehicles and engines (i.e., Tier 4 Final) for the Trenching and Pipeline Construction phase (i.e., Phase 6). Construction equipment would be fitted with appropriate mufflers, and engines would be maintained regularly. The CalEEMod default distances of 18.5 miles and 10.2 miles were used for the worker and vendor trips, respectively. The CalEEMod default distance of 20 miles was used for the hauling trips. Table 3-5 summarizes the construction trip rates and mileages.

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Table 3-2: Land Use, RNG Plant, and SoCalGas Pipeline Data for CalEEMod Input

Land Use Type	Land Use Subtype	Unit Amount	Size Metric	Lot Acreage (footprint)	Square Feet	Description
Commercial	General Office Building	2.670	1,000 sq. ft.	0.061	2,670	Control Building on site
Industrial	General Heavy Industry	22.045	1,000 sq. ft.	0.51	22,045	Site of Renewable Gas Facility
Parking	Other Asphalt Surfaces	23.240	1,000 sq. ft.	0.53	23,240	Parking Areas (Concrete hardscape and asphalt paving)
Parking	Other Non-Asphalt Surfaces	136.840	1,000 sq. ft.	3.14	136,840	Graded Non-Asphalt Areas
Linear	User Defined Linear	2.40	Mile	–	–	SoCalGas Pipeline
			Project Size	**4.24**	**184,800**	

Sources: Applicant 2023, CalEEMod version 2022.1.1.29.

Notes:

Electric utility: Southern California Edison.

Gas utility: Southern California Gas Company.

Table 3-3: Proposed Project Preliminary Construction Schedule by Phase

Phase #	Phase Name	CalEEMod Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase
1	Earthworks A	Site Preparation	10/28/2025	11/10/2025	5	10
2	Earthworks B	Grading	11/11/2025	1/5/2026	5	40
3	Building Construction A	Building Construction	7/13/2026	1/8/2027	5	130
	Building Construction B		8/7/2026	11/6/2026	5	66
	Building Construction C		5/18/2026	2/26/2027	5	205
4	Paving	Paving	1/11/2027	1/22/2027	5	10
5	Architectural Coating	Architectural Coating	11/7/2026	11/28/2026	5	15
6	SoCalGas Pipeline Construction	Linear, Drainage, Utilities, & Sub-Grade	7/17/2026	4/13/2027	5	193

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Table 3-4: Proposed Project Offroad Equipment Used for Construction Phases for CalEEMod Input

Phase #	Phase Name	Equipment Description	Fuel Type	Engine Tier	Qty	Hours/Day	HP	Load Factor
1	Site Preparation	Rubber Tired Dozers	Diesel	Average	3	8	367	0.4
		Tractors/Loaders/Backhoes	Diesel	Average	4	8	84	0.37
2	Grading	Rubber Tired Dozers	Diesel	Average	2	6	148	0.41
		Tractors/Loaders/Backhoes	Diesel	Average	2	6	84	0.37
		Cement and Mortar Mixers	Diesel	Average	1	6	367	0.4
		Sweepers/Scrubbers	Diesel	Average	1	6	36	0.46
		Dumpers/Tenders	Diesel	Average	10	6	16	0.38
		Off-Highway Trucks	Diesel	Average	1	6	376	0.38
		Excavators	Diesel	Average	1	8	36	0.38
3	Building Construction	Cranes	Diesel	Average	2	6	367	0.29
		Forklifts	Diesel	Average	3	8	82	0.2
		Tractors/Loaders/Backhoes	Diesel	Average	1	6	14	0.74
		Aerial Lifts	Diesel	Average	1	6	84	0.37
		Off-Highway Trucks	Diesel	Average	1	6	46	0.45
4	Paving	Tractors/Loaders/Backhoes	Diesel	Average	1	8	84	0.37
		Pavers	Diesel	Average	1	8	81	0.42
		Paving Equipment	Diesel	Average	2	6	89	0.36
		Rollers	Diesel	Average	2	6	36	0.38
		Cement and Mortar Mixers	Diesel	Average	2	6	10	0.56
5	Architectural Coating	Air Compressors	Diesel	Average	1	6	37	0.48
6	Trenching and Pipeline Construction	Bore/Drill rigs	Diesel	Average	1	6	83	0.5
		Excavators	Diesel	Average	1	6	36	0.38
		Rubber Tired Dozers	Diesel	Tier 4 Final	1	6	367	0.4
		Tractors/Loaders/Backhoes	Diesel	Average	1	6	84	0.37
		Cranes	Diesel	Tier 4 Final	1	6	367	0.29
		Graders	Diesel	Average	1	6	148	0.41
		Other General Industrial Equipment	Diesel	Average	1	6	35	0.34
		Air Compressors	Diesel	Average	1	6	37	0.48
		Other Construction Equipment	Diesel	Average	1	6	82	0.42

Notes: Diesel engines greater than 350 HP for Phase 6 (i.e., Trenching and Pipeline Construction) will be EPA Tier 4 Final.

Engine load factors are CalEEMod default values (version 2022.1.1.29).

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Table 3-5: Proposed Project Construction Traffic Summary

Phase #	Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
1	Earthworks A	Worker	20.0	18.5	LDA,LDT1,LDT2
2	Earthworks B	Hauling	366.9	20.0	HHDT
		Worker	20.0	18.5	LDA,LDT1,LDT2
3	Building Construction A	Worker	20.0	18.5	LDA,LDT1,LDT2
		Vendor	4.1	10.2	HHDT,MHDT
	Building Construction B	Worker	50.0	18.5	LDA,LDT1,LDT2
		Vendor	4.1	10.2	HHDT,MHDT
	Building Construction C	Worker	50.0	18.5	LDA,LDT1,LDT2
		Vendor	4.1	10.2	HHDT,MHDT
4	Paving	Worker	20.0	18.5	LDA,LDT1,LDT2
5	Architectural Coating	Worker	20.0	18.5	LDA,LDT1,LDT2
6	SoCalGas Pipeline Construction	Hauling	0.5	20.0	HHDT
		Onsite truck	2.0	20.0	HHDT
		Worker	50.0	18.5	LDA,LDT1,LDT2

Key: LDA = Light-Duty Automobile; LDT = Light-Duty Truck; MHDT = Medium-Heavy-Duty Truck; HHDT = Heavy-Heavy-Duty Truck

3.2.2 Operation

The term "project operations" refers to the full range of activities that can or may generate criteria pollutant, GHG, and TAC emissions when the project is functioning in its intended use. CalEEMod estimates emissions from the following sources:

- "Mobile" sources, which include emissions from onroad vehicles required to operate the proposed Project;
- "Area" sources, which include emissions from consumer products, architectural coatings, and landscaping equipment;
- "Energy" Sources, which include emissions from building electricity and natural gas usage (non-hearth);
- "Water and Wastewater", which includes the GHG emissions associated with supplying and treating water and wastewater used and generated by the project land uses;
- "Waste", which includes the GHG emissions at landfills associated with disposal of solid waste generated for each project land use subtype; and
- "Refrigerants", which includes the fugitive GHG emissions associated with building air conditioning (A/C) and refrigeration equipment.

Emissions from the abovementioned sources are collectively referred to as "miscellaneous operational sources" in this document.

For industrial projects and some commercial projects, equipment operation and manufacturing processes, i.e., permitted stationary sources, can be of greatest concern from an emissions standpoint. For this Project, the stationary sources of combustion byproducts, criteria pollutants, and GHGs are the RNG thermal oxidizer, RNG flare, and emergency generator.

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This report evaluates the total operational emissions increases from the stationary sources, which include the combustion of pilot fuel (natural gas) and tail gas in the RNG thermal oxidizer, the combustion of pilot fuel (natural gas) and off-spec gas in the RNG flare, as well as the combustion of natural gas in the emergency generator. Combustion of off-spec gas sent to the RNG flare for disposal during transient conditions (e.g., during off-spec composition or system upset), is presented in this report (Appendix D) but is excluded from the analysis since the thermal oxidizer and RNG flare will not be used simultaneously. Under normal operating conditions, only the thermal oxidizer will be operating, with the RNG flare operating only in cases of a system upset or off-spec gas composition unfit to send to the SoCalGas pipeline.[1] Therefore, RNG flare emissions are based on the supplemental pilot fuel (natural gas) usage, which is continuously operating.

CO_2 and CH_4 may be emitted from various RNG production process components (e.g., fittings, flanges, connectors, pumps, pressure release valves, etc.) in the RNG facility, SoCalGas pipeline, and POR station (AKA, Fugitive emissions). Fugitive emissions were estimated using SCAQMD Guidelines for Reporting VOC Emissions from Component Leaks, Continuous Leaking (SCAQMD 2015) as shown in Appendix D.

Emissions from combustion for each of these sources along with fugitive emissions were calculated separately and entered into CalEEMod under the "User Defined" category. Further details regarding the source dimensions, specifications, and a process flow diagram of the project are presented in Appendix B.

3.3 Regional CEQA Significance of Criteria Pollutants

3.3.1 Construction

A project's construction phase produces many types of emissions, and generally, particulate matter less than 10 microns in size (PM_{10}) [including particulate matter less than 2.5 microns in size ($PM_{2.5}$)] in fugitive dust and diesel engine exhaust are the pollutants of greatest concern. Construction-related emissions can cause substantial increases in localized concentrations of PM_{10}, as well as affecting PM_{10} compliance with ambient air quality standards on a regional basis. The use of diesel-powered construction equipment emits ozone precursors NO_x and reactive organic gases (ROG), as well as diesel particulate matter (DPM); however, the use of diesel-powered equipment would be minimal. Use of architectural coatings and other materials associated with finishing buildings may also emit ROG and toxic air contaminants (TACs). CEQA significance thresholds address the impacts of construction activity emissions on local and regional air quality. Thresholds are also provided for other potential impacts related to Project construction, such as odors and TACs.

The SCAQMD's approach to CEQA analyses of fugitive dust impacts is to require implementation of effective and comprehensive dust control measures rather than to require detailed quantification of emissions. PM_{10} emitted during construction can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors, making quantification difficult. Despite this variability in emissions, experience has shown that there are several feasible control measures that can be reasonably implemented to

[1] Under normal operating conditions, 6,000 scfm of landfill gas, after going through the LFGTS, will be split between 1) the thermal oxidizer running for up to 8,760 hours annually, and 2) the product gas being sent to the SoCalGas pipeline, with no fuel remaining to be sent to the proposed flare. A simplified PFD of the process is shown in Figure 1-2 and details on the breakdown and flow of each component of the raw LFG are shown in Appendix B, page 8.

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significantly reduce fugitive dust emissions from construction. For larger projects, the SCAQMD has determined that compliance with an approved fugitive dust control plan comprising Best Management Practices (BMPs), primarily through frequent water application, constitutes sufficient control to reduce PM_{10} impacts to a level considered less than significant.

CalEEMod outputs are in Appendix A. SCAQMD Rule 403, Fugitive Dust, requires that water be applied in sufficient quantities to prevent the generation of visible dust plumes, several watering related options were chosen in CalEEMod (i.e., water exposed surfaces, water unpaved construction roads, limit vehicle speed on unpaved roads, and sweep paved roads). As additional CalEEMod dust controls, the Project intends to implement a 15 mile per hour (mph), which further reduces fugitive dust emissions. For this project, applicable SCAQMD and Planning Department approved BMPs (e.g., compliance with SCAQMD Rule 403, Fugitive Dust) will be implemented as project design features. This is a standard Condition of Approval and pursuant to CEQA, is not considered mitigation.

Table 3-6 shows the peak daily criteria pollutants emissions for construction of proposed Project and evaluates them against SCAQMD significance thresholds. As shown in Table 3-6, mass emissions of criteria pollutants from construction would be below applicable SCAQMD significance thresholds. No mitigation measure is needed to reduce regional emissions to a *less-than-significant* level; MM-AQ-1, which is mentioned later in the report, was applied to phase 6 of the construction to reduce the health impacts of the proposed SoCalGas pipeline construction as explained in Section 4.2.

Table 3-6: Construction Emissions Summary and Significance Evaluation

Criteria Pollutants	Construction Emissions (lbs/day)	Threshold (lbs/day)	Significant?
ROG (VOC)	20.9	75	**No**
NO_x	56.6	100	**No**
CO	39.0	550	**No**
SO_x	0.22	150	**No**
Total PM_{10}	16.4	150	**No**
Total $PM_{2.5}$	4.6	55	**No**

Sources: SCAQMD 2023, CalEEMod version 2022.1.1.29.

Notes:

lbs/day are winter or summer maxima for planned land use.

Total PM_{10}/$PM_{2.5}$ comprises fugitive dust plus engine exhaust.

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3.3.2 Operation

Table 3-7 shows baseline and the proposed Project's criteria pollutants emissions for operations and evaluates the incremental change in emissions as a result of the proposed Project against SCAQMD significance thresholds.

The Project's baseline is defined as the emissions associated with the highest daily LFG consumption at the FRB Landfill's flare station for the prior two calendar years (2023 and 2024).[2] Daily emissions are estimated from emission factors that are back-calculated from permit conditions.

The operational emissions include the calculated operational emissions from Miscellaneous Operational Sources (i.e., mobile, area, energy sources) as well as the stationary sources (i.e., pilot fuel (natural gas) and tail gas for the thermal oxidizer, pilot fuel for the flare, as well as natural gas for emergency generator usage). The difference ([G]) between the proposed Project ([F]) and baseline emissions ([A]) represent the incremental change in emissions, and these incremental changes are compared to the SCAQMD CEQA significance thresholds ([H]). These emissions represent the peak operating day with the TOU, Flare, and Emergency Engine operating on the same day. This is a conservative estimate because a normal operating day would not involve emergency engine usage, which is limited to maintenance and testing hours only.

As shown in Table 3-7, mass emissions of criteria pollutants from operation are below applicable SCAQMD CEQA significance thresholds. The proposed Project would provide a beneficial use for the LFG generated from the landfill and therefore, would have a less than significant impact.

[2] Engines located at the existing Bowerman Power Plant are not affected by the proposed project, and thus, are not included in the baseline.

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Table 3-7: Operational Emissions Summary and Significance Evaluation

Emission Source		Criteria Pollutant Emissions on Peak Operating Day [8] (lb/day)					
		VOC	NO_x	CO	SO_x[9]	PM_{10}[10]	$PM_{2.5}$[10]
[A]	Baseline Existing LFG Flare Emissions[1]	84.14	304.37	236.73	140.94	138.75	138.75
[B]	Proposed TOU[2]	4.33	25.27	57.75	124.26	5.16	5.16
[C]	Proposed Flare[3]	0.01	0.14	0.14	0.001	0.01	0.01
[D]	Proposed Engine[4]	0.66	4.01	6.69	0.02	0.40	0.40
[E]	Proposed Miscellaneous Operational Sources[5]	0.83	0.32	1.59	0.00	0.12	0.05
[F] = [B + C + D + E]	**Proposed Project[6]**	**5.83**	**29.74**	**66.17**	**124.28**	**5.69**	**5.62**
[G] = [F] - [A]	**Proposed Project - Baseline Existing LFG Flare Emissions**	**-78.31**	**-274.63**	**-170.56**	**-16.65**	**-133.07**	**-133.07**
[H]	SCAQMD Mass Daily Thresholds for Operation [7]	55	55	550	150	150	150
Is [G] > [H]?	**Significant?**	**No**	**No**	**No**	**No**	**No**	**No**

[1] Baseline is calculated as the emissions associated with the highest daily LFG consumption at the FRB Landfill's flare station for the prior two calendar years (2023 and 2024). Engines located at the existing Bowerman Power Plant are not affected by the proposed project, and thus, are not included in the baseline.

[2] Proposed TOU: 2,309 scfm Tail Gas 1 (~6.3 mmBtu/hr) + 883 scfm Tail Gas 2 (~6.1 mmBtu/hr) + 280 scfm Supplemental Fuel (~17.6 mmBtu/hr), 24 hours. Further information regarding tail gas compositions and fuel heat ratings are provided in Appendices B and D.

[3] Proposed Flare: ~1.6 scfm Supplemental Fuel (0.1 mmBtu/hr) operating 24 hours a day.

[4] Proposed Engine: Engine is natural gas fired and has a maximum permitted daily usage of 24 hours per day (including maintenance and testing and emergency use).

[5] Proposed Miscellaneous Operational Sources: Includes Mobile, Area, and Energy sources from CalEEMod.

[6] Proposed Project: Proposed TOU + Proposed Flare + Proposed Engine + Proposed Miscellaneous Operational Sources.

[7] Source: SCAQMD 2023.

[8] Peak operating day with emergency engine usage is shown here. A typical day would not involve emergency generator usage.

[9] SOx EF is based on daily/hourly BACT basis (85 ppm or 14.354 lb/mmscf). Proposed TOU SOx emissions include 100% of the Landfill Tail Gas SOx emissions + SOx from supplemental fuel. Proposed Flare SOx emissions include SOx from supplemental fuel.

[10] Total PM_{10} / $PM_{2.5}$ comprises fugitive dust plus engine exhaust.

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3.4 Localized Significance Threshold Analysis

The SCAQMD's LST methodology (SCAQMD 2008a) was used to analyze the neighborhood scale impacts of NO_x, carbon monoxide (CO), PM_{10}, and $PM_{2.5}$ associated with Project-specific mass emissions. Introduced in 2003, the LST methodology was revised in 2008 to include the $PM_{2.5}$ significance threshold methodology and update the LST mass rate lookup tables for the new 1-hour nitrogen dioxide (NO_2) standard.

For determining localized air quality impacts from small projects in a defined geographic source-receptor area (SRA), the LST methodology provides mass emission rate lookup tables for 1-acre, 2-acre, and 5-acre parcels by SRA. The tabulated LSTs represent the maximum mass emissions from a project that will not cause or contribute to an exceedance of California or national ambient air quality standards (CAAQS or NAAQS) for the above pollutants and were developed based on ambient concentrations of these pollutants for each SRA in the South Coast Air Basin (SCAQMD 2008a).

For most land use projects, the highest daily emission rates occur during the site preparation and grading phases of construction; where applicable, these maximum daily emissions were used in the LST analysis.

The proposed Project site is 4.24 acres in SRA Zone 19 – Saddleback Valley. As a conservative estimate, the 2-acre screening lookup tables were used to evaluate NO_x, CO, PM_{10}, and $PM_{2.5}$ impacts on nearby receptors. The nearest receptor is approximately 50 meters (165 feet) away from the boundary of the proposed construction site. Therefore, the impact evaluation was performed using the closest distance within SCAQMD LST tables of 50 meters for construction (SCAQMD 2008a).

3.4.1 Construction

The LST results provided in Table 3-8 show that on-site emissions from construction would meet the LST passing criteria at the nearest receptors. Thus, impacts would be less than significant. No mitigation measure is needed to reduce localized emissions to a *less-than-significant* level; MM-AQ-1, which is mentioned later in the report, was applied to phase 6 of the construction to reduce the health impacts of the proposed SoCalGas pipeline construction as explained in Section 4.2.

Table 3-8: Construction Localized Significance Threshold Evaluation

Criteria Pollutants	Construction Emissions (lbs/day)	Threshold (lbs/day)	Significant?
NO_x	56.6	127	**No**
CO	39.0	1,227	**No**
PM_{10}	16.4	18	**No**
$PM_{2.5}$	4.6	6	**No**

Sources: SCAQMD 2008a, CalEEMod version 2022.1.1.29.

Notes:

SRA: Zone 19 – Saddleback Valley. 2-acre area, 50 meters to receptor.

3.4.2 Operation

An AQIA was conducted to evaluate localized air quality impacts from operational emissions and is discussed in Section 4.3.1.

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3.5 Greenhouse Gas Emissions from Construction and Operation

GHGs – primarily CO_2, methane (CH_4), and nitrous oxide (N_2O), collectively reported as carbon dioxide equivalents (CO_2e) – are directly emitted from stationary source combustion of natural gas in equipment such as water heaters, boilers, process heaters, and furnaces. GHGs are also emitted from mobile sources, such as on-road vehicles and off-road construction equipment, burning fuels such as gasoline, diesel, biodiesel, propane, or natural gas (compressed or liquefied). Indirect GHG emissions result from electric power generated elsewhere (i.e., power plants) used to operate process equipment, lighting, and utilities at a facility. Also, included in GHG quantification is electric power used to pump the water supply (e.g., aqueducts, wells, pipelines) and disposal and decomposition of municipal waste in landfills (CARB 2022a).

California's Building Energy Efficiency Standards are updated on an approximately 3-year cycle. The 2022 standards improved upon the 2019 standards for new construction of, and additions and alterations to, residential, commercial, and industrial buildings. The 2022 standards went into effect on January 1, 2023 (CEC 2022).

Since the Title 24 standards require energy conservation features in new construction [e.g., high-efficiency lighting; high-efficiency heating, ventilation, and air conditioning (HVAC) systems; thermal insulation; double-glazed windows; water conserving plumbing fixtures; etc.], they indirectly regulate and reduce GHG emissions.

Using CalEEMod, direct on-site and off-site GHG emissions were estimated for construction and operation, and indirect off-site GHG emissions were estimated to account for electric power used by the proposed Project, water conveyance, and solid waste disposal. CalEEMod also quantifies common refrigerant GHGs (abbreviated as "R" in the model output) used in air conditioning and refrigeration equipment, some of which are hydrofluorocarbons (HFCs).

The SCAQMD officially adopted an industrial facility mass emissions threshold of 10,000 metric tons (MT) CO_2e per year (SCAQMD 2023).

The City of Irvine adopted its Climate Action and Adaptation Plan (CAAP) in June 2021. The measures identified in the CAAP represent the City's actions to achieve the GHG reduction targets of Assembly Bill (AB) 32 for target year 2030. Local measures included in the CAAP include:

- An energy measure that directs the City to create an energy action plan to reduce energy consumption citywide;
- Land use and transportation measures that encourage alternative modes of transportation (walking, biking, and transit), reduce motor vehicle use by allowing a reduction in parking supply, voluntary transportation demand management to reduce vehicle miles traveled, and land use strategies that improve jobs-housing balance (increased density and mixed-use); and
- Solid waste measures that reduce landfilled solid waste in the City.

Table 3-9 shows a breakdown of the Project construction GHG emissions over the approximately 1.5 years construction period. Table 3-10 shows a breakdown of the Project operation GHG emissions. Details of the analysis are shown in Appendix D. As shown in Appendix D, Table D.23, baseline GHG emissions from existing flare operations are estimated at 135,844 MT/yr CO2e.

Table 3-11 combines the emissions from Table 3-9 and Table 3-10 for comparison to baseline emissions. Baseline emissions include CO_2, CH_4, and N_2O based on total inlet flow rate of 6,000

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scfm, the equivalent fuel rate being directed to the proposed RNG facility (Appendix B (page 8, Process Point 1). As shown in Table 3-11, incremental GHG emissions from operations are below the applicable SCAQMD CEQA significance threshold. The baseline comparison was also broken down by source contribution and shows that the total GHGs associated with the proposed LFG usage is roughly equivalent to the GHGs from the baseline LFG flare station, with the additional GHGs coming from the pilot gas combustion at the flare and thermal oxidizer, emergency generator usage, fugitive emissions, and construction/miscellaneous operational sources. The Project is expected to have a less than significant impact.

Table 3-9: Construction Greenhouse Gas Emissions Summary by Year

Year	CO_2	CH_4	N_2O	R	CO_2e
	MT/yr	MT/yr	MT/yr	MT/yr	MT/yr
2025	520.30	0.04	0.07	0.40	542
2026	507.59	0.02	0.02	0.25	514
2027	163.84	0.01	0.00	0.06	165
Total	**1,191.73**	**0.06**	**0.09**	**0.70**	**1,221**

Source: CalEEMod version 2022.1.1.29

Table 3-10: Operation Greenhouse Gas Emissions Summary by Sector/Equipment

Year	CO_2	CH_4	N_2O	R	CO_2e
	MT/yr	MT/yr	MT/yr	MT/yr	MT/yr
Mobile	17.79	0.00	0.001	0.03	18
Area	0.50	0.00	0.000	0.00	1
Energy	116.17	0.01	0.001	0.00	117
Water	10.92	0.18	0.004	0.00	17
Waste	2.66	0.27	0.000	0.00	9
Refrigeration	0.00	0.00	0.000	0.95	1
Thermal Oxidizer (TOU)[1,2]	74,875.99	0.26	0.03	0.00	74,890
Off-Spec Flare[1]	46.46	0.00	0.00	0.00	47
Genset with ICE	18.43	0.00	0.00	0.00	18
Fugitives	0.60	12.23	0.00	0.00	306
Off-site Combustion of Product Gas[3]	69,061.49	1.28	0.13	0.00	69,132
Total	**144,151.00**	**14.23**	**0.16**	**0.98**	**144,555**

Source: CalEEMod version 2022.1.1.29

[1]The control of process gas is exclusively through the thermal oxidizer or the flare. Maximum GHG emissions results from the combustion of process gas from the TOU and Flare were evaluated in Appendix D. The combustion from the TOU, representing the maximum potential GHG emissions and normal operations is shown in this table.

[2]Thermal Oxidizer CO_2e is comprised of 66,686.79 MT/yr (rounded to 66,687 MT/yr in Table 3-11) from tail gas combustion and 8,203.60 $^{MT/yr}$ (rounded to 8,204 MT/yr in Table 3-11) from pilot gas combustion.

[3]Off-site Combustion of Product Gas is based on 2,412 scfm product gas stream flowrate from PFD in Appendix B (page 8, Process Point 5), Continuous operation.

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Table 3-11: Greenhouse Gas Emissions Device Breakdown and Significance Evaluation

Emission Source		GHG Emissions (MT/yr)				
		CO_2	CH_4	N_2O	R	Total CO_2e
[A]	**Baseline Existing LFG Flare Station Emissions[1]**	**135,768**	**1.39**	**0.14**	**--**	**135,844**
[B]	TOU/Flare[2] (from Tail Gas)	66,681	0.11	0.01	--	66,687
[C]	Off-site Combustion of Product Gas[3]	69,061	1.28	0.13	--	69,132
[D] = [B] + [C]	**Total GHGs associated with Proposed Landfill Gas Usage[4]**	**135,742**	**1.39**	**0.14**	**--**	**135,818**
[E]	TOU[2] (from Pilot Gas)	8,195	0.15	0.02	--	8,204
[F]	Flare[5] (from Pilot Gas)	46	0.00	0.00	--	46.51
[G]	Emergency Engine[6]	18	0.00	0.00	--	18.45
[H]	Fugitive Emissions[7]	1	12.23	--	--	306.44
[I]	Construction[8]	40	0.00	0.00	0.02	40.70
[J]	Miscellaneous Operational Sources[9]	148	0.46	0.01	0.98	162.17
[K] = [B + C + E + F + G + H + I + J]	**Proposed Project**	**144,191**	**14.23**	**0.16**	**1.00**	**144,596**
[L] = [K] - [A]	**Proposed Project - Baseline Existing LFG Flare Emissions**	**8,423**	**12.85**	**0.02**	**1.00**	**8,752**
[M]					SCAQMD GHG Threshold	10,000
Is [L] > [M]?					**Significant?**	**No**

Sources: SCAQMD 2008b, Yorke 2025 (Appendix D), CalEEMod version 2022.1.1.29.

Notes:

[1]Baseline existing flare station emissions are based on total inlet flow rate of 6,000 scfm, the equivalent fuel rate being directed to the proposed RNG facility (Appendix B (page 8, Process Point 1), Continuous operation. The total inlet flow rate was separated into CO_2 and CH_4 components in the stream, with CO_2 emissions directly emitted from the flare and CH_4 combustion estimated using natural gas GHG emission factors.
[2]Proposed TOU: 2,309 scfm Process Gas 1 (~6.3 mmBtu/hr) + 883 scfm Process Gas 2 (~6.1 mmBtu/hr) + 280 scfm Supplemental Fuel (~17.6 mmBtu/hr), Continuous operation. The control of process gas is exclusively through the thermal oxidizer or the flare. Maximum GHG emissions results from the combustion of process gas from the TOU and Flare were evaluated in Appendix D. The combustion from the TOU, representing the maximum potential GHG emissions and normal operations is shown in this table.
[3]Off-site Combustion of Product Gas is based on 2,412 scfm product gas stream flowrate from PFD in Appendix B (page 8, Process Point 5), Continuous operation.
[4]Note that the total GHGs associated with Proposed LFG usage is roughly equivalent to the GHGs from baseline LFG Flare Station
[5]Proposed Flare: ~1.6 scfm Supplemental Fuel (0.1 mmBtu/hr), Continuous operation. Off-Spec Flare Gas is not included since the flare will not be used concurrently with the Thermal Oxidizer, under which condition, only pilot gas consumption would occur at flare. Off-Spec Flare will only be operated in case of a system upset or if RNG is off-spec.
[6]Proposed Engine: Engine is natural gas fired and used for maintenance and testing.
[7]Fugitive Emissions: Component counts from Tent Engineering and SoCalGas, using SCAQMD Guidelines for Reporting VOC Emissions from Component Leaks, Continuous Leaking (SCAQMD 2015)
[8] Construction emissions shown in Table 3-9 (1,221 MT CO2e), amortized over 30 years.
[9] Miscellaneous Operational Sources: Include Mobile, Area, and Energy sources from CalEEMod.

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4.0 MODELING ANALYSIS

CEQA requires that the environmental impacts of a proposed project be identified and assessed. If these impacts are found to be significant, the impacts must be mitigated to the extent feasible.

The SCAQMD has developed CEQA thresholds for determination of significance and determination if AQIA modeling is required (SCAQMD 2023); these criteria are described further in Section 5. Per SCAQMD Final Localized Significance Threshold Methodology, LST analysis is not applicable for project sites where emissions are distinctly non-uniform across the site (SCAQMD, 2008a); therefore, an AQIA was conducted for operations.

The modeling analyses discussed in this section include criteria pollutant AQIA modeling with respect to the NAAQS/CAAQS/SCAQMD thresholds for operational activities and two separate HRAs for construction and operations.

The methodology used to develop the AQIA and HRAs is described below and based on SCAQMD guidance documents and policies, in particular, "South Coast AQMD Modeling Guidance for AERMOD" (SCAQMD 2024). The AERMOD dispersion model was used as the basis for both the AQIA and HRAs.

4.1 Dispersion Modeling

4.1.1 Air Dispersion Model

The air dispersion model used for the AQIA/HRAs is the **A**MS/**E**PA **R**egulatory **Mod**el (AERMOD). AERMOD is a steady-state plume dispersion model that incorporates air dispersion calculations based on planetary boundary layer turbulence structure and scaling concepts. AERMOD includes the treatment of both surface and elevated sources and simple and complex terrain. AERMOD, like most dispersion models, uses mathematical algorithms to characterize the atmospheric processes that disperse pollutants emitted by a source. Using emission rates, release parameters, terrain characteristics, and meteorological inputs, AERMOD calculates downwind pollutant concentrations at specified receptor locations.

The Lakes Environmental Software Implementation/user interface, AERMOD View™, version 13.0.0, was used for this Project. This version of AERMOD View™ implements version 24142 of AERMOD.

4.1.2 Modeling Options

AERMOD View™ allows the user to select from a variety of dispersion options. For this project, "Regulatory Default" options were used.

4.1.3 Meteorological Data

Five years of AERMOD-ready preprocessed meteorological data files for 2017-2021 were obtained from the SCAQMD for the Mission Viejo (MSV) meteorological station (SCAQMD 2024).

4.1.4 Terrain Data

Digital elevation data were imported into AERMOD and elevations were assigned to receptors, buildings, and emissions sources, as necessary. Future on-site buildings have elevations set to their post-construction elevations. National Elevation Dataset (NED) elevation data were obtained through the AERMOD View™ WebGIS import feature. The dataset has a resolution of

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approximately 10 meters. Per SCAQMD modeling guidance, since some receptors are lower and some receptors are higher than the base elevation of the sources, AERMOD was run twice– once using the default elevated option and the second time using the non-default (flat) option. The maximum ground-level concentration from both runs, whichever is greater, is reported.

4.1.5 Urban/Rural Dispersion Coefficient

AERMOD allows for the use of urban or rural dispersion coefficients. The determination of whether the facility is in an urban or rural area followed the Auer method noted in the References section of 40 CFR Part 51 Appendix W. The Auer method requires drawing a circle with a 3-kilometer radius centered on the centroid of the emission source locations and classifying the land use types within the circle as urban or rural according to a set of criteria. If 50% or more of the land use types within the circle meet the urban criteria, the facility is considered to be in an urban area. The 3-km Auer method circle is shown in Appendix E.

Consistent with this guidance, the model uses rural dispersion coefficients, with more than 50% of the land use types within the circle meeting the criteria to be classified as rural.

4.1.6 Receptor Locations

Grid receptors representing nearby residents, sensitive receptors, and off-site workers were located:

- Every 10 meters along the project boundary;
- At 50-meter spacing from the center of source locations out to 1,000 meters; and
- At 200-meter spacing between 1,000 meters and 5,000 meters from the center of source locations.

For the HRA, additional receptor grids were placed in residentially dense areas to ensure worst-case concentrations were captured.

For the construction HRA, since AERMOD does not correctly predict concentrations for receptors within volume source exclusion zones, receptors located within the project boundary or within the truck volume source exclusion zone were excluded.

Figure 4-1 shows the facility layout, buildings, and receptor locations.

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Figure 4-1: Air Dispersion Modeling Receptor Setup



Notes:

RNG Plant buildings shown in blue. Project boundary shown in red. Receptor locations shown in yellow.

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4.1.7 Buildings

For the operational HRA and AQIA, the modeling included existing and future on-site and off-site structures expected to have the potential to result in downwash effects. Building downwash effects were assessed for all emissions sources using the Building Profile Input Program for PRIME (BPIPPRM).

Building locations are shown in Figure 4-1. Building locations and dimensions are included with the AERMOD Project files.

Buildings were not included in the construction HRA since the modeling solely involves volume and line-volume sources, neither of which are affected by building downwash.

4.1.8 Source Information and Release Parameters

For the HRAs, AERMOD was run with a unit emission rate [1 gram per second (g/s)] for each source to calculate the concentration of TACs from each source per unit emission rate, known as X/Q (Chi/Q), for 1-hour and period (annual) averaging time options per receptor. The modeled X/Q concentration was calculated for each source, at each receptor, for each averaging time for input into the Hotspots Analysis and Reporting Program, version 2 (HARP2).

4.1.8.1 Construction

HRA modeling was conducted for the DPM exhaust from the construction equipment and delivery trucks. The construction HRA encompassed all stages of construction spanning the 1-year period.

Source release parameters for each source are described in detail below; the sources are shown in Figure 4-2. DPM emissions from the RNG Plant construction were modeled as a 47,961 square feet surface-based volume source in the middle of the site, corresponding to the total on-site land use in Table 3-1. The pipeline construction trucks were parameterized in AERMOD as a 3,917-meter (2.43-mile) line-volume source. The path was set based on the proposed pipeline trenching pathway. The line-volume source represents a series of separated volume sources with parameters based on truck dimensions and the algorithms in the United States Environmental Protection Agency's (U.S. EPA's) Haul Road Workgroup for volume sources (EPA 2012).

Table 4-1: Source Parameters – RNG Facility Construction

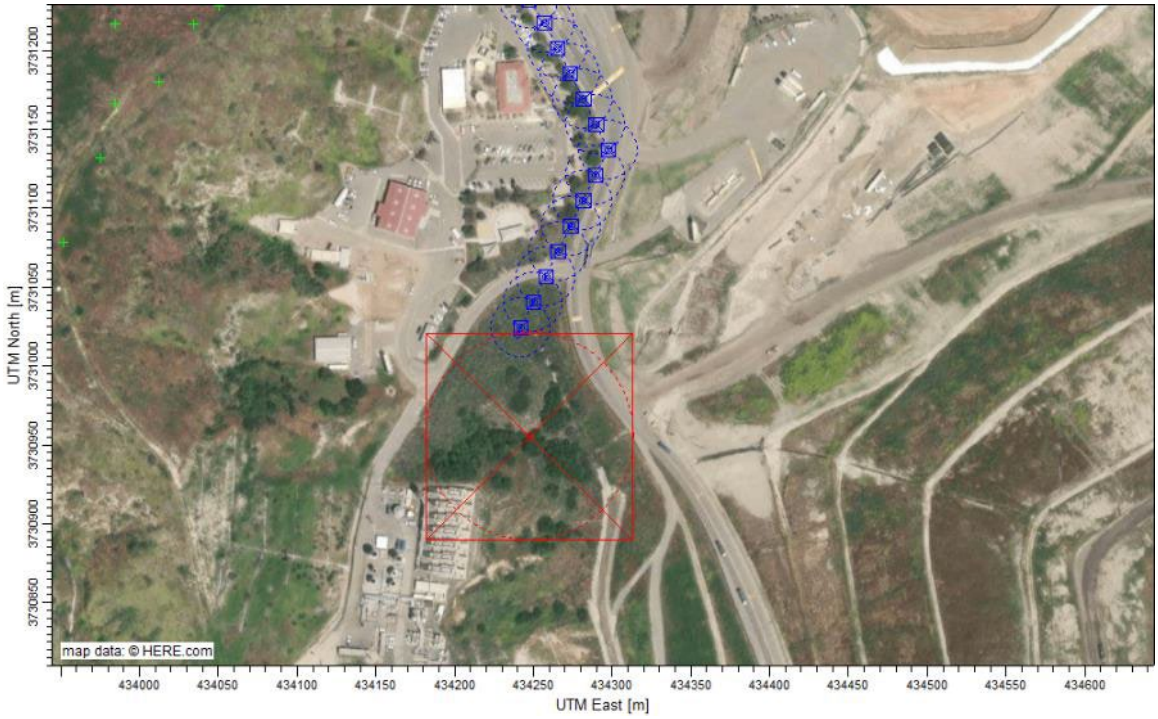
Source ID	Source Type	Release Height (m)	Length of Side (m)	Initial Lateral Dimension (m)	Initial Vertical Dimension (m)
RNG_FAC	Volume	2.5	131.06	30.48	1.16

Table 4-2: Source Parameters – SoCalGas Pipeline Construction

Source ID	Source Type	Plume Height (m)	Plume Width (m)	Release Height (m)	Total Length (m)
PIPELINE	Line Volume	5.1	9.0	2.55	3917

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Figure 4-2: Construction HRA Source Setup



Notes:

Volume source for the RNG Plant construction shown in red.

Truck travel line volume source shown in blue.

4.1.8.2 Operations

An AQIA and HRA for the proposed Project were prepared to evaluate criteria pollutant levels and health risk impacts due to operational emissions. The equipment and operations that would contribute to the emissions of criteria pollutants and TACs from the combustion equipment, and thus were included in the AQIA/HRA, are:

- The thermal oxidizer unit that uses tail gas from the landfill and natural gas as the supplemental fuel;
- The off-spec flare pilot that uses natural gas; and
- The generator set ICE that uses natural gas.

Figure 4-3 shows the location of each source.

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Figure 4-3: Operational AQIA/HRA Source Setup



Notes:

Point sources for flare, thermal oxidizer unit, and generator set with ICE shown in red.

Proposed Project building layout shown in blue.

All stationary sources were modeled as point sources, including the flare, thermal oxidizer unit, and generator set with ICE. The emissions for the point sources were based on the methodology discussed in Section 3.2.2, and further shown in Appendix D.

The release parameters utilized for each source are shown in Table 4-3.

For the AQIA, emissions for each criteria pollutant and source were used in AERMOD. Maximum hourly, daily, and annual emissions were used in modeling all hourly, 24-hour, and annual averaging periods, respectively. Maximum 8-hour emissions were used in modeling the 8-hour averaging period for CO.

For the HRAs, AERMOD was run with a unit emission rate for each source for 1-hour and period averaging times.

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Table 4-3: Source Parameters – RNG Plant Operation

Source ID	Source Description	UTM Easting (m)	UTM Northing (m)	Release Height (ft)	Exit Temperature (°F)	Inside Diameter (ft)	Exhaust Flow (scfm)	Exit Velocity (m/s)
FLARE	Off-Spec Flare	434,255.01	3,730,882.74	50	1,018	11.77	150,000	7.003
ICE	CAT DG150 Backup Generator ICE	434,246.91	3,730,967.73	6.15	1,304	0.4167	1,177	43.852
TOU	PEI Thermal Oxidizer – Pilot Gas	434,255.52	3,730,894.15	50	1,000	5.6	39,000	8.044

4.2 Construction – Health Risk Assessment

The principal TAC emitted during Project construction would be DPM from diesel-powered equipment. DPM emissions were derived from the CalEEMod run in Attachment A, where DPM is assumed to be the same amount as the exhaust PM_{10} emissions.

Although the total Project construction period is expected to occur over a span of approximately 1.5 years, the majority of DPM-emitting construction phases overlap during a 1-year period. Thus, a conservative approach was used, where the total DPM emissions from the RNG Plant and SoCalGas pipeline construction over the approximately 1.5-year period were assumed to simultaneously emit over a 1-year period. The DPM emission rates for the RNG Plant and SoCalGas pipeline construction are shown in Table 4-4. As stated in Section 3.2.1, for mitigated emissions, all construction equipment greater than 350 HP for the Trenching and Pipeline Construction phase (i.e., Phase 6) were assumed to use Tier 4 engines (MM-AQ-1). Annual emission rates were calculated by conservatively assuming that the total DPM exhaust emissions during construction occur over a single year.

Table 4-4: DPM Emissions for RNG Plant and SoCalGas Pipeline Construction

Construction Phase	DPM (PM_{10}) Exhaust Emissions During Construction (lbs)	Working Days	Annual Emission Rate[1] (lbs/year)
RNG Facility Construction	122.54	346	122.54
SoCalGas Pipeline Construction	60.64	193	60.64

Source: CalEEMod version 2022.1.1.29.

1) To be conservative, it was assumed that the total DPM exhaust emissions during construction occur over a single year.

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4.2.1 Health Risk Assessment Calculations

This HRA was conducted in accordance with SCAQMD Risk Assessment Procedures (SCAQMD 2024) and the Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics Hot Spots Program Guidance Manual (OEHHA 2015).

The construction HRA health risk calculations were performed using the HARP2 Air Dispersion Modeling and Risk Tool (ADMRT, version 22118, CARB 2022b). The X/Q 1-hour and annual values that were determined for each source using AERMOD were imported into HARP2 and used in conjunction with hourly and annual emissions to determine the ground-level concentration (GLC) of DPM to an individual. The GLCs were then used to estimate the long-term cancer health risk to an individual. Since DPM is the only TAC in this HRA, and only carcinogenic and chronic toxicity values are documented for DPM, only cancer and chronic risk assessments were conducted.

A description of the health risk indices and associated calculations conducted in HARP2 is provided below. Table 4-5 provides a listing of the HARP2 options that were selected for the analysis.

4.2.2 Cancer Risk

Cancer risk is the estimated probability of a maximally exposed individual potentially contracting cancer as a result of exposure to TACs over a period of time. Cancer risk at all receptors was estimated over a 1-year period, corresponding to the 1-year construction period shown in Table 4-4. This provides a conservative health risk estimate since the total DPM emissions are assumed to be emitted over a single year, which provides the largest overlap with the highest sensitive specific age group weighting factors (3rd trimester and 0-2 years).

Residential receptor cancer risk estimates were calculated using CARB's Risk Management Policy (RMP), "RMP Using the Derived Method," and off-site workplace cancer risk estimates used the "OEHHA Derived" calculation method. The RMP uses high-end breathing rates (95th percentile) for children from the third trimester through age 2 and 80th percentile breathing rates for all other ages for residential exposures (CARB 2015). The "OEHHA Derived" method uses high-end exposure parameters for the top two exposure pathways and mean exposure parameters for the remaining pathways for cancer risk estimates. The "RMP Using the Derived Method" combines the two approaches.

4.2.3 Chronic Hazard Index

DPM also has non-cancer health risk due to long-term (chronic) exposure. The Chronic Hazard Index (HIC) is the sum of the individual substance HICs for all TACs affecting the same target organ system. Chronic risk was calculated using the "OEHHA Derived" Method at all receptors for an annual exposure duration. The same exposure pathways, as outlined in Table 4-5, were used in the HIC assessment.

4.2.4 Acute Hazard Risk

Some TACs may have non-cancer health risk due to short-term (acute) exposures. Acute Hazard Index (HIA) is the sum of the individual substance HIAs for all TACs affecting the same target organ system. Since DPM does not have an acute reference exposure level (REL), no acute risks were estimated for the construction scenario.

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Table 4-5: Construction HRA – HARP2 Model Options

Parameter	Assumptions				Comments
Multi-Pathway					
Inhalation	Res	☒	Work	☒	–
Soil	Res	☒	Work	☒	–
Dermal	Res	☒	Work	☒	"Warm" climate
Mother's Milk	Res	☒	Work	☐	–
Drinking Water	Res	☐	Work	☐	–
Fish	Res	☐	Work	☐	–
Homegrown Produce	Res	☒	Work	☐	Default for "Households that Garden"
Beef/Dairy	Res	☐	Work	☐	–
Pigs, Chickens, and/or Eggs	Res	☐	Work	☐	
Deposition Velocity	0.02 m/s				
Residential Cancer Risk Assumptions					
Exposure Duration	1 year				Corresponding to overlapped 1-year construction period
Fraction of Time at Home	3rd Trimester to 16 years: Off 16 years to 30 years: On				–
Analysis Option	RMP Using the Derived Method				–
Worker Cancer Risk Assumptions					
Exposure Duration	1 year				Corresponding to overlapped 1-year construction period
Analysis Option	OEHHA Derived Method				–
Inhalation Rate Basis	8-hour breathing rates, moderate intensity				–
Worker Adjustment Factor	Yes, 5.6				Construction will take place 5 days/week, 6 hours/day
Residential and Worker Non-Cancer Risk Assumptions					
Analysis Option	OEHHA Derived Method				–
Inhalation Rate Basis	Long-term 24-hour (resident) Moderate 8-hour (worker)				–
Worker Adjustment Factor	1				–

4.2.5 Construction HRA Results

The construction HRA results predict that all health risk factors would be less than the CEQA significance thresholds at all actual receptors with implementation of the proposed mitigation measure (MM-AQ-1). The results of the HRA are summarized in Table 4-6.

The maximally exposed individual resident (MEIR) was predicted to be at the end of the pipeline construction line within the Portola Springs community, and the maximally exposed individual worker (MEIW) was predicted to be located at one of the administrative buildings on the landfill utilized by OCWR staff. Figure 4-4 shows the locations of the MEIR and MEIW receptors.

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Sensitive receptors were evaluated as part of the receptor grid and have impacts below the maximum impact identified at the MEIR or MEIW, with the closest sensitive receptors located at Crean Lutheran High School and Stonegate Elementary School. All health risk values were predicted to be less than the CEQA significance thresholds and are shown in Table 4-6.

Figure 4-4: Maximally Exposed Receptors – Construction HRA Cancer Risk



Notes:

RNG Plant shown in red. Truck travel line volume source shown in blue.

MEIR shown in green square. MEIW shown in blue square.

Table 4-6: Summary of Construction HRA Results

Risk[1]	Receptor	Receptor	UTM Easting Coordinate (m)	UTM Northing Coordinate (m)	Estimated Risk Value	CEQA Threshold[2]	Health Risk Significant?
Cancer	MEIR	17	431,458	3,730,677	4.39	10 in one million	**No**
	MEIW	3,110	434,171	3,731,089	2.51		**No**
Chronic	MEIR	17	431,458	3,730,677	0.0049	1.0	**No**
	MEIW	3,110	434,171	3,731,089	0.0348		**No**

1. Maximum risk values from flat terrain AERMOD run.
2. Source: SCAQMD 2023.

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4.2.6 Mitigation Measures

MM-AQ-1: Construction equipment greater than 350 HP for the Trenching and Pipeline Construction phase (i.e., Phase 6) must be equipped with Tier 4 Final engines.

4.3 Operation

An AQIA and HRA for the proposed Project were prepared to evaluate criteria pollutant level and health risk impacts due to operational emissions. The equipment and operations that would contribute to the emissions of criteria pollutants and TACs from the combustion equipment, and thus be included in the AQIA/HRA, are:

- The thermal oxidizer unit that uses tail gas from the landfill and natural gas as the supplemental fuel;
- The off-spec flare pilot that uses natural gas; and
- The generator set ICE that uses natural gas.

Criteria pollutant and TAC emissions from operational activity for each of the sources are shown in Tables 4-7 to 4-9 and Table 4-10, respectively. Emission calculation methodology is shown in Appendix D.

Table 4-7: Criteria Pollutant Emissions from Operations – Thermal Oxidizer Unit

Pollutant	1-Hour Averaging Period (lb/hr)	8-Hour Averaging Period (lb/8-hr)	24-Hour Averaging Period (lb/24-hr)	Annual Averaging Period (lb/yr)
NO_2	1.053E+00	--	--	9.22E+03
SO_2	5.177E+00	--	1.243E+02	3.20E+04
CO	2.406E+00	1.925E+01	--	--
PM_{10}	--	--	5.156E+00	1.88E+03
$PM_{2.5}$	--	--	5.156E+00	1.88E+03

Table 4-8: Criteria Pollutant Emissions from Operations – Off-Spec Flare

Pollutant	1-Hour Averaging Period (lb/hr)	8-Hour Averaging Period (lb/8-hr)	24-Hour Averaging Period (lb/24-hr)	Annual Averaging Period (lb/yr)
NO_2	6.000E-03	--	--	5.256E+01
SO_2	5.714E-05	--	1.371E-03	5.006E-01
CO	6.000E-03	4.800E-02	--	--
PM_{10}	--	--	1.394E-02	5.089E+00
$PM_{2.5}$	--	--	1.394E-02	5.089E+00

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Table 4-9: Criteria Pollutant Emissions from Operations – Generator Set with ICE

Pollutant	1-Hour Averaging Period (lb/hr)	8-Hour Averaging Period (lb/8-hr)	24-Hour Averaging Period (lb/24-hr)	Annual Averaging Period (lb/yr)
NO_2	1.672E-01	–	–	3.344E+01
SO_2	9.929E-04	–	2.383E-02	1.986E-01
CO	2.786E-01	2.229E+00	--	--
PM_{10}	–	–	3.972E-01	3.310E+00
$PM_{2.5}$	–	–	3.972E-01	3.310E+00

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Table 4-10: TAC Emissions from Operations

Pollutant	CAS No.	Thermal Oxidizer Unit		Off-Spec Flare		Generator Set with ICE	
		Annual Emissions (lb/year)	Maximum Hourly Emissions (lb/hr)	Annual Emissions (lb/year)	Maximum Hourly Emissions (lb/hr)	Annual Emissions (lb/year)	Maximum Hourly Emissions (lb/hr)
1,3-Butadiene	106990	–	–	–	–	2.24E-01	1.12E-03
1,1-Dichloroethene	75354	2.13E-01	2.44E-05	–	–	–	–
1,1-Dichloroethane	75343	1.94E-01	2.21E-05	–	–	–	–
1,2-Dichloroethane	107062	2.31E+00	2.64E-04	–	–	3.81E-03	1.90E-05
1,1,1-Trichloroethane	71556	1.45E-01	1.65E-05	–	–	–	–
1,1,2-Trichloroethane	79005	–	–	–	–	5.16E-03	2.58E-05
1,1,2,2-Tetrachloroethane	79345	–	–	–	–	8.54E-03	4.27E-05
Acetaldehyde	75070	7.79E-01	8.89E-05	3.59E-02	4.10E-06	9.43E-01	4.72E-03
Acrolein	107028	6.78E-01	7.74E-05	8.34E-03	9.52E-07	8.87E-01	4.44E-03
Ammonia	7664417	8.04E+02	9.18E-02	–	–	1.06E+00	5.30E-03
Benzene	71432	1.99E+01	2.27E-03	1.33E-01	1.51E-05	5.33E-01	2.66E-03
Carbon Tetrachloride	56235	–	–	–	–	5.99E-03	3.00E-05
Chlorobenzene	108907	5.83E+01	6.65E-03	–	–	–	–
Chloroform	67663	6.13E-02	7.00E-06	–	–	4.63E-03	2.32E-05
Chrysene	218019	–	–	–	–	–	–
Ethyl Benzene	100414	1.73E+00	1.98E-04	1.20E+00	1.38E-04	8.37E-03	4.19E-05

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Pollutant	CAS No.	Thermal Oxidizer Unit		Off-Spec Flare		Generator Set with ICE	
		Annual Emissions (lb/year)	Maximum Hourly Emissions (lb/hr)	Annual Emissions (lb/year)	Maximum Hourly Emissions (lb/hr)	Annual Emissions (lb/year)	Maximum Hourly Emissions (lb/hr)
Ethylene Dibromide	106934	–	–	–	–	7.18E-03	3.59E-05
Formaldehyde	50000	3.09E+00	3.53E-04	9.75E-01	1.11E-04	6.92E+00	3.46E-02
Hexane	110543	1.16E+00	1.32E-04	2.42E-02	2.76E-06	–	–
Methylene Chloride	75092	6.56E+00	7.49E-04	–	–	1.39E-02	6.95E-05
Methanol	67561	–	–	–	–	1.03E+00	5.16E-03
Naphthalene	91203	7.54E-02	8.60E-06	9.18E-03	1.05E-06	3.28E-02	1.64E-04
PAH	1151	2.51E-02	2.87E-06	2.50E-03	2.86E-07	–	–
Styrene	100425	–	–	–	–	4.00E-03	2.00E-05
Tetrachloroethene	127184	7.14E+00	8.16E-04	–	–	–	–
Toluene	108883	8.30E+01	9.47E-03	4.84E-02	5.52E-06	1.88E-01	9.42E-04
Trichloroethylene	79016	1.75E+00	1.99E-04	–	–	–	–
Vinyl Chloride	75014	1.09E+00	1.24E-04	–	–	2.42E-03	1.21E-05
Xylenes	1330207	6.45E+01	7.36E-03	2.42E-02	2.76E-06	6.59E-02	3.29E-04

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4.3.1 Air Quality Impact Analysis

CEQA requires that the environmental impacts of a proposed project be identified and assessed. If these impacts are found to be significant, the impacts must be mitigated to the extent feasible.

The SCAQMD has developed CEQA thresholds for determination of significance and determination if AQIA modeling is required (SCAQMD 2023). Based on the size of the Project, modeling is required to demonstrate compliance with the NAAQS and CAAQS for five primary criteria pollutants, i.e., NO_2, CO, sulfur dioxide (SO_2), PM_{10}, and $PM_{2.5}$.

The purpose of the AQIA is to evaluate whether or not criteria pollutant emissions resulting from the proposed Project would cause or contribute significantly to a violation of the CAAQS or NAAQS. AERMOD was used to simulate the atmospheric transport and dispersion of airborne pollutants and to quantify the maximum expected GLCs from Project emissions. The air quality modeling methodology described in this section is based on SCAQMD policies and "South Coast AQMD Modeling Guidance for AERMOD" (SCAQMD 2024).

Each pollutant is modeled separately using maximum emission rates for the appropriate averaging time. The modeled concentration is combined with a conservative background concentration for comparison to the CAAQS/NAAQS. If the Project plus background concentration is less than the CAAQS/NAAQS, then Project emissions would have a less than significant impact. This technique was used to assess the impacts of the proposed Project's NO_x, CO, and SO_2 emissions.

Per CEQA threshold guidance (SCAQMD 2023), for PM_{10} and $PM_{2.5}$, the maximum modeled concentration is compared to the corresponding significant change threshold, see Table 4-12. If the Project concentration is less than the significant change threshold, then Project emissions would not contribute significantly to a violation of the CAAQS or NAAQS.

NO_2 modeling for the 1-hour and annual CAAQS/NAAQS followed the U.S. EPA Tier 1 technique outlined in the U.S. EPA NO_2 clarification memo (EPA 2024), which conservatively assumes that all NO_x converts to NO_2.

4.3.1.1 Background Air Quality

Dispersion modeling to evaluate compliance with air quality standards requires the use of measured air pollutant concentrations to account for the background contributions of regional emissions, i.e., emissions sources not explicitly included in the model simulations.

Table 4-11 presents the maximum observed ambient background data for each pollutant and averaging time at the nearest representative monitoring station for the most recent data available. The nearest monitoring sites with available data (Central Orange County and Downtown Los Angeles) are located in an area that likely has higher ambient pollutant concentrations than the proposed Project site. The tabulated values were used to represent background levels for the indicated pollutants and averaging times in the AQIA to evaluate compliance with the CAAQS or NAAQS. The monitoring data indicate that air quality in the Project area complies with all NAAQS and CAAQS for NO_2, CO, and SO_2. However, the CAAQS and NAAQS are periodically exceeded in the Project area for $PM_{2.5}$ and PM_{10}.

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Table 4-11: AQIA Background Concentrations

Pollutant	Averaging Time	Standard	Monitoring Station	Ambient Background Data (concentration units)				AAQS (concentration units)	Exceeds Standard?	Background Concentration Notes
				2021	2022	2023	Summary			
NO_2 (Concentration Units = ppb)	1-Hour	California	SCAQMD; Central Orange County	67.1	53	50.9	67.1	180	No	Highest of most recent 3 years.
	Annual	Federal	SCAQMD; Central Orange County	12.4	11.8	10.5	12.4	53	No	Highest of most recent 3 years.
		California	SCAQMD; Central Orange County	12.4	11.8	10.5	12.4	30	No	Highest of most recent 3 years.
CO (Concentration Units = ppm)	1-Hour	Federal	SCAQMD; Central Orange County	2.1	2.4	2.5	2.5	35	No	Highest of most recent 3 years.
		California	SCAQMD; Central Orange County	2.1	2.4	2.5	2.5	20	No	Highest of most recent 3 years.
	8-Hour	Federal	SCAQMD; Central Orange County	1.5	1.4	1.6	1.6	9	No	Highest of most recent 3 years.
		California	SCAQMD; Central Orange County	1.5	1.4	1.6	1.6	9	No	Highest of most recent 3 years.

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Pollutant	Averaging Time	Standard	Monitoring Station	Ambient Background Data (concentration units)				AAQS (concentration units)	Exceeds Standard?	Background Concentration Notes
				2021	2022	2023	Summary			
SO_2 (Concentration Units = ppb)	1-Hour	Federal	EPA; Main St, Los Angeles	2	2	2	2	75	No	The design value (=3-year average of 99th percentile of 1-hour daily max).
		California	EPA; Main St, Los Angeles	2.2	6.5	7.7	7.7	250	No	Highest of most recent 3 years.
	24-Hour	California	EPA; Main St, Los Angeles	1.2	1.2	2.3	2.3	40	No	Highest of most recent 3 years.
PM_{10} (Concentration Units = $\mu g/m^3$)	24-Hour	Federal	SCAQMD; Central Orange County	115	90	146	146	150	No	Highest of most recent 3 years.
		California	SCAQMD; Central Orange County	115	90	146	146	50	Yes	Highest of most recent 3 years.
	Annual	California	SCAQMD; Central Orange County	22.9	22.3	24	24	20	Yes	Highest of most recent 3 years.
$PM_{2.5}$ (Concentration Units = $\mu g/m^3$)	24-Hour	Federal	SCAQMD; Central Orange County	36.70	22.10	22.00	26.93	35	No	The design value (=3-year average of 98th percentile of 24-hour daily max).
	Annual	Federal	SCAQMD; Central Orange County	11.4	9.87	9.07	11.4	9	Yes	Highest of most recent 3 years.
		California	SCAQMD; Central Orange County	11.4	9.87	9.07	11.4	12	No	Highest of most recent 3 years.

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4.3.1.2 Analysis Scenario and Emission Rates

The criteria pollutant modeling was conducted using the respective emission rate for each averaging times (1-hour, 8-hour, 24-hour, and annual), depending on the pollutant (e.g., 1-hour emission rate for 1-hour averaging period). Calculated emissions for each pollutant's averaging periods are shown in Tables 4-7 to 4-9, outlined in Appendix D, and contained in the electronic modeling files.

4.3.1.3 AQIA Results

Table 4-12 presents the maximum model-predicted concentrations from the proposed Project emissions, maximum background concentrations, and the sum of these concentrations in comparison to the NO_2, SO_2, CO, PM_{10}, and $PM_{2.5}$ CEQA thresholds. The AQIA modeling results presented in Table 4-12 demonstrate that the Project would not cause an exceedance of the NO_2, SO_2, or CO NAAQS or CAAQS.

Table 4-12 also shows that the model-predicted PM_{10} and $PM_{2.5}$ concentrations from the operational sources would not exceed the 24-hour and annual significant change thresholds. Thus, the proposed Project would not cause a violation of the NAAQS or CAAQS or contribute substantially to an existing air quality violation, and therefore, the proposed Project would have a less than significant impact on air quality.

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Table 4-12: AQIA Modeling Results for Project Operations

Pollutant	Averaging Time	Federal or State Standard	Modeled Concentration (Concentration Units)	Background Concentration (Concentration Units)	Modeled + Background Concentration (Concentration Units)	CEQA Threshold (Concentration Units)	Significant?
NO_2 (Concentration Units = ppb)	1-Hour[F]	California[1]	16.591	67.1	83.7	180	**No**
	Annual[E]	Federal	0.184	12.4	12.6	53	**No**
		California	0.184	12.4	12.6	30	**No**
CO (Concentration Units = ppm)	1-Hour[F]	Federal	0.045	2.5	2.5	35	**No**
		California	0.045	2.5	2.5	20	**No**
	8-Hour[F]	Federal	0.026	1.6	1.6	9	**No**
		California	0.026	1.6	1.6	9	**No**
SO_2 (Concentration Units = ppb)	1-Hour[E]	Federal	30.37	2	32.4	75	**No**
		California	40.89	7.7	48.6	250	**No**
	24-Hour[E]	California	5.157	2.3	7.5	40	**No**
PM_{10} (Concentration Units = µg/m^3)	24-Hour[F]	SCAQMD CEQA Significant Change Threshold	0.913	–	–	2.5	**No**
	Annual[E]		0.071	–	–	1	
$PM_{2.5}$ (Concentration Units = µg/m^3)	24-Hour[F]		0.913	–	–	2.5	

Notes:

1. The modeled concentration presented is the model predicted maximum hourly value using full NO2 conversion.
2. "E" indicates modeled concentration was higher in Elevated Terrain modeling run and is presented here.
3. "F" indicates modeled concentration was higher in Flat Terrain modeling run and is presented here.

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4.3.2 Operations – Health Risk Assessment

4.3.2.1 Mobile Sources

The proposed Project would add four additional employees and five to ten truck trips per year for maintenance purposes. The CalEEMod default distances of 18.44 miles, 13.4 miles, and 7.9 miles were used for the home to work (H-W), work to other locations (W-O), and other to other location (O-O) trips, respectively. As shown in Section 2.5 of the CalEEMod output file (page 15 of 104 of Appendix A), the daily DPM emissions due to operational mobile sources would be less than 0.005 lb/day (approximately 1.9 lb/yr) dispersed over the total daily vehicle miles traveled (VMT). A Tier 2 HRA was conducted using the SCAQMD Rule 1401 health risk assessment tool and annual DPM emission rate of 1.9 lb/yr indicates cancer health risks values of 0.4 in a million for worker receptors and below 0.1 for residential receptors compared to the CEQA threshold for cancer risk being 10 in a million (SCAQMD 2023), therefore these health risk impacts are considered de minimis. The output of the Tier 2 HRA is shown in Appendix F-1. Therefore, impacts would be less than significant.

4.3.2.2 Stationary Sources

An HRA for the proposed Project was prepared to evaluate health risk impacts due to operational TAC emissions. The equipment and operations that would contribute to the emissions of TACs/hazardous air pollutants (HAPs) from the combustion equipment, and thus were included in this HRA, are:

- The thermal oxidizer unit that uses tail gas from the landfill and natural gas as the supplemental fuel;
- The off-spec flare pilot that uses natural gas; and
- The generator set ICE that uses natural gas.

The SCAQMD has defined CEQA health risk thresholds for long-term and short-term health impacts. All three combustion units emit TACs that potentially have the following health impacts to residential, sensitive, and worker receptors: long-term cancer risk, chronic (long-term) health hazard (HIC) to various human organs and systems, and acute (short-term) health hazards (HIA). The SCAQMD CEQA thresholds of significance for these health risks are as follows:

- Cancer risk greater than or equal to 10 in one million;
- HIC greater than or equal to 1.0; and
- HIA greater than or equal to 1.0.
- Cancer Burden >0.5 excess cancer cases (in areas ≥1 in one million)

The TAC emissions from the thermal oxidizer unit, off-spec flare, and generator set with ICE operational sources are shown in Table 4-10 and in Appendix D. The thermal oxidizer unit and off-spec flare are assumed to operate continuously. The generator set with ICE emissions were calculated based on the maximum permitted usage (24 hours per day, 200 hours per year).

4.3.2.2.1 Health Risk Assessment Calculations

This HRA was conducted in accordance with SCAQMD Risk Assessment Procedures (SCAQMD 2024) and the OEHHA Air Toxics Hot Spots Program Guidance Manual (OEHHA 2015).

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The construction HRA health risk calculations were performed using the HARP2 ADMRT, version 22118 (CARB 2022b). The X/Q 1-hour and annual values that were determined for each source using AERMOD were imported into HARP2 and used in conjunction with hourly and annual emissions to determine the GLC of each TAC to an individual. The GLCs were then used to estimate the long-term cancer, chronic, and acute health risks to an individual.

Table 4-13 provides a listing of the HARP2 options that were selected for the analysis.

4.3.2.2.2 Cancer Risk

Cancer risk is the estimated probability of a maximally exposed individual potentially contracting cancer as a result of exposure to TACs over an extended period of time. This HRA estimated cancer risk over a 30-year period for residential receptor locations and 25 years for off-site worker receptor locations.

Residential receptor cancer risk estimates were calculated using CARB's "RMP Using the Derived Method," and off-site workplace cancer risk estimates used the "OEHHA Derived" calculation method. The RMP uses high-end breathing rates (95th percentile) for children from the third trimester through age 2 and 80th percentile breathing rates for all other ages for residential exposures (CARB/CAPCOA 2015). The "OEHHA Derived" method uses high-end exposure parameters for the top two exposure pathways and mean exposure parameters for the remaining pathways for cancer risk estimates. The "RMP Using the Derived Method" combines the two approaches.

4.3.2.2.3 Chronic Hazard Index

The emitted TACs also have non-cancer health risks due to long-term (chronic) exposure. The HIC is the sum of the individual substance HICs for all TACs affecting the same target organ system. Chronic risk was calculated using the "OEHHA Derived" Method at all receptors for an annual exposure duration. The same exposure pathways, as outlined in Table 4-13, were used in the HIC assessment.

4.3.2.2.4 Acute Hazard Risk

Some TACs may have non-cancer health risk due to short-term (acute) exposures. The HIA is the sum of the individual substance HIAs for all TACs affecting the same target organ system. Acute risk was calculated at all receptors for an exposure duration of 1 hour.

Acute impacts for start-up of the thermal oxidizer or the flare during upset conditions would be limited to the maximum gas rate to the RNG plant. As such, any operating condition in which both thermal oxidizer and the flare are concurrently used would be at a reduced rate that would not equal more than the maximum for either unit. Therefore, acute impacts during start-up conditions were not evaluated. Moreover, since both the thermal oxidizer and flare are modeled as point sources, have similar stack parameters (same height and similar exit velocity within 1 m/s), and are located within 36 feet of each other. Since the dispersion characteristics between the thermal oxidizer and flare are similar, during startup and upset conditions impacts are also expected to be similar – modeled as a flare or as a thermal oxidizer.

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Table 4-13: Operational HRA – HARP2 Model Options

Parameter	Assumptions				Comments
Multi-Pathway					
Inhalation	Res	☒	Work	☒	–
Soil	Res	☒	Work	☒	–
Dermal	Res	☒	Work	☒	"Warm" climate
Mother's Milk	Res	☒	Work	☐	–
Drinking Water	Res	☐	Work	☐	–
Fish	Res	☐	Work	☐	–
Homegrown Produce	Res	☒	Work	☐	Default for "Households that Garden"
Beef/Dairy	Res	☐	Work	☐	–
Pigs, Chickens, and/or Eggs	Res	☐	Work	☐	
Deposition Velocity	0.02 m/s				
Residential Cancer Risk Assumptions					
Exposure Duration	30 year				–
Fraction of Time at Home	3rd Trimester to 16 years: On 16 years to 30 years: On				Maximum residential cancer risk is less than 1 in a million; therefore, one in a million isopleth does not exist.
Analysis Option	RMP Using the Derived Method				–
Worker Cancer Risk Assumptions					
Exposure Duration	25 year				–
Analysis Option	OEHHA Derived Method				–
Inhalation Rate Basis	8-hour breathing rates, moderate intensity				–
Worker Adjustment Factor	1				–
Residential and Worker Non-Cancer Risk Assumptions					
Analysis Option	OEHHA Derived Method				–
Inhalation Rate Basis	Long-term 24-hour (resident) Moderate 8-hour (worker)				–
Worker Adjustment Factor	1				–

4.3.2.2.5 Operational HRA Results

The operational HRA results predict that all health risk factors would be less than the CEQA significance thresholds at all actual receptors. The results of the HRA are summarized in Tables 4-14 through 4-16.

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Cancer and non-cancer chronic health impacts for off-site worker receptors were evaluated at office building locations on the landfill, as these are the only areas where an employee would be consistently located for an extended period of time. Acute health risk impacts for off-site worker receptors were evaluated at any receptor location across the working part of the landfill, regardless of the presence of a structure.

The MEIR and MEIW were predicted to be the same for cancer and chronic health risk indices. The MEIR was predicted to be southwest of the project site within the Portola Springs community, and the MEIW was predicted to be located at one of the administrative buildings on the landfill utilized by OCWR staff. The acute risk MEIR was also predicted to be at the southwest of the project site within the Portola Springs community. The acute risk MEIW was located at one of the covered areas on the landfill, adjacent to the RNG facility. Figure 4-5 shows the locations of the MEIR and MEIW receptors.

Figure 4-5: Operational HRA MEIR and MEIW Receptor Locations



Green Square: MEIR for Cancer and Chronic Health Risks.
Blue Square: MEIW for Cancer and Chronic Risk.
Yellow Triangle: MEIR for Acute Health Risk.
Orange Triangle: MEIW for Acute Health Risk.

Cancer Risk

The HRA predicted that the cancer risk at all receptor types would be below 10 in one million, which is below the CEQA threshold. Figure 4-5 shows the locations of the MEIR and MEIW receptors. As the cancer risk was below 1 in one million, no isopleth was created. Table 4-14 presents the 30-year cancer risk at the MEIR and the 25-year cancer risk at the MEIW, plus the

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coordinates of each receptor. Sensitive receptors[3] were evaluated as part of the receptor grid and have impacts below the maximum impact identified at the MEIR or MEIW, with the closest sensitive receptors located at Crean Lutheran High School and Stonegate Elementary School.

Table 4-14: Cancer Risk Results

Receptor	Exposure Duration	UTM Easting (m)	UTM Northing (m)	Cancer Risk (in one million)	CEQA Threshold[2]
MEIR[1]	30-Year	433,238	3,730,039	0.0090	10 in one million
MEIW[1]	25-Year	434,246	3,731,163	0.0027	

1. Maximum Risk from flat terrain AERMOD run.
2. Source: SCAQMD 2023.

Chronic Hazard Index

The HIC at all receptor types due to operational emissions was predicted to be well below the CEQA threshold of 1.0. Figure 4-5 shows the locations of the MEIR and MEIW receptors. Table 4-15 presents the HIC at the MEIR and the annual and 8-hour HIC at the MEIW, plus the coordinates of each receptor. Sensitive receptors[4] were evaluated as part of the receptor grid and have impacts below the maximum impact identified at the MEIR or MEIW, with the closest sensitive receptors located at Crean Lutheran High School and Stonegate Elementary School.

Table 4-15: Chronic Hazard Index Results

Receptor	Exposure Duration	UTM Easting (m)	UTM Northing (m)	HIC	CEQA Threshold[2]
MEIR[1]	Annual	433,238	3,730,039	0.0001	1.0
MEIW[1]		434,246	3,731,163	0.0003	
MEIW[1]	8-hour	434,246	3,731,163	0.0002	

1. Maximum Risk from flat terrain AERMOD run.
2. Source: SCAQMD 2023.
3. The HIC at the MEIW was estimated on an annual and 8-hour basis.

Acute Hazard Index

The HIA at all actual receptors due to Project emissions was predicted to be below the CEQA threshold of 1.0. Figure 4-5 shows the locations of the MEIR and MEIW receptors. As the HIA was below 0.5, no isopleth was created. Table 4-16 presents the HIA at the MEIR and MEIW receptors, plus the coordinates of each receptor. The MEIR was predicted to be at the southwest of the project site within the Portola Springs community. The MEIW was predicted to be at one of the covered areas on the landfill, adjacent to the RNG facility. Sensitive receptors[3] were evaluated as part of the receptor grid and have impacts below the maximum impact identified at the MEIR or MEIW, with the closest sensitive receptors located at Crean Lutheran High School and Stonegate Elementary School.

[3] For the purposes of a CEQA analysis, the SCAQMD considers a sensitive receptor to be to be a receptor such as residence, hospital, convalescent facility where it is possible that an individual could remain for 24 hours.

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Table 4-16: Acute Hazard Index Results

Receptor	Exposure Duration	UTM Easting (m)	UTM Northing (m)	HIA	CEQA Threshold[2]
MEIR[1]	1-Hour	433,275	3,729,974	0.0165	1.0
MEIW[1]		434,185	3,731,019	0.3574	

1. Maximum Risk from flat terrain AERMOD run.
2. Source: SCAQMD 2023.

All health risk values were predicted to be less than the CEQA significance thresholds and show that for all receptor types, i.e., MEIR and MEIW, the predicted health risks would be well below the CEQA cancer, non-cancer chronic, and acute health risk thresholds. Since the cancer risk would be less than 1 in one million for any real receptor, there is no excess cancer burden to evaluate.

5.0 ANALYSIS OF AIR QUALITY SIGNIFICANCE CRITERIA

Estimated construction and operational impacts were evaluated based on the emissions presented in this report and compared against quantitative criteria established by the SCAQMD. These criteria are relied upon to make significance determinations based on mass emissions of criteria pollutants. As shown above, the proposed Project would result in a less than significant impact related to regional and localized emissions, which would not be cumulatively considerable. Further, the proposed Project would not conflict with SCAQMD planning goals or be a source of objectionable odors. Moreover, the proposed Project would not cause substantial air pollutant concentrations with implementation of the proposed mitigation measure (MM-AQ-1).

5.1 Environmental Determination

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

Less Than Significant Impact. The Project site is located in the South Coast Air Basin, comprising all of Orange County and the non-desert regions of Los Angeles, Riverside, and San Bernardino Counties. The SCAQMD is the agency primarily responsible for comprehensive air pollution control in the South Coast Air Basin and reducing emissions from area and point stationary, mobile, and indirect sources. The SCAQMD prepared the 2022 Air Quality Management Plan (AQMP) to meet federal and State ambient air quality standards. The 2022 AQMP contains a comprehensive list of pollution control strategies directed at reducing emissions and achieving ambient air quality standards. These strategies are developed, in part, based on regional population, housing, and employment projections prepared by the Southern California Association of Governments (SCAG). SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial Counties and addresses regional issues relating to transportation, the economy, community development, and the environment. With regard to future growth, SCAG has prepared the 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (2020-2045 RTP/SCS), which provides population, housing, and employment projections for cities under its jurisdiction. These growth projections are based in part on projections originating under County and City General Plans. These growth projections were utilized in the preparation of the air quality forecasts and consistency analysis included in the 2022 AQMP. The 2020-2045 RTP/SCS was approved in September 2020.

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The 2022 AQMP was adopted by the SCAQMD Governing Board on December 2, 2022, as a program to lead the South Coast Air Basin into compliance with several criteria pollutant standards and other federal requirements. It relies on emissions forecasts based on demographic and economic growth projections provided by SCAG's 2020-2045 RTP/SCS. SCAG is charged by California law to prepare and approve "the portions of each AQMP relating to demographic projections and integrated regional land use, housing, employment, and transportation programs, measures and strategies." Projects whose growth is included in the projections used in the formulation of the AQMP are considered to be consistent with the plan and not to interfere with its attainment. The SCAQMD recommends that, when determining whether a project is consistent with the current AQMP, a lead agency must assess whether the project would directly obstruct implementation of the plan and whether it is consistent with the demographic and economic assumptions (typically land use-related, such as resultant employment or residential units) upon which the plan is based (SCAQMD 2022).

A significant air quality impact may occur if a project is inconsistent with the AQMP or would in some way represent a substantial hindrance to employing the policies or obtaining the goals of that plan. As shown above, the construction emissions and the incremental emissions from the operations of the proposed Project do not exceed the SCAQMD's established thresholds of potential significance for air quality impacts. The proposed Project would provide a beneficial use for the LFG generated at the landfill and would be consistent with the goals and objectives of the AQMP. Therefore, the Project would not increase the frequency or severity of an air quality standards violation or cause a new violation. Furthermore, the Project is consistent with the land use and zoning designation through development of the proposed Project. Because the Project would be consistent with the City's General Plan, it is also consistent with the regional growth projections adopted in the 2022 AQMP. Air quality emissions generated by the proposed Project are considered to be evaluated in the AQMP, and Project development in accordance with the City's General Plan would not conflict with or obstruct implementation of the regional 2022 AQMP. Thus, the proposed Project is not expected to conflict with or obstruct the implementation of the AQMP and SCAQMD rules. Therefore, impacts would be less than significant.

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

Less Than Significant Impact. To evaluate impacts, quantitative significance criteria established by the local air quality agency, such as the SCAQMD, may be relied upon to make significance determinations based on mass emissions of criteria pollutants.

A significant impact would occur if the proposed Project would violate any air quality standard or contribute substantially to an existing or projected air quality violation. Project construction emissions were estimated using CalEEMod, the statewide land use emissions computer model designed to quantify potential criteria pollutant and GHG emissions associated with both construction and operations from land use projects. As shown in Tables 3-6, the Project is estimated to generate less than the SCAQMD threshold of 75 pounds per day ROG, 100 pounds per day NO_x, 550 pounds per day CO, 150 pounds per

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day oxides of sulfur (SO_x), 150 pounds per day PM_{10}, and 55 pounds per day $PM_{2.5}$ during the construction phase and no mitigation is needed.

The primary sources of operations phase emissions are the three stationary sources (i.e., thermal oxidizer, flare, and ICE), on-road vehicles traveling to and from the site buildings, and operational activities such as landscape equipment, consumer products, and energy use. As shown in Tables 3-7, the Project is estimated to generate less than the SCAQMD threshold of 55 pounds per day ROG, 55 pounds per day NO_x, 550 pounds per day CO, 150 pounds per day SO_x, 150 pounds per day PM_{10}, and 55 pounds per day $PM_{2.5}$ during the operational phase.

The proposed Project site is 4.24 acres in SRA Zone 19 – Saddleback Valley. As a conservative estimate, the 2-acre screening lookup tables were used to evaluate NO_x, CO, PM_{10}, and $PM_{2.5}$ impacts on nearby receptors. The nearest receptor is approximately 50 meters (165 feet) away from the proposed RNG facility. Therefore, the impact evaluation was performed using the closest distance within SCAQMD LST tables of 50 meters for construction. (SCAQMD 2008a). As shown in Table 3-8, on-site emissions from construction would meet the LST passing criteria at the nearest receptors (50 meters).

Additionally, the AQIA conducted shows that operational activities would not cause an exceedance of the NO_2, SO_2, or CO NAAQS or CAAQS. Furthermore, the model-predicted PM_{10} and $PM_{2.5}$ concentrations from the operational sources would not exceed the 24-hour and annual significant change thresholds (see Table 4-12). Thus, the proposed Project would not cause a violation of the NAAQS or CAAQS or contribute substantially to an existing air quality violation, and therefore, the proposed Project would have a less than significant impact.

SCAQMD Guidance

The SCAQMD's 2003 guidance on addressing cumulative impacts for air quality is as follows: "As Lead Agency, the SCAQMD uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in an Environmental Assessment or EIR [Environmental Impact Report]. […] Projects that exceed the project-specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant" (SCAQMD 2003).

CEQA Guidelines

As referenced above, the SCAQMD cumulative air quality significance thresholds are the same as the project-specific air quality significance thresholds. Because the criteria pollutant mass emissions impacts shown in Tables 3-3 through 3-6 would not be expected to exceed any of the SCAQMD air quality significance thresholds, cumulative air quality impacts from comparable development projects would also be expected to be less than significant. Therefore, potential adverse impacts from implementing the proposed Project would not be "cumulatively considerable" as defined by CEQA Guidelines Section 15064(h)(1) for air quality impacts. Per CEQA Guidelines Section 15064(h)(4), the mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed Project's incremental effects would be cumulatively considerable.

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As shown in Tables 3-6 through 3-8 and Table 4-12, the proposed Project would result in a less than significant impact for both localized and regional air pollution emissions and no mitigation is needed.

c) Expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant with Mitigation Incorporated. A significant impact would occur if the proposed Project were to expose sensitive receptors to pollutant concentrations. The SCAQMD identifies the following as sensitive receptors: long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, childcare centers, and athletic facilities. There are residential land uses approximately 0.87 mile west of the Project site. The Project would be subject to grading and construction standards to mitigate air pollution and dust impacts. Construction equipment greater than 350 HP for the Trenching and Pipeline Construction phase (i.e., Phase 6) must be equipped with Tier 4 Final engines (MM-AQ-1). As demonstrated by the HRA results presented in Sections 4.2 and 4.3.2, the Project is not expected to substantially contribute to pollutant concentrations or expose surrounding residences and other sensitive receptors during construction or operation. The Project is required to meet SCAQMD Rule 403 requirements for controlling fugitive dust, as well as the City's requirements for grading and construction related to air pollution. Therefore, impacts would be less than significant with implementation of the proposed mitigation measure (MM-AQ-1).

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

Less Than Significant Impact. Potential sources that may emit odors during construction activities include equipment exhaust and architectural coatings. Odors from these sources would be localized and generally confined to the immediate area surrounding the Project site. The proposed Project would utilize typical construction techniques, and the odors would be typical of most construction sites and temporary in nature. Construction of the proposed Project would not cause an odor nuisance. The proposed RNG facility would not create odors because the LFG is being processed and compressed for shipment in the SoCalGas pipeline, and not released into the air. The byproducts of the treatment would be combusted at high temperatures just as it is currently being combusted in the existing flare station. The maintenance work on site also would not generate any significant odor. Therefore, the proposed Project would result in a less than significant impact related to objectionable odors, and no mitigation is required.

5.2 Mitigation Measures

MM-AQ-1: Construction equipment greater than 350 HP for the Trenching and Pipeline Construction phase (i.e., Phase 6) must be equipped with Tier 4 Final engines.

5.3 Cumulative Impacts

The FRB Landfill and Bowerman Power Plant will be operated concurrently with the proposed Project. Both facilities operate under SCAQMD permits and will not be affected as a result of the proposed Project. The SCAQMD's 2003 guidance on addressing cumulative impacts for air quality is as follows: "As Lead Agency, the SCAQMD uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in an Environmental Assessment or EIR [Environmental Impact Report]." Furthermore, "Projects that exceed the

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project-specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant" (SCAQMD 2003). As shown above, the predicted air quality impacts of the proposed Project are well below the applicable CEQA significance thresholds. Therefore, potential adverse impacts from implementing the proposed Project would not be "cumulatively considerable" as defined by state CEQA Guidelines Section 15064(h)(1) for air quality impacts. Per state CEQA Guidelines Section 15064(h)(4), the mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed Project's incremental effects are cumulatively considerable. As such, Project related emissions would not result in significant cumulative impacts.

6.0 ANALYSIS OF GREENHOUSE GAS EMISSIONS SIGNIFICANCE CRITERIA

This technical report contains details of the interrelated air quality and GHG studies. As shown in Table 3-11, GHG emissions would be below the GHG significance threshold for industrial projects.

6.1 Environmental Determination

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

Less Than Significant Impact. Using CalEEMod, direct on-site and off-site GHG emissions were estimated for construction and operation, and indirect off-site GHG emissions were estimated to account for electric power used by the proposed Project, water conveyance, and solid waste disposal. In addition, stationary source emission calculations were performed for the RNG thermal oxidizer and the RNG flare, emergency generator usage, fugitive emissions, as well as product gas combustion.

The SCAQMD has officially adopted an industrial facility mass emissions threshold of 10,000 MT CO_2e per year (SCAQMD 2023).

Table 3-11 show the incremental GHG emissions and evaluate them against SCAQMD significance thresholds. Operational measures incorporate typical code-required energy and water conservation features. Off-site traffic impacts are included in these emissions estimates, along with construction emissions amortized over 30 years.

The proposed project would provide a beneficial use and as shown in Table 3-11, incremental GHG emissions would be below the proposed GHG significance threshold for land use projects. Additionally, the Project will contribute to California Public Utility Commission's Renewable Gas Program to procure RNG made by methane from organic waste from landfills and other sources, reduce the volume of LFG being flared, and help reduce greenhouse gas (GHG) emissions from the FRB Landfill. The annual CH_4 emissions avoided from 6,000 scfm of LFG is equivalent to 30,051.4 metric tons of CH_4 per year. Based on 2020 Bowerman Landfill GHG data, the 2020 disposable quantity of 1,998,625 metric tons of waste resulted in 14,179.32 metric tons of CH_4. Based on this ratio and the Bowerman Landfill permitted capacity of 8,000 tons per day or 2.9 million metric tons per year, the 6,000 scfm of LFG collected and sent into the SCE pipeline would

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reduce the equivalent amount of CH_4 from waste collected at the landfill for an approximately 1.5-year period.

Thus, impacts would be less than significant.

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

Less Than Significant Impact. The California legislature passed Senate Bill (SB) 375 to connect regional transportation planning to land use decisions made at a local level. SB 375 requires the metropolitan planning organizations (MPOs) to prepare a Sustainable Communities Strategy (SCS) in their RTPs to achieve the per capita GHG reduction targets. For the SCAG region, the SCS is contained in the 2024-2050 RTP/SCS. The 2024-2050 RTP/SCS focuses the majority of new housing and job growth in high-quality transit areas and other opportunity areas on existing main streets, downtowns, and commercial corridors, resulting in an improved jobs-housing balance and more opportunity for transit-oriented development (SCAG 2024). In addition, SB 743, adopted September 27, 2013, encourages land use and transportation planning decisions and investments that reduce vehicle miles traveled that contribute to GHG emissions, as required by AB 32. The proposed Project would not interfere with SCAG's ability to implement the regional strategies outlined in the 2024-2050 RTP/SCS. As such, impacts would be less than significant.

6.2 Mitigation Measures

None required.

6.3 Cumulative Impacts

As shown above, the predicted GHG impacts of the proposed Project are well below the SCAQMD threshold. These impacts characterize the incremental impacts of other comparable past, present, and reasonably foreseeable future development actions in the vicinity of the proposed project site per state CEQA Guidelines Section 15355(b). Because GHG mass emissions impacts of the proposed Project would not be expected to exceed the SCAQMD significance threshold, cumulative GHG impacts from related concurrent projects would also be expected to be less than significant. Therefore, potential adverse impacts from implementing the proposed Project would not be "cumulatively considerable" as defined by state CEQA Guidelines Section 15064(h)(1). Per state CEQA Guidelines Section 15064(h)(4), the mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable.

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APPENDIX A – CALEEMOD OUTPUTS

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Bowerman Power LFG, LLC (BP) - RNG Plant Detailed Report

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1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Bowerman Power LFG, LLC (BP) - RNG Plant
Construction Start Date	10/28/2025
Operational Year	2027
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.50
Precipitation (days)	4.20
Location	33.71669152511946, -117.70992361946648
County	Orange
City	—
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	5930
EDFZ	7
Electric Utility	Southern California Edison
Gas Utility	Southern California Gas
App Version	2022.1.1.29

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
General Office Building	2.67	1000sqft	0.06	2,670	0.00	—	—	—

General Heavy Industry	22.0	1000sqft	0.51	22,045	0.00	—	—	—
Other Asphalt Surfaces	23.2	1000sqft	0.53	0.00	0.00	—	—	—
User Defined Linear	2.40	Mile	0.00	0.00	0.00	—	—	—
Other Non-Asphalt Surfaces	137	1000sqft	3.14	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-5	Use Advanced Engine Tiers

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.41	26.6	37.9	0.06	1.06	15.6	16.7	0.97	2.41	3.39	—	8,480	8,480	0.29	0.21	9.02	8,558
Mit.	2.61	18.6	39.0	0.06	0.71	15.6	16.4	0.66	2.41	3.07	—	8,480	8,480	0.29	0.21	9.02	8,558
% Reduced	23%	30%	-3%	—	33%	—	2%	33%	—	9%	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	21.7	56.6	36.7	0.22	1.44	15.6	16.7	1.35	3.24	4.60	—	29,966	29,966	2.24	4.18	1.42	31,270
Mit.	20.9	56.6	37.8	0.22	1.44	15.6	16.4	1.35	3.24	4.60	—	29,966	29,966	2.24	4.18	1.42	31,270
% Reduced	4%	—	-3%	—	—	—	2%	—	—	—	—	—	—	—	—	—	—

Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.91	9.42	12.6	0.02	0.36	5.18	5.55	0.34	0.82	1.15	—	3,143	3,143	0.23	0.42	2.39	3,276
Mit.	1.65	6.80	13.0	0.02	0.25	5.18	5.43	0.23	0.82	1.05	—	3,143	3,143	0.23	0.42	2.39	3,276
% Reduced	14%	28%	-3%	—	31%	—	2%	31%	—	9%	—	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.35	1.72	2.30	< 0.005	0.07	0.95	1.01	0.06	0.15	0.21	—	520	520	0.04	0.07	0.40	542
Mit.	0.30	1.24	2.37	< 0.005	0.05	0.95	0.99	0.04	0.15	0.19	—	520	520	0.04	0.07	0.40	542
% Reduced	14%	28%	-3%	—	31%	—	2%	31%	—	9%	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	3.41	26.6	37.9	0.06	1.06	15.6	16.7	0.97	2.41	3.39	—	8,480	8,480	0.29	0.21	9.02	8,558
2027	1.83	15.4	20.2	0.03	0.62	14.0	14.6	0.57	2.02	2.59	—	4,086	4,086	0.15	0.08	2.34	4,115
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	3.69	56.6	36.1	0.22	1.44	9.50	10.9	1.35	3.24	4.60	—	29,966	29,966	2.24	4.18	1.42	31,270
2026	21.7	53.9	36.7	0.22	1.31	15.6	16.7	1.23	3.24	4.47	—	29,516	29,516	2.07	4.02	1.34	30,768
2027	3.07	25.1	33.8	0.06	0.97	15.0	15.9	0.90	2.25	3.15	—	7,593	7,593	0.28	0.16	0.15	7,649
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	0.46	6.55	4.46	0.02	0.18	1.09	1.27	0.17	0.40	0.57	—	3,143	3,143	0.23	0.42	2.39	3,276
2026	1.91	9.42	12.6	0.02	0.36	5.18	5.55	0.34	0.82	1.15	—	3,066	3,066	0.12	0.11	1.49	3,102

2027	0.43	3.46	4.72	0.01	0.14	2.88	3.01	0.13	0.42	0.55	—	990	990	0.04	0.02	0.33	997
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	0.08	1.20	0.81	< 0.005	0.03	0.20	0.23	0.03	0.07	0.10	—	520	520	0.04	0.07	0.40	542
2026	0.35	1.72	2.30	< 0.005	0.07	0.95	1.01	0.06	0.15	0.21	—	508	508	0.02	0.02	0.25	514
2027	0.08	0.63	0.86	< 0.005	0.03	0.53	0.55	0.02	0.08	0.10	—	164	164	0.01	< 0.005	0.06	165

2.3. Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	2.61	18.6	39.0	0.06	0.71	15.6	16.4	0.66	2.41	3.07	—	8,480	8,480	0.29	0.21	9.02	8,558
2027	1.06	7.80	21.4	0.03	0.29	14.0	14.3	0.27	2.02	2.29	—	4,086	4,086	0.15	0.08	2.34	4,115
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	3.69	56.6	36.1	0.22	1.44	9.50	10.9	1.35	3.24	4.60	—	29,966	29,966	2.24	4.18	1.42	31,270
2026	20.9	53.9	37.8	0.22	1.31	15.6	16.4	1.23	3.24	4.47	—	29,516	29,516	2.07	4.02	1.34	30,768
2027	2.30	17.5	35.1	0.06	0.64	15.0	15.6	0.59	2.25	2.84	—	7,593	7,593	0.28	0.16	0.15	7,649
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	0.46	6.55	4.46	0.02	0.18	1.09	1.27	0.17	0.40	0.57	—	3,143	3,143	0.23	0.42	2.39	3,276
2026	1.65	6.80	13.0	0.02	0.25	5.18	5.43	0.23	0.82	1.05	—	3,066	3,066	0.12	0.11	1.49	3,102
2027	0.27	1.93	4.97	0.01	0.07	2.88	2.95	0.07	0.42	0.49	—	990	990	0.04	0.02	0.33	997
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	0.08	1.20	0.81	< 0.005	0.03	0.20	0.23	0.03	0.07	0.10	—	520	520	0.04	0.07	0.40	542
2026	0.30	1.24	2.37	< 0.005	0.05	0.95	0.99	0.04	0.15	0.19	—	508	508	0.02	0.02	0.25	514
2027	0.05	0.35	0.91	< 0.005	0.01	0.53	0.54	0.01	0.08	0.09	—	164	164	0.01	< 0.005	0.06	165

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	5.84	29.8	66.2	124	5.59	0.10	5.69	5.59	0.02	5.62	26.7	870,698	870,724	86.0	0.97	6.16	873,168
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	5.66	29.8	65.1	124	5.59	0.10	5.69	5.59	0.02	5.62	26.7	870,689	870,716	86.0	0.97	5.76	873,160
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	5.13	25.9	59.3	87.8	5.20	0.10	5.29	5.20	0.02	5.22	26.7	870,653	870,680	85.9	0.96	5.92	873,121
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.94	4.72	10.8	16.0	0.95	0.02	0.97	0.95	< 0.005	0.95	4.43	144,147	144,151	14.2	0.16	0.98	144,555

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.02	0.04	0.29	< 0.005	< 0.005	0.10	0.10	< 0.005	0.02	0.03	—	110	110	< 0.005	< 0.005	0.42	112
Area	0.79	0.01	1.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.42	4.42	< 0.005	< 0.005	—	4.44
Energy	0.01	0.27	0.23	< 0.005	0.02	—	0.02	0.02	—	0.02	—	702	702	0.05	< 0.005	—	704
Water	—	—	—	—	—	—	—	—	—	—	10.7	55.3	66.0	1.10	0.03	—	101
Waste	—	—	—	—	—	—	—	—	—	—	16.1	0.00	16.1	1.61	0.00	—	56.2
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.74	5.74

User-Def	5.01	29.4	64.6	124	5.57	—	5.57	5.57	—	5.57	—	869,826	869,826	83.2	0.93	—	872,184
Total	5.84	29.8	66.2	124	5.59	0.10	5.69	5.59	0.02	5.62	26.7	870,698	870,724	86.0	0.97	6.16	873,168
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.02	0.04	0.26	< 0.005	< 0.005	0.10	0.10	< 0.005	0.02	0.03	—	106	106	< 0.005	0.01	0.01	108
Area	0.62	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.01	0.27	0.23	< 0.005	0.02	—	0.02	0.02	—	0.02	—	702	702	0.05	< 0.005	—	704
Water	—	—	—	—	—	—	—	—	—	—	10.7	55.3	66.0	1.10	0.03	—	101
Waste	—	—	—	—	—	—	—	—	—	—	16.1	0.00	16.1	1.61	0.00	—	56.2
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.74	5.74
User-Defined	5.01	29.4	64.6	124	5.57	—	5.57	5.57	—	5.57	—	869,826	869,826	83.2	0.93	—	872,184
Total	5.66	29.8	65.1	124	5.59	0.10	5.69	5.59	0.02	5.62	26.7	870,689	870,716	86.0	0.97	5.76	873,160
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.02	0.04	0.26	< 0.005	< 0.005	0.10	0.10	< 0.005	0.02	0.03	—	107	107	< 0.005	0.01	0.18	109
Area	0.74	0.01	0.74	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.03	3.03	< 0.005	< 0.005	—	3.04
Energy	0.01	0.27	0.23	< 0.005	0.02	—	0.02	0.02	—	0.02	—	702	702	0.05	< 0.005	—	704
Water	—	—	—	—	—	—	—	—	—	—	10.7	55.3	66.0	1.10	0.03	—	101
Waste	—	—	—	—	—	—	—	—	—	—	16.1	0.00	16.1	1.61	0.00	—	56.2
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.74	5.74
User-Defined	4.36	25.6	58.1	87.8	5.17	—	5.17	5.17	—	5.17	—	869,786	869,786	83.2	0.93	—	872,142
Total	5.13	25.9	59.3	87.8	5.20	0.10	5.29	5.20	0.02	5.22	26.7	870,653	870,680	85.9	0.96	5.92	873,121
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	< 0.005	0.01	0.05	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	—	17.8	17.8	< 0.005	< 0.005	0.03	18.1
Area	0.13	< 0.005	0.13	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.50	0.50	< 0.005	< 0.005	—	0.50
Energy	< 0.005	0.05	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	116	116	0.01	< 0.005	—	117
Water	—	—	—	—	—	—	—	—	—	—	1.77	9.15	10.9	0.18	< 0.005	—	16.8

Waste	—	—	—	—	—	—	—	—	—	—	2.66	0.00	2.66	0.27	0.00	—	9.31
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.95	0.95
User-Defined	0.80	4.66	10.6	16.0	0.94	—	0.94	0.94	—	0.94	—	144,003	144,003	13.8	0.15	—	144,393
Total	0.94	4.72	10.8	16.0	0.95	0.02	0.97	0.95	< 0.005	0.95	4.43	144,147	144,151	14.2	0.16	0.98	144,555

2.6. Operations Emissions by Sector, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.02	0.04	0.29	< 0.005	< 0.005	0.10	0.10	< 0.005	0.02	0.03	—	110	110	< 0.005	< 0.005	0.42	112
Area	0.79	0.01	1.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.42	4.42	< 0.005	< 0.005	—	4.44
Energy	0.01	0.27	0.23	< 0.005	0.02	—	0.02	0.02	—	0.02	—	702	702	0.05	< 0.005	—	704
Water	—	—	—	—	—	—	—	—	—	—	10.7	55.3	66.0	1.10	0.03	—	101
Waste	—	—	—	—	—	—	—	—	—	—	16.1	0.00	16.1	1.61	0.00	—	56.2
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.74	5.74
User-Defined	5.01	29.4	64.6	124	5.57	—	5.57	5.57	—	5.57	—	869,826	869,826	83.2	0.93	—	872,184
Total	5.84	29.8	66.2	124	5.59	0.10	5.69	5.59	0.02	5.62	26.7	870,698	870,724	86.0	0.97	6.16	873,168
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.02	0.04	0.26	< 0.005	< 0.005	0.10	0.10	< 0.005	0.02	0.03	—	106	106	< 0.005	0.01	0.01	108
Area	0.62	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.01	0.27	0.23	< 0.005	0.02	—	0.02	0.02	—	0.02	—	702	702	0.05	< 0.005	—	704
Water	—	—	—	—	—	—	—	—	—	—	10.7	55.3	66.0	1.10	0.03	—	101
Waste	—	—	—	—	—	—	—	—	—	—	16.1	0.00	16.1	1.61	0.00	—	56.2
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.74	5.74

User-Def	5.01	29.4	64.6	124	5.57	—	5.57	5.57	—	5.57	—	869,826	869,826	83.2	0.93	—	872,184
Total	5.66	29.8	65.1	124	5.59	0.10	5.69	5.59	0.02	5.62	26.7	870,689	870,716	86.0	0.97	5.76	873,160
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.02	0.04	0.26	< 0.005	< 0.005	0.10	0.10	< 0.005	0.02	0.03	—	107	107	< 0.005	0.01	0.18	109
Area	0.74	0.01	0.74	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.03	3.03	< 0.005	< 0.005	—	3.04
Energy	0.01	0.27	0.23	< 0.005	0.02	—	0.02	0.02	—	0.02	—	702	702	0.05	< 0.005	—	704
Water	—	—	—	—	—	—	—	—	—	—	10.7	55.3	66.0	1.10	0.03	—	101
Waste	—	—	—	—	—	—	—	—	—	—	16.1	0.00	16.1	1.61	0.00	—	56.2
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.74	5.74
User-Defined	4.36	25.6	58.1	87.8	5.17	—	5.17	5.17	—	5.17	—	869,786	869,786	83.2	0.93	—	872,142
Total	5.13	25.9	59.3	87.8	5.20	0.10	5.29	5.20	0.02	5.22	26.7	870,653	870,680	85.9	0.96	5.92	873,121
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	< 0.005	0.01	0.05	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	—	17.8	17.8	< 0.005	< 0.005	0.03	18.1
Area	0.13	< 0.005	0.13	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.50	0.50	< 0.005	< 0.005	—	0.50
Energy	< 0.005	0.05	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	116	116	0.01	< 0.005	—	117
Water	—	—	—	—	—	—	—	—	—	—	1.77	9.15	10.9	0.18	< 0.005	—	16.8
Waste	—	—	—	—	—	—	—	—	—	—	2.66	0.00	2.66	0.27	0.00	—	9.31
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.95	0.95
User-Defined	0.80	4.66	10.6	16.0	0.94	—	0.94	0.94	—	0.94	—	144,003	144,003	13.8	0.15	—	144,393
Total	0.94	4.72	10.8	16.0	0.95	0.02	0.97	0.95	< 0.005	0.95	4.43	144,147	144,151	14.2	0.16	0.98	144,555

3. Construction Emissions Details

3.1. Earthworks A (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.31	31.6	30.2	0.05	1.37	—	1.37	1.26	—	1.26	—	5,295	5,295	0.21	0.04	—	5,314
Dust From Material Movement	—	—	—	—	—	5.11	5.11	—	2.63	2.63	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.87	0.83	< 0.005	0.04	—	0.04	0.03	—	0.03	—	145	145	0.01	< 0.005	—	146
Dust From Material Movement	—	—	—	—	—	0.14	0.14	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.16	0.15	< 0.005	0.01	—	0.01	0.01	—	0.01	—	24.0	24.0	< 0.005	< 0.005	—	24.1
Dust From Material Movement	—	—	—	—	—	0.03	0.03	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.08	0.97	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	253	253	< 0.005	0.01	0.03	256
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.02	7.02	< 0.005	< 0.005	0.01	7.11
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.16	1.16	< 0.005	< 0.005	< 0.005	1.18
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.2. Earthworks A (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.31	31.6	30.2	0.05	1.37	—	1.37	1.26	—	1.26	—	5,295	5,295	0.21	0.04	—	5,314

Dust From Material Movement	—	—	—	—	—	5.11	5.11	—	2.63	2.63	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.87	0.83	< 0.005	0.04	—	0.04	0.03	—	0.03	—	145	145	0.01	< 0.005	—	146
Dust From Material Movement	—	—	—	—	—	0.14	0.14	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.16	0.15	< 0.005	0.01	—	0.01	0.01	—	0.01	—	24.0	24.0	< 0.005	< 0.005	—	24.1
Dust From Material Movement	—	—	—	—	—	0.03	0.03	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.08	0.97	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	253	253	< 0.005	0.01	0.03	256
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.02	7.02	< 0.005	< 0.005	0.01	7.11
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.16	1.16	< 0.005	< 0.005	< 0.005	1.18
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.3. Earthworks B (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.10	24.2	21.3	0.05	1.12	—	1.12	1.03	—	1.03	—	4,121	4,121	0.17	0.03	—	4,135
Dust From Material Movement	—	—	—	—	—	2.60	2.60	—	1.32	1.32	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.31	2.42	2.12	< 0.005	0.11	—	0.11	0.10	—	0.10	—	411	411	0.02	< 0.005	—	413

Dust From Material Movement	—	—	—	—	—	0.26	0.26	—	0.13	0.13	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.44	0.39	< 0.005	0.02	—	0.02	0.02	—	0.02	—	68.1	68.1	< 0.005	< 0.005	—	68.3
Dust From Material Movement	—	—	—	—	—	0.05	0.05	—	0.02	0.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.08	0.97	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	253	253	< 0.005	0.01	0.03	256
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.52	32.3	13.9	0.17	0.32	6.64	6.96	0.32	1.86	2.19	—	25,593	25,593	2.07	4.14	1.40	26,880
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.10	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	25.6	25.6	< 0.005	< 0.005	0.04	25.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.05	3.26	1.38	0.02	0.03	0.66	0.69	0.03	0.19	0.22	—	2,554	2,554	0.21	0.41	2.33	2,684
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	4.23	4.23	< 0.005	< 0.005	0.01	4.29
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	0.59	0.25	< 0.005	0.01	0.12	0.13	0.01	0.03	0.04	—	423	423	0.03	0.07	0.39	444

3.4. Earthworks B (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.10	24.2	21.3	0.05	1.12	—	1.12	1.03	—	1.03	—	4,121	4,121	0.17	0.03	—	4,135
Dust From Material Movement	—	—	—	—	—	2.60	2.60	—	1.32	1.32	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.31	2.42	2.12	< 0.005	0.11	—	0.11	0.10	—	0.10	—	411	411	0.02	< 0.005	—	413
Dust From Material Movement	—	—	—	—	—	0.26	0.26	—	0.13	0.13	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.44	0.39	< 0.005	0.02	—	0.02	0.02	—	0.02	—	68.1	68.1	< 0.005	< 0.005	—	68.3
Dust From Material Movement	—	—	—	—	—	0.05	0.05	—	0.02	0.02	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.08	0.97	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	253	253	< 0.005	0.01	0.03	256
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.52	32.3	13.9	0.17	0.32	6.64	6.96	0.32	1.86	2.19	—	25,593	25,593	2.07	4.14	1.40	26,880
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.10	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	25.6	25.6	< 0.005	< 0.005	0.04	25.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.05	3.26	1.38	0.02	0.03	0.66	0.69	0.03	0.19	0.22	—	2,554	2,554	0.21	0.41	2.33	2,684
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	4.23	4.23	< 0.005	< 0.005	0.01	4.29
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	0.59	0.25	< 0.005	0.01	0.12	0.13	0.01	0.03	0.04	—	423	423	0.03	0.07	0.39	444

3.5. Earthworks B (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	2.93	22.7	21.1	0.05	0.98	—	0.98	0.90	—	0.90	—	4,120	4,120	0.17	0.03	—	4,134
Dust From Material Movement	—	—	—	—	—	2.60	2.60	—	1.32	1.32	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.22	0.21	< 0.005	0.01	—	0.01	0.01	—	0.01	—	40.3	40.3	< 0.005	< 0.005	—	40.5
Dust From Material Movement	—	—	—	—	—	0.03	0.03	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.04	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.67	6.67	< 0.005	< 0.005	—	6.70
Dust From Material Movement	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.91	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	248	248	< 0.005	0.01	0.02	251
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.36	31.1	13.4	0.17	0.32	6.64	6.96	0.32	1.86	2.19	—	25,148	25,148	1.90	3.98	1.32	26,383
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.46	2.46	< 0.005	< 0.005	< 0.005	2.49
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.31	0.13	< 0.005	< 0.005	0.06	0.07	< 0.005	0.02	0.02	—	246	246	0.02	0.04	0.21	258
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.41	0.41	< 0.005	< 0.005	< 0.005	0.41
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.06	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	40.7	40.7	< 0.005	0.01	0.04	42.8

3.6. Earthworks B (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.93	22.7	21.1	0.05	0.98	—	0.98	0.90	—	0.90	—	4,120	4,120	0.17	0.03	—	4,134
Dust From Material Movement	—	—	—	—	—	2.60	2.60	—	1.32	1.32	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.03	0.22	0.21	< 0.005	0.01	—	0.01	0.01	—	0.01	—	40.3	40.3	< 0.005	< 0.005	—	40.5
Dust From Material Movement	—	—	—	—	—	0.03	0.03	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.04	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.67	6.67	< 0.005	< 0.005	—	6.70
Dust From Material Movement	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.91	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	248	248	< 0.005	0.01	0.02	251
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.36	31.1	13.4	0.17	0.32	6.64	6.96	0.32	1.86	2.19	—	25,148	25,148	1.90	3.98	1.32	26,383
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.46	2.46	< 0.005	< 0.005	< 0.005	2.49
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.31	0.13	< 0.005	< 0.005	0.06	0.07	< 0.005	0.02	0.02	—	246	246	0.02	0.04	0.21	258
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.41	0.41	< 0.005	< 0.005	< 0.005	0.41

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.06	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	40.7	40.7	< 0.005	0.01	0.04	42.8

3.7. Building Construction A (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.07	9.67	10.9	0.02	0.38	—	0.38	0.35	—	0.35	—	2,435	2,435	0.10	0.02	—	2,444
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.07	9.67	10.9	0.02	0.38	—	0.38	0.35	—	0.35	—	2,435	2,435	0.10	0.02	—	2,444
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.36	3.25	3.67	0.01	0.13	—	0.13	0.12	—	0.12	—	820	820	0.03	0.01	—	823
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.59	0.67	< 0.005	0.02	—	0.02	0.02	—	0.02	—	136	136	0.01	< 0.005	—	136
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	1.05	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	260	260	< 0.005	0.01	0.91	264
Vendor	< 0.005	0.13	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	127	127	0.01	0.02	0.33	133
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.91	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	248	248	< 0.005	0.01	0.02	251
Vendor	< 0.005	0.13	0.07	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	127	127	0.01	0.02	0.01	133
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.32	0.00	0.00	0.09	0.09	0.00	0.02	0.02	—	84.6	84.6	< 0.005	< 0.005	0.13	85.7
Vendor	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	42.8	42.8	< 0.005	0.01	0.05	44.7
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.06	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	14.0	14.0	< 0.005	< 0.005	0.02	14.2
Vendor	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	7.08	7.08	< 0.005	< 0.005	0.01	7.40
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.8. Building Construction A (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.07	9.67	10.9	0.02	0.38	—	0.38	0.35	—	0.35	—	2,435	2,435	0.10	0.02	—	2,444

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.07	9.67	10.9	0.02	0.38	—	0.38	0.35	—	0.35	—	2,435	2,435	0.10	0.02	—	2,444
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.36	3.25	3.67	0.01	0.13	—	0.13	0.12	—	0.12	—	820	820	0.03	0.01	—	823
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.59	0.67	< 0.005	0.02	—	0.02	0.02	—	0.02	—	136	136	0.01	< 0.005	—	136
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	1.05	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	260	260	< 0.005	0.01	0.91	264
Vendor	< 0.005	0.13	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	127	127	0.01	0.02	0.33	133
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.91	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	248	248	< 0.005	0.01	0.02	251
Vendor	< 0.005	0.13	0.07	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	127	127	0.01	0.02	0.01	133
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.32	0.00	0.00	0.09	0.09	0.00	0.02	0.02	—	84.6	84.6	< 0.005	< 0.005	0.13	85.7
Vendor	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	42.8	42.8	< 0.005	0.01	0.05	44.7
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.06	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	14.0	14.0	< 0.005	< 0.005	0.02	14.2
Vendor	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	7.08	7.08	< 0.005	< 0.005	0.01	7.40
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Building Construction A (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.04	9.25	10.9	0.02	0.35	—	0.35	0.32	—	0.32	—	2,435	2,435	0.10	0.02	—	2,444
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.14	0.17	< 0.005	0.01	—	0.01	0.01	—	0.01	—	38.1	38.1	< 0.005	< 0.005	—	38.3
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	< 0.005	0.03	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.31	6.31	< 0.005	< 0.005	—	6.33
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.85	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	244	244	< 0.005	0.01	0.02	247
Vendor	< 0.005	0.13	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	125	125	0.01	0.02	0.01	130
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.87	3.87	< 0.005	< 0.005	0.01	3.92
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.95	1.95	< 0.005	< 0.005	< 0.005	2.04
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.64	0.64	< 0.005	< 0.005	< 0.005	0.65
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.32	0.32	< 0.005	< 0.005	< 0.005	0.34
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.10. Building Construction A (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.04	9.25	10.9	0.02	0.35	—	0.35	0.32	—	0.32	—	2,435	2,435	0.10	0.02	—	2,444
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.14	0.17	< 0.005	0.01	—	0.01	0.01	—	0.01	—	38.1	38.1	< 0.005	< 0.005	—	38.3
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.03	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.31	6.31	< 0.005	< 0.005	—	6.33
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.85	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	244	244	< 0.005	0.01	0.02	247
Vendor	< 0.005	0.13	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	125	125	0.01	0.02	0.01	130
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.87	3.87	< 0.005	< 0.005	0.01	3.92
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.95	1.95	< 0.005	< 0.005	< 0.005	2.04
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.64	0.64	< 0.005	< 0.005	< 0.005	0.65
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.32	0.32	< 0.005	< 0.005	< 0.005	0.34
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Building Construction B (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.15	2.64	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	651	651	0.01	0.02	2.26	661
Vendor	< 0.005	0.13	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	127	127	0.01	0.02	0.33	133
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.17	2.27	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	620	620	0.01	0.02	0.06	627
Vendor	< 0.005	0.13	0.07	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	127	127	0.01	0.02	0.01	133
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.43	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	114	114	< 0.005	< 0.005	0.18	115
Vendor	< 0.005	0.02	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	23.0	23.0	< 0.005	< 0.005	0.03	24.0
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	18.8	18.8	< 0.005	< 0.005	0.03	19.1
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.80	3.80	< 0.005	< 0.005	< 0.005	3.97
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.12. Building Construction B (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.15	2.64	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	651	651	0.01	0.02	2.26	661
Vendor	< 0.005	0.13	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	127	127	0.01	0.02	0.33	133
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.17	2.27	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	620	620	0.01	0.02	0.06	627
Vendor	< 0.005	0.13	0.07	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	127	127	0.01	0.02	0.01	133
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.43	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	114	114	< 0.005	< 0.005	0.18	115
Vendor	< 0.005	0.02	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	23.0	23.0	< 0.005	< 0.005	0.03	24.0
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	18.8	18.8	< 0.005	< 0.005	0.03	19.1
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.80	3.80	< 0.005	< 0.005	< 0.005	3.97
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Building Construction C (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.15	2.64	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	651	651	0.01	0.02	2.26	661
Vendor	< 0.005	0.13	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	127	127	0.01	0.02	0.33	133
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.17	2.27	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	620	620	0.01	0.02	0.06	627
Vendor	< 0.005	0.13	0.07	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	127	127	0.01	0.02	0.01	133
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.08	1.05	0.00	0.00	0.29	0.29	0.00	0.07	0.07	—	280	280	< 0.005	0.01	0.44	284

Vendor	< 0.005	0.06	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	—	56.7	56.7	< 0.005	0.01	0.06	59.2
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.19	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	46.4	46.4	< 0.005	< 0.005	0.07	47.0
Vendor	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	9.39	9.39	< 0.005	< 0.005	0.01	9.80
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.14. Building Construction C (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.17	0.15	2.64	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	651	651	0.01	0.02	2.26	661
Vendor	< 0.005	0.13	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	127	127	0.01	0.02	0.33	133
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.17	2.27	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	620	620	0.01	0.02	0.06	627
Vendor	< 0.005	0.13	0.07	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	127	127	0.01	0.02	0.01	133
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.08	1.05	0.00	0.00	0.29	0.29	0.00	0.07	0.07	—	280	280	< 0.005	0.01	0.44	284
Vendor	< 0.005	0.06	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	—	56.7	56.7	< 0.005	0.01	0.06	59.2
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.19	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	46.4	46.4	< 0.005	< 0.005	0.07	47.0
Vendor	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	9.39	9.39	< 0.005	< 0.005	0.01	9.80
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.15. Building Construction C (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.15	2.13	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	609	609	0.01	0.02	0.05	617
Vendor	< 0.005	0.13	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	125	125	0.01	0.02	0.01	130
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.25	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	68.9	68.9	< 0.005	< 0.005	0.10	69.8
Vendor	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	13.9	13.9	< 0.005	< 0.005	0.01	14.5
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.4	11.4	< 0.005	< 0.005	0.02	11.6
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.30	2.30	< 0.005	< 0.005	< 0.005	2.40
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.16. Building Construction C (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.15	2.13	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	609	609	0.01	0.02	0.05	617
Vendor	< 0.005	0.13	0.06	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	125	125	0.01	0.02	0.01	130
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.25	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	68.9	68.9	< 0.005	< 0.005	0.10	69.8
Vendor	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	13.9	13.9	< 0.005	< 0.005	0.01	14.5
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.4	11.4	< 0.005	< 0.005	0.02	11.6
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.30	2.30	< 0.005	< 0.005	< 0.005	2.40

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.17. Paving (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.66	6.09	8.83	0.01	0.24	—	0.24	0.22	—	0.22	—	1,350	1,350	0.05	0.01	—	1,355
Paving	0.14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.17	0.24	< 0.005	0.01	—	0.01	0.01	—	0.01	—	37.0	37.0	< 0.005	< 0.005	—	37.1
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.03	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.13	6.13	< 0.005	< 0.005	—	6.15
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.85	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	244	244	< 0.005	0.01	0.02	247
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.77	6.77	< 0.005	< 0.005	0.01	6.86
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.12	1.12	< 0.005	< 0.005	< 0.005	1.14
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.18. Paving (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.66	6.09	8.83	0.01	0.24	—	0.24	0.22	—	0.22	—	1,350	1,350	0.05	0.01	—	1,355
Paving	0.14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.17	0.24	< 0.005	0.01	—	0.01	0.01	—	0.01	—	37.0	37.0	< 0.005	< 0.005	—	37.1
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.03	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.13	6.13	< 0.005	< 0.005	—	6.15
Paving	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.85	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	244	244	< 0.005	0.01	0.02	247
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.77	6.77	< 0.005	< 0.005	0.01	6.86
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.12	1.12	< 0.005	< 0.005	< 0.005	1.14

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.19. Architectural Coating (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.86	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	18.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.04	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.49	5.49	< 0.005	< 0.005	—	5.51
Architectural Coatings	0.75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.91	0.91	< 0.005	< 0.005	—	0.91

Architectural Coatings	0.14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.91	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	248	248	< 0.005	0.01	0.02	251
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.3	10.3	< 0.005	< 0.005	0.02	10.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.71	1.71	< 0.005	< 0.005	< 0.005	1.73
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.20. Architectural Coating (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.86	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	18.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.04	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.49	5.49	< 0.005	< 0.005	—	5.51
Architectural Coatings	0.75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.91	0.91	< 0.005	< 0.005	—	0.91
Architectural Coatings	0.14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.91	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	248	248	< 0.005	0.01	0.02	251

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.3	10.3	< 0.005	< 0.005	0.02	10.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.71	1.71	< 0.005	< 0.005	< 0.005	1.73
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.21. SoCalGas Pipeline Construction (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.75	15.8	17.8	0.03	0.67	—	0.67	0.62	—	0.62	—	3,281	3,281	0.13	0.03	—	3,293
Dust From Material Movement	—	—	—	—	—	1.38	1.38	—	0.67	0.67	—	—	—	—	—	—	—
Onsite truck	< 0.005	0.16	0.07	< 0.005	< 0.005	11.9	11.9	< 0.005	1.19	1.19	—	137	137	0.01	0.02	0.28	144
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.75	15.8	17.8	0.03	0.67	—	0.67	0.62	—	0.62	—	3,281	3,281	0.13	0.03	—	3,293

Dust From Material Movement	—	—	—	—	—	1.38	1.38	—	0.67	0.67	—	—	—	—	—	—	—
Onsite truck	< 0.005	0.17	0.07	< 0.005	< 0.005	11.9	11.9	< 0.005	1.19	1.19	—	137	137	0.01	0.02	0.01	144
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.58	5.20	5.84	0.01	0.22	—	0.22	0.20	—	0.20	—	1,079	1,079	0.04	0.01	—	1,083
Dust From Material Movement	—	—	—	—	—	0.45	0.45	—	0.22	0.22	—	—	—	—	—	—	—
Onsite truck	< 0.005	0.06	0.02	< 0.005	< 0.005	3.88	3.88	< 0.005	0.39	0.39	—	45.1	45.1	< 0.005	0.01	0.04	47.3
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.11	0.95	1.07	< 0.005	0.04	—	0.04	0.04	—	0.04	—	179	179	0.01	< 0.005	—	179
Dust From Material Movement	—	—	—	—	—	0.08	0.08	—	0.04	0.04	—	—	—	—	—	—	—
Onsite truck	< 0.005	0.01	< 0.005	< 0.005	< 0.005	0.71	0.71	< 0.005	0.07	0.07	—	7.46	7.46	< 0.005	< 0.005	0.01	7.83
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.15	2.64	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	651	651	0.01	0.02	2.26	661
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.04	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.2	31.2	< 0.005	< 0.005	0.06	32.8
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.17	0.17	2.27	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	620	620	0.01	0.02	0.06	627
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.04	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.3	31.3	< 0.005	< 0.005	< 0.005	32.8
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.78	0.00	0.00	0.21	0.21	0.00	0.05	0.05	—	207	207	< 0.005	0.01	0.32	209
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	10.3	10.3	< 0.005	< 0.005	0.01	10.8
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.14	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	34.2	34.2	< 0.005	< 0.005	0.05	34.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.70	1.70	< 0.005	< 0.005	< 0.005	1.79

3.22. SoCalGas Pipeline Construction (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.96	7.86	18.9	0.03	0.33	—	0.33	0.30	—	0.30	—	3,281	3,281	0.13	0.03	—	3,293
Dust From Material Movement	—	—	—	—	—	1.38	1.38	—	0.67	0.67	—	—	—	—	—	—	—
Onsite truck	< 0.005	0.16	0.07	< 0.005	< 0.005	11.9	11.9	< 0.005	1.19	1.19	—	137	137	0.01	0.02	0.28	144
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.96	7.86	18.9	0.03	0.33	—	0.33	0.30	—	0.30	—	3,281	3,281	0.13	0.03	—	3,293
Dust From Material Movement	—	—	—	—	—	1.38	1.38	—	0.67	0.67	—	—	—	—	—	—	—
Onsite truck	< 0.005	0.17	0.07	< 0.005	< 0.005	11.9	11.9	< 0.005	1.19	1.19	—	137	137	0.01	0.02	0.01	144
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.31	2.58	6.20	0.01	0.11	—	0.11	0.10	—	0.10	—	1,079	1,079	0.04	0.01	—	1,083
Dust From Material Movement	—	—	—	—	—	0.45	0.45	—	0.22	0.22	—	—	—	—	—	—	—
Onsite truck	< 0.005	0.06	0.02	< 0.005	< 0.005	3.88	3.88	< 0.005	0.39	0.39	—	45.1	45.1	< 0.005	0.01	0.04	47.3
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.47	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	179	179	0.01	< 0.005	—	179
Dust From Material Movement	—	—	—	—	—	0.08	0.08	—	0.04	0.04	—	—	—	—	—	—	—
Onsite truck	< 0.005	0.01	< 0.005	< 0.005	< 0.005	0.71	0.71	< 0.005	0.07	0.07	—	7.46	7.46	< 0.005	< 0.005	0.01	7.83
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.15	2.64	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	651	651	0.01	0.02	2.26	661
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.04	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.2	31.2	< 0.005	< 0.005	0.06	32.8

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.17	0.17	2.27	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	620	620	0.01	0.02	0.06	627
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.04	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.3	31.3	< 0.005	< 0.005	< 0.005	32.8
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.78	0.00	0.00	0.21	0.21	0.00	0.05	0.05	—	207	207	< 0.005	0.01	0.32	209
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	10.3	10.3	< 0.005	< 0.005	0.01	10.8
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.14	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	34.2	34.2	< 0.005	< 0.005	0.05	34.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.70	1.70	< 0.005	< 0.005	< 0.005	1.79

3.23. SoCalGas Pipeline Construction (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.69	15.0	17.6	0.03	0.62	—	0.62	0.57	—	0.57	—	3,281	3,281	0.13	0.03	—	3,292
Dust From Material Movement	—	—	—	—	—	1.38	1.38	—	0.67	0.67	—	—	—	—	—	—	—
Onsite truck	< 0.005	0.16	0.07	< 0.005	< 0.005	11.9	11.9	< 0.005	1.19	1.19	—	134	134	0.01	0.02	0.26	141

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.69	15.0	17.6	0.03	0.62	—	0.62	0.57	—	0.57	—	3,281	3,281	0.13	0.03	—	3,292
Dust From Material Movement	—	—	—	—	—	1.38	1.38	—	0.67	0.67	—	—	—	—	—	—	—
Onsite truck	< 0.005	0.16	0.07	< 0.005	< 0.005	11.9	11.9	< 0.005	1.19	1.19	—	134	134	0.01	0.02	0.01	141
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.34	3.03	3.55	0.01	0.12	—	0.12	0.11	—	0.11	—	661	661	0.03	0.01	—	664
Dust From Material Movement	—	—	—	—	—	0.28	0.28	—	0.13	0.13	—	—	—	—	—	—	—
Onsite truck	< 0.005	0.03	0.01	< 0.005	< 0.005	2.38	2.38	< 0.005	0.24	0.24	—	27.1	27.1	< 0.005	< 0.005	0.02	28.5
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.55	0.65	< 0.005	0.02	—	0.02	0.02	—	0.02	—	109	109	< 0.005	< 0.005	—	110
Dust From Material Movement	—	—	—	—	—	0.05	0.05	—	0.02	0.02	—	—	—	—	—	—	—
Onsite truck	< 0.005	0.01	< 0.005	< 0.005	< 0.005	0.43	0.43	< 0.005	0.04	0.04	—	4.49	4.49	< 0.005	< 0.005	< 0.005	4.71
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.15	2.47	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	640	640	0.01	0.02	2.03	649
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	< 0.005	0.04	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	30.6	30.6	< 0.005	< 0.005	0.06	32.2
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.15	2.13	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	609	609	0.01	0.02	0.05	617
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.04	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	30.7	30.7	< 0.005	< 0.005	< 0.005	32.2
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.45	0.00	0.00	0.13	0.13	0.00	0.03	0.03	—	124	124	< 0.005	< 0.005	0.18	126
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	6.18	6.18	< 0.005	< 0.005	0.01	6.49
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	20.6	20.6	< 0.005	< 0.005	0.03	20.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.02	1.02	< 0.005	< 0.005	< 0.005	1.07

3.24. SoCalGas Pipeline Construction (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.91	7.45	18.9	0.03	0.29	—	0.29	0.27	—	0.27	—	3,281	3,281	0.13	0.03	—	3,292
Dust From Material Movement	—	—	—	—	—	1.38	1.38	—	0.67	0.67	—	—	—	—	—	—	—
Onsite truck	< 0.005	0.16	0.07	< 0.005	< 0.005	11.9	11.9	< 0.005	1.19	1.19	—	134	134	0.01	0.02	0.26	141

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.91	7.45	18.9	0.03	0.29	—	0.29	0.27	—	0.27	—	3,281	3,281	0.13	0.03	—	3,292
Dust From Material Movement	—	—	—	—	—	1.38	1.38	—	0.67	0.67	—	—	—	—	—	—	—
Onsite truck	< 0.005	0.16	0.07	< 0.005	< 0.005	11.9	11.9	< 0.005	1.19	1.19	—	134	134	0.01	0.02	0.01	141
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.18	1.50	3.80	0.01	0.06	—	0.06	0.05	—	0.05	—	661	661	0.03	0.01	—	664
Dust From Material Movement	—	—	—	—	—	0.28	0.28	—	0.13	0.13	—	—	—	—	—	—	—
Onsite truck	< 0.005	0.03	0.01	< 0.005	< 0.005	2.38	2.38	< 0.005	0.24	0.24	—	27.1	27.1	< 0.005	< 0.005	0.02	28.5
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.27	0.69	< 0.005	0.01	—	0.01	0.01	—	0.01	—	109	109	< 0.005	< 0.005	—	110
Dust From Material Movement	—	—	—	—	—	0.05	0.05	—	0.02	0.02	—	—	—	—	—	—	—
Onsite truck	< 0.005	0.01	< 0.005	< 0.005	< 0.005	0.43	0.43	< 0.005	0.04	0.04	—	4.49	4.49	< 0.005	< 0.005	< 0.005	4.71
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.15	2.47	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	640	640	0.01	0.02	2.03	649
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	< 0.005	0.04	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	30.6	30.6	< 0.005	< 0.005	0.06	32.2
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.15	2.13	0.00	0.00	0.65	0.65	0.00	0.15	0.15	—	609	609	0.01	0.02	0.05	617
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.04	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	30.7	30.7	< 0.005	< 0.005	< 0.005	32.2
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.45	0.00	0.00	0.13	0.13	0.00	0.03	0.03	—	124	124	< 0.005	< 0.005	0.18	126
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	6.18	6.18	< 0.005	< 0.005	0.01	6.49
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	20.6	20.6	< 0.005	< 0.005	0.03	20.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.02	1.02	< 0.005	< 0.005	< 0.005	1.07

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	0.02	0.01	0.25	< 0.005	< 0.005	0.08	0.08	< 0.005	0.02	0.02	—	70.2	70.2	< 0.005	< 0.005	0.22	70.9

General Heavy Industry	< 0.005	0.02	0.04	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	39.9	39.9	< 0.005	< 0.005	0.20	41.1
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.02	0.04	0.29	< 0.005	< 0.005	0.10	0.10	< 0.005	0.02	0.03	—	110	110	< 0.005	< 0.005	0.42	112
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	0.02	0.02	0.22	< 0.005	< 0.005	0.08	0.08	< 0.005	0.02	0.02	—	66.8	66.8	< 0.005	< 0.005	0.01	67.3
General Heavy Industry	< 0.005	0.02	0.04	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	39.7	39.7	< 0.005	< 0.005	0.01	40.7
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.02	0.04	0.26	< 0.005	< 0.005	0.10	0.10	< 0.005	0.02	0.03	—	106	106	< 0.005	0.01	0.01	108
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	< 0.005	< 0.005	0.04	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	11.2	11.2	< 0.005	< 0.005	0.02	11.3
General Heavy Industry	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	6.58	6.58	< 0.005	< 0.005	0.01	6.76
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	< 0.005	0.01	0.05	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	—	17.8	17.8	< 0.005	< 0.005	0.03	18.1

4.1.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	0.02	0.01	0.25	< 0.005	< 0.005	0.08	0.08	< 0.005	0.02	0.02	—	70.2	70.2	< 0.005	< 0.005	0.22	70.9
General Heavy Industry	< 0.005	0.02	0.04	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	39.9	39.9	< 0.005	< 0.005	0.20	41.1
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.02	0.04	0.29	< 0.005	< 0.005	0.10	0.10	< 0.005	0.02	0.03	—	110	110	< 0.005	< 0.005	0.42	112
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	0.02	0.02	0.22	< 0.005	< 0.005	0.08	0.08	< 0.005	0.02	0.02	—	66.8	66.8	< 0.005	< 0.005	0.01	67.3
General Heavy Industry	< 0.005	0.02	0.04	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	39.7	39.7	< 0.005	< 0.005	0.01	40.7

Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.02	0.04	0.26	< 0.005	< 0.005	0.10	0.10	< 0.005	0.02	0.03	—	106	106	< 0.005	0.01	0.01	108
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	< 0.005	< 0.005	0.04	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	11.2	11.2	< 0.005	< 0.005	0.02	11.3
General Heavy Industry	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	6.58	6.58	< 0.005	< 0.005	0.01	6.76
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	< 0.005	0.01	0.05	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	—	17.8	17.8	< 0.005	< 0.005	0.03	18.1

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	69.3	69.3	< 0.005	< 0.005	—	69.6

General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	308	308	0.02	< 0.005	—	309
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	378	378	0.02	< 0.005	—	379
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	69.3	69.3	< 0.005	< 0.005	—	69.6
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	308	308	0.02	< 0.005	—	309
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	378	378	0.02	< 0.005	—	379
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	11.5	11.5	< 0.005	< 0.005	—	11.5
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	51.0	51.0	< 0.005	< 0.005	—	51.2
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	62.5	62.5	< 0.005	< 0.005	—	62.7

4.2.2. Electricity Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	69.3	69.3	< 0.005	< 0.005	—	69.6
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	308	308	0.02	< 0.005	—	309
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	378	378	0.02	< 0.005	—	379
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	69.3	69.3	< 0.005	< 0.005	—	69.6
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	308	308	0.02	< 0.005	—	309

Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	378	378	0.02	< 0.005	—	379
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	11.5	11.5	< 0.005	< 0.005	—	11.5
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	51.0	51.0	< 0.005	< 0.005	—	51.2
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	62.5	62.5	< 0.005	< 0.005	—	62.7

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	21.7	21.7	< 0.005	< 0.005	—	21.7
General Heavy Industry	0.01	0.25	0.21	< 0.005	0.02	—	0.02	0.02	—	0.02	—	302	302	0.03	< 0.005	—	303

Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.01	0.27	0.23	< 0.005	0.02	—	0.02	0.02	—	0.02	—	324	324	0.03	< 0.005	—	325
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	21.7	21.7	< 0.005	< 0.005	—	21.7
General Heavy Industry	0.01	0.25	0.21	< 0.005	0.02	—	0.02	0.02	—	0.02	—	302	302	0.03	< 0.005	—	303
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.01	0.27	0.23	< 0.005	0.02	—	0.02	0.02	—	0.02	—	324	324	0.03	< 0.005	—	325
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.59	3.59	< 0.005	< 0.005	—	3.60
General Heavy Industry	< 0.005	0.05	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	50.1	50.1	< 0.005	< 0.005	—	50.2
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	< 0.005	0.05	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	53.7	53.7	< 0.005	< 0.005	—	53.8

4.2.4. Natural Gas Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	21.7	21.7	< 0.005	< 0.005	—	21.7
General Heavy Industry	0.01	0.25	0.21	< 0.005	0.02	—	0.02	0.02	—	0.02	—	302	302	0.03	< 0.005	—	303
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.01	0.27	0.23	< 0.005	0.02	—	0.02	0.02	—	0.02	—	324	324	0.03	< 0.005	—	325
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	21.7	21.7	< 0.005	< 0.005	—	21.7
General Heavy Industry	0.01	0.25	0.21	< 0.005	0.02	—	0.02	0.02	—	0.02	—	302	302	0.03	< 0.005	—	303
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.01	0.27	0.23	< 0.005	0.02	—	0.02	0.02	—	0.02	—	324	324	0.03	< 0.005	—	325

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.59	3.59	< 0.005	< 0.005	—	3.60
General Heavy Industry	< 0.005	0.05	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	50.1	50.1	< 0.005	< 0.005	—	50.2
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	< 0.005	0.05	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	53.7	53.7	< 0.005	< 0.005	—	53.8

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.54	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.18	0.01	1.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.42	4.42	< 0.005	< 0.005	—	4.44
Total	0.79	0.01	1.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.42	4.42	< 0.005	< 0.005	—	4.44

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.54	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	0.62	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.02	< 0.005	0.13	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.50	0.50	< 0.005	< 0.005	—	0.50
Total	0.13	< 0.005	0.13	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.50	0.50	< 0.005	< 0.005	—	0.50

4.3.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.54	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Landsca Equipment	0.18	0.01	1.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.42	4.42	< 0.005	< 0.005	—	4.44
Total	0.79	0.01	1.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.42	4.42	< 0.005	< 0.005	—	4.44
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.54	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.07	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	0.62	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.02	< 0.005	0.13	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.50	0.50	< 0.005	< 0.005	—	0.50
Total	0.13	< 0.005	0.13	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.50	0.50	< 0.005	< 0.005	—	0.50

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

General Office Building	—	—	—	—	—	—	—	—	—	—	0.91	4.71	5.62	0.09	< 0.005	—	8.63
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	9.77	50.6	60.3	1.00	0.02	—	92.7
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	10.7	55.3	66.0	1.10	0.03	—	101
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	0.91	4.71	5.62	0.09	< 0.005	—	8.63
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	9.77	50.6	60.3	1.00	0.02	—	92.7
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	10.7	55.3	66.0	1.10	0.03	—	101
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	0.15	0.78	0.93	0.02	< 0.005	—	1.43
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	1.62	8.37	9.99	0.17	< 0.005	—	15.3

Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	1.77	9.15	10.9	0.18	< 0.005	—	16.8

4.4.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	0.91	4.71	5.62	0.09	< 0.005	—	8.63
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	9.77	50.6	60.3	1.00	0.02	—	92.7
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	10.7	55.3	66.0	1.10	0.03	—	101
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	0.91	4.71	5.62	0.09	< 0.005	—	8.63

General Heavy Industry	—	—	—	—	—	—	—	—	—	—	9.77	50.6	60.3	1.00	0.02	—	92.7
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	10.7	55.3	66.0	1.10	0.03	—	101
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	0.15	0.78	0.93	0.02	< 0.005	—	1.43
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	1.62	8.37	9.99	0.17	< 0.005	—	15.3
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	1.77	9.15	10.9	0.18	< 0.005	—	16.8

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

General Office Building	—	—	—	—	—	—	—	—	—	—	1.34	0.00	1.34	0.13	0.00	—	4.68
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	14.7	0.00	14.7	1.47	0.00	—	51.5
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	16.1	0.00	16.1	1.61	0.00	—	56.2
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	1.34	0.00	1.34	0.13	0.00	—	4.68
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	14.7	0.00	14.7	1.47	0.00	—	51.5
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	16.1	0.00	16.1	1.61	0.00	—	56.2
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	0.22	0.00	0.22	0.02	0.00	—	0.78
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	2.44	0.00	2.44	0.24	0.00	—	8.53

Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	2.66	0.00	2.66	0.27	0.00	—	9.31

4.5.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	1.34	0.00	1.34	0.13	0.00	—	4.68
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	14.7	0.00	14.7	1.47	0.00	—	51.5
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	16.1	0.00	16.1	1.61	0.00	—	56.2
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	1.34	0.00	1.34	0.13	0.00	—	4.68

General Heavy Industry	—	—	—	—	—	—	—	—	—	—	14.7	0.00	14.7	1.47	0.00	—	51.5
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	16.1	0.00	16.1	1.61	0.00	—	56.2
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	0.22	0.00	0.22	0.02	0.00	—	0.78
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	2.44	0.00	2.44	0.24	0.00	—	8.53
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	2.66	0.00	2.66	0.27	0.00	—	9.31

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.74	5.74
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.74	5.74
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.74	5.74
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.74	5.74
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.95	0.95
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.95	0.95

4.6.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.74	5.74
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.74	5.74
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.74	5.74
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.74	5.74
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Office Building	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	< 0.005	< 0.005
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.95	0.95
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.95	0.95

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Thermal Oxidizer (TOU)	4.34	25.3	57.8	124	5.16	—	5.16	5.16	—	5.16	—	452,333	452,333	1.59	0.16	—	452,420
Off-Spec Flare Pilot	0.01	0.14	0.14	< 0.005	0.01	—	0.01	0.01	—	0.01	—	171	171	< 0.005	< 0.005	—	171
Genset with ICE	0.66	4.01	6.69	0.02	0.40	—	0.40	0.40	—	0.40	—	111	111	< 0.005	< 0.005	—	111
Fugitives	—	—	—	—	—	—	—	—	—	—	—	3.60	3.60	73.9	—	—	1,851
Product Gas	—	—	—	—	—	—	—	—	—	—	—	417,207	417,207	7.72	0.77	—	417,630
Total	5.01	29.4	64.6	124	5.57	—	5.57	5.57	—	5.57	—	869,826	869,826	83.2	0.93	—	872,184
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Thermal Oxidizer (TOU)	4.34	25.3	57.8	124	5.16	—	5.16	5.16	—	5.16	—	452,333	452,333	1.59	0.16	—	452,420
Off-Spec Flare Pilot	0.01	0.14	0.14	< 0.005	0.01	—	0.01	0.01	—	0.01	—	171	171	< 0.005	< 0.005	—	171
Genset with ICE	0.66	4.01	6.69	0.02	0.40	—	0.40	0.40	—	0.40	—	111	111	< 0.005	< 0.005	—	111
Fugitives	—	—	—	—	—	—	—	—	—	—	—	3.60	3.60	73.9	—	—	1,851
Product Gas	—	—	—	—	—	—	—	—	—	—	—	417,207	417,207	7.72	0.77	—	417,630
Total	5.01	29.4	64.6	124	5.57	—	5.57	5.57	—	5.57	—	869,826	869,826	83.2	0.93	—	872,184
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Thermal Oxidizer (TOU)	0.79	4.62	10.6	16.0	0.94	—	0.94	0.94	—	0.94	—	74,876	74,876	0.26	0.03	—	74,890
Off-Spec Flare Pilot	< 0.005	0.03	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	46.5	46.5	< 0.005	< 0.005	—	46.5
Genset with ICE	< 0.005	0.02	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	18.4	18.4	< 0.005	< 0.005	—	18.4
Fugitives	—	—	—	—	—	—	—	—	—	—	—	0.60	0.60	12.2	—	—	306
Product Gas	—	—	—	—	—	—	—	—	—	—	—	69,061	69,061	1.28	0.13	—	69,132
Total	0.80	4.66	10.6	16.0	0.94	—	0.94	0.94	—	0.94	—	144,003	144,003	13.8	0.15	—	144,393

4.9.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Thermal Oxidizer (TOU)	4.34	25.3	57.8	124	5.16	—	5.16	5.16	—	5.16	—	452,333	452,333	1.59	0.16	—	452,420
Off-Spec Flare Pilot	0.01	0.14	0.14	< 0.005	0.01	—	0.01	0.01	—	0.01	—	171	171	< 0.005	< 0.005	—	171
Genset with ICE	0.66	4.01	6.69	0.02	0.40	—	0.40	0.40	—	0.40	—	111	111	< 0.005	< 0.005	—	111
Fugitives	—	—	—	—	—	—	—	—	—	—	—	3.60	3.60	73.9	—	—	1,851
Product Gas	—	—	—	—	—	—	—	—	—	—	—	417,207	417,207	7.72	0.77	—	417,630
Total	5.01	29.4	64.6	124	5.57	—	5.57	5.57	—	5.57	—	869,826	869,826	83.2	0.93	—	872,184

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Thermal Oxidizer (TOU)	4.34	25.3	57.8	124	5.16	—	5.16	5.16	—	5.16	—	452,333	452,333	1.59	0.16	—	452,420
Off-Spec Flare Pilot	0.01	0.14	0.14	< 0.005	0.01	—	0.01	0.01	—	0.01	—	171	171	< 0.005	< 0.005	—	171
Genset with ICE	0.66	4.01	6.69	0.02	0.40	—	0.40	0.40	—	0.40	—	111	111	< 0.005	< 0.005	—	111
Fugitives	—	—	—	—	—	—	—	—	—	—	—	3.60	3.60	73.9	—	—	1,851
Product Gas	—	—	—	—	—	—	—	—	—	—	—	417,207	417,207	7.72	0.77	—	417,630
Total	5.01	29.4	64.6	124	5.57	—	5.57	5.57	—	5.57	—	869,826	869,826	83.2	0.93	—	872,184
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Thermal Oxidizer (TOU)	0.79	4.62	10.6	16.0	0.94	—	0.94	0.94	—	0.94	—	74,876	74,876	0.26	0.03	—	74,890
Off-Spec Flare Pilot	< 0.005	0.03	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	46.5	46.5	< 0.005	< 0.005	—	46.5
Genset with ICE	< 0.005	0.02	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	18.4	18.4	< 0.005	< 0.005	—	18.4
Fugitives	—	—	—	—	—	—	—	—	—	—	—	0.60	0.60	12.2	—	—	306
Product Gas	—	—	—	—	—	—	—	—	—	—	—	69,061	69,061	1.28	0.13	—	69,132
Total	0.80	4.66	10.6	16.0	0.94	—	0.94	0.94	—	0.94	—	144,003	144,003	13.8	0.15	—	144,393

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Earthworks A	Site Preparation	10/28/2025	11/10/2025	5.00	10.0	—
Earthworks B	Grading	11/11/2025	1/5/2026	5.00	40.0	—
Building Construction A	Building Construction	7/13/2026	1/8/2027	5.00	130	Site/Civil Work
Building Construction B	Building Construction	8/7/2026	11/6/2026	5.00	66.0	Structural
Building Construction C	Building Construction	5/18/2026	2/26/2027	5.00	205	Mechanical and Electrical
Paving	Paving	1/11/2027	1/22/2027	5.00	10.0	—
Architectural Coating	Architectural Coating	11/7/2026	11/28/2026	5.00	15.0	—
SoCalGas Pipeline Construction	Linear, Drainage, Utilities, & Sub-Grade	7/17/2026	4/13/2027	5.00	193	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Earthworks A	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Earthworks A	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37

Earthworks B	Rubber Tired Dozers	Diesel	Average	2.00	6.00	148	0.41
Earthworks B	Tractors/Loaders/Backhoes	Diesel	Average	2.00	6.00	84.0	0.37
Earthworks B	Cement and Mortar Mixers	Diesel	Average	1.00	6.00	367	0.40
Earthworks B	Sweepers/Scrubbers	Diesel	Average	1.00	6.00	36.0	0.46
Earthworks B	Dumpers/Tenders	Diesel	Average	10.0	6.00	16.0	0.38
Earthworks B	Off-Highway Trucks	Diesel	Average	1.00	6.00	376	0.38
Earthworks B	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Building Construction A	Cranes	Diesel	Average	2.00	6.00	367	0.29
Building Construction A	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction A	Tractors/Loaders/Backhoes	Diesel	Average	1.00	6.00	14.0	0.74
Building Construction A	Aerial Lifts	Diesel	Average	1.00	6.00	84.0	0.37
Building Construction A	Off-Highway Trucks	Diesel	Average	1.00	6.00	46.0	0.45
Paving	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Paving	Pavers	Diesel	Average	1.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	6.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	6.00	36.0	0.38
Paving	Cement and Mortar Mixers	Diesel	Average	2.00	6.00	10.0	0.56
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48
SoCalGas Pipeline Construction	Bore/Drill Rigs	Diesel	Average	1.00	6.00	83.0	0.50
SoCalGas Pipeline Construction	Excavators	Diesel	Average	1.00	6.00	36.0	0.38
SoCalGas Pipeline Construction	Rubber Tired Dozers	Diesel	Average	1.00	6.00	367	0.40

SoCalGas Pipeline Construction	Tractors/Loaders/Back	Diesel	Average	1.00	6.00	84.0	0.37
SoCalGas Pipeline Construction	Cranes	Diesel	Average	1.00	6.00	367	0.29
SoCalGas Pipeline Construction	Graders	Diesel	Average	1.00	6.00	148	0.41
SoCalGas Pipeline Construction	Other General Industrial Equipment	Diesel	Average	1.00	6.00	35.0	0.34
SoCalGas Pipeline Construction	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48
SoCalGas Pipeline Construction	Other Construction Equipment	Diesel	Average	1.00	6.00	82.0	0.42

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Earthworks A	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Earthworks A	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Earthworks B	Rubber Tired Dozers	Diesel	Average	2.00	6.00	148	0.41
Earthworks B	Tractors/Loaders/Backhoes	Diesel	Average	2.00	6.00	84.0	0.37
Earthworks B	Cement and Mortar Mixers	Diesel	Average	1.00	6.00	367	0.40
Earthworks B	Sweepers/Scrubbers	Diesel	Average	1.00	6.00	36.0	0.46
Earthworks B	Dumpers/Tenders	Diesel	Average	10.0	6.00	16.0	0.38
Earthworks B	Off-Highway Trucks	Diesel	Average	1.00	6.00	376	0.38
Earthworks B	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Building Construction A	Cranes	Diesel	Average	2.00	6.00	367	0.29
Building Construction A	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20

Building Construction A	Tractors/Loaders/Backhoes	Diesel	Average	1.00	6.00	14.0	0.74
Building Construction A	Aerial Lifts	Diesel	Average	1.00	6.00	84.0	0.37
Building Construction A	Off-Highway Trucks	Diesel	Average	1.00	6.00	46.0	0.45
Paving	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Paving	Pavers	Diesel	Average	1.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	6.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	6.00	36.0	0.38
Paving	Cement and Mortar Mixers	Diesel	Average	2.00	6.00	10.0	0.56
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48
SoCalGas Pipeline Construction	Bore/Drill Rigs	Diesel	Average	1.00	6.00	83.0	0.50
SoCalGas Pipeline Construction	Excavators	Diesel	Average	1.00	6.00	36.0	0.38
SoCalGas Pipeline Construction	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	6.00	367	0.40
SoCalGas Pipeline Construction	Tractors/Loaders/Backhoes	Diesel	Average	1.00	6.00	84.0	0.37
SoCalGas Pipeline Construction	Cranes	Diesel	Tier 4 Final	1.00	6.00	367	0.29
SoCalGas Pipeline Construction	Graders	Diesel	Average	1.00	6.00	148	0.41
SoCalGas Pipeline Construction	Other General Industrial Equipment	Diesel	Average	1.00	6.00	35.0	0.34
SoCalGas Pipeline Construction	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48
SoCalGas Pipeline Construction	Other Construction Equipment	Diesel	Average	1.00	6.00	82.0	0.42

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Earthworks A	—	—	—	—
Earthworks A	Worker	20.0	18.5	LDA,LDT1,LDT2
Earthworks A	Vendor	—	10.2	HHDT,MHDT
Earthworks A	Hauling	0.00	20.0	HHDT
Earthworks A	Onsite truck	—	—	HHDT
Earthworks B	—	—	—	—
Earthworks B	Worker	20.0	18.5	LDA,LDT1,LDT2
Earthworks B	Vendor	—	10.2	HHDT,MHDT
Earthworks B	Hauling	367	20.0	HHDT
Earthworks B	Onsite truck	—	—	HHDT
Building Construction A	—	—	—	—
Building Construction A	Worker	20.0	18.5	LDA,LDT1,LDT2
Building Construction A	Vendor	4.05	10.2	HHDT,MHDT
Building Construction A	Hauling	0.00	20.0	HHDT
Building Construction A	Onsite truck	—	—	HHDT
Building Construction B	—	—	—	—
Building Construction B	Worker	50.0	18.5	LDA,LDT1,LDT2
Building Construction B	Vendor	4.05	10.2	HHDT,MHDT
Building Construction B	Hauling	0.00	20.0	HHDT
Building Construction B	Onsite truck	—	—	HHDT
Building Construction C	—	—	—	—
Building Construction C	Worker	50.0	18.5	LDA,LDT1,LDT2
Building Construction C	Vendor	4.05	10.2	HHDT,MHDT
Building Construction C	Hauling	0.00	20.0	HHDT

Building Construction C	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	20.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	20.0	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT
SoCalGas Pipeline Construction	—	—	—	—
SoCalGas Pipeline Construction	Worker	50.0	18.5	LDA,LDT1,LDT2
SoCalGas Pipeline Construction	Vendor	0.00	10.2	HHDT,MHDT
SoCalGas Pipeline Construction	Hauling	0.46	20.0	HHDT
SoCalGas Pipeline Construction	Onsite truck	2.00	20.0	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Earthworks A	—	—	—	—
Earthworks A	Worker	20.0	18.5	LDA,LDT1,LDT2
Earthworks A	Vendor	—	10.2	HHDT,MHDT
Earthworks A	Hauling	0.00	20.0	HHDT
Earthworks A	Onsite truck	—	—	HHDT
Earthworks B	—	—	—	—
Earthworks B	Worker	20.0	18.5	LDA,LDT1,LDT2
Earthworks B	Vendor	—	10.2	HHDT,MHDT
Earthworks B	Hauling	367	20.0	HHDT

Earthworks B	Onsite truck	—	—	HHDT
Building Construction A	—	—	—	—
Building Construction A	Worker	20.0	18.5	LDA,LDT1,LDT2
Building Construction A	Vendor	4.05	10.2	HHDT,MHDT
Building Construction A	Hauling	0.00	20.0	HHDT
Building Construction A	Onsite truck	—	—	HHDT
Building Construction B	—	—	—	—
Building Construction B	Worker	50.0	18.5	LDA,LDT1,LDT2
Building Construction B	Vendor	4.05	10.2	HHDT,MHDT
Building Construction B	Hauling	0.00	20.0	HHDT
Building Construction B	Onsite truck	—	—	HHDT
Building Construction C	—	—	—	—
Building Construction C	Worker	50.0	18.5	LDA,LDT1,LDT2
Building Construction C	Vendor	4.05	10.2	HHDT,MHDT
Building Construction C	Hauling	0.00	20.0	HHDT
Building Construction C	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	20.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	20.0	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT
SoCalGas Pipeline Construction	—	—	—	—
SoCalGas Pipeline Construction	Worker	50.0	18.5	LDA,LDT1,LDT2

SoCalGas Pipeline Construction	Vendor	0.00	10.2	HHDT,MHDT
SoCalGas Pipeline Construction	Hauling	0.46	20.0	HHDT
SoCalGas Pipeline Construction	Onsite truck	2.00	20.0	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Control Strategies Applied	PM10 Reduction	PM2.5 Reduction
Water unpaved roads twice daily	55%	55%
Limit vehicle speeds on unpaved roads to 25 mph	55%	55%
Sweep paved roads once per month	9%	9%

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00	0.00	37,073	12,358	9,605

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Earthworks A	0.00	0.00	10.3	0.00	—
Earthworks B	93,190	24,196	36.8	0.00	—
Paving	0.00	0.00	0.00	0.00	3.68
SoCalGas Pipeline Construction	0.00	704	0.00	0.00	—

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	3	74%	74%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
General Office Building	0.00	0%
General Heavy Industry	0.00	0%
Other Asphalt Surfaces	0.53	100%
User Defined Linear	0.00	100%
Other Non-Asphalt Surfaces	3.14	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2025	0.00	532	0.03	< 0.005
2026	0.00	532	0.03	< 0.005
2027	0.00	532	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
General Office Building	8.00	8.00	8.00	2,920	108	108	108	39,373
General Heavy Industry	2.00	2.00	2.00	730	27.0	27.0	27.0	9,843

Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.9.2. Mitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
General Office Building	8.00	8.00	8.00	2,920	108	108	108	39,373
General Heavy Industry	2.00	2.00	2.00	730	27.0	27.0	27.0	9,843
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.1.2. Mitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	37,073	12,358	9,605

5.10.3. Landscape Equipment

Season	Unit	Value

Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.10.4. Landscape Equipment - Mitigated

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
General Office Building	47,580	532	0.0330	0.0040	67,675
General Heavy Industry	211,472	532	0.0330	0.0040	943,569
Other Asphalt Surfaces	0.00	532	0.0330	0.0040	0.00
Other Non-Asphalt Surfaces	0.00	532	0.0330	0.0040	0.00

5.11.2. Mitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
General Office Building	47,580	532	0.0330	0.0040	67,675
General Heavy Industry	211,472	532	0.0330	0.0040	943,569
Other Asphalt Surfaces	0.00	532	0.0330	0.0040	0.00
Other Non-Asphalt Surfaces	0.00	532	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
General Office Building	474,549	0.00
General Heavy Industry	5,097,906	0.00
Other Asphalt Surfaces	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
General Office Building	474,549	0.00
General Heavy Industry	5,097,906	0.00
Other Asphalt Surfaces	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
General Office Building	2.48	—
General Heavy Industry	27.3	—
Other Asphalt Surfaces	0.00	—
Other Non-Asphalt Surfaces	0.00	—

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
General Office Building	2.48	—
General Heavy Industry	27.3	—

Other Asphalt Surfaces	0.00	—
Other Non-Asphalt Surfaces	0.00	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
General Office Building	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
General Office Building	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
General Heavy Industry	Other commercial A/C and heat pumps	R-410A	2,088	0.30	4.00	4.00	18.0

5.14.2. Mitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
General Office Building	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
General Office Building	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
General Heavy Industry	Other commercial A/C and heat pumps	R-410A	2,088	0.30	4.00	4.00	18.0

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.15.2. Mitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type
Thermal Oxidizer (TOU)	Natural Gas and 2 Tail Gas Streams
Off-Spec Flare Pilot	Pilot Gas
Genset with ICE	Natural Gas
Fugitives	Natural Gas
Product Gas	Natural Gas

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

5.18.2.2. Mitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	9.78	annual days of extreme heat
Extreme Precipitation	3.80	annual days with precipitation above 20 mm
Sea Level Rise	0.00	meters of inundation depth
Wildfire	41.0	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	1	1	2
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	1	1	2

Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	65.7
AQ-PM	55.2
AQ-DPM	65.8
Drinking Water	47.3
Lead Risk Housing	6.36
Pesticides	65.3
Toxic Releases	65.8
Traffic	55.3
Effect Indicators	—
CleanUp Sites	71.6
Groundwater	39.9

Haz Waste Facilities/Generators	68.4
Impaired Water Bodies	43.8
Solid Waste	83.8
Sensitive Population	—
Asthma	2.50
Cardio-vascular	5.61
Low Birth Weights	29.9
Socioeconomic Factor Indicators	—
Education	13.7
Housing	23.4
Linguistic	70.3
Poverty	18.2
Unemployment	48.3

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	77.62094187
Employed	84.28076479
Median HI	92.14679841
Education	—
Bachelor's or higher	94.35390735
High school enrollment	21.05735917
Preschool enrollment	62.04285898
Transportation	—
Auto Access	86.34672142
Active commuting	14.52585654

Social	—
2-parent households	84.25510073
Voting	66.95752598
Neighborhood	—
Alcohol availability	88.92595919
Park access	28.96188887
Retail density	5.607596561
Supermarket access	46.38778391
Tree canopy	34.62081355
Housing	—
Homeownership	50.58385731
Housing habitability	79.40459387
Low-inc homeowner severe housing cost burden	70.24252534
Low-inc renter severe housing cost burden	87.52726806
Uncrowded housing	65.16104196
Health Outcomes	—
Insured adults	93.45566534
Arthritis	99.0
Asthma ER Admissions	98.5
High Blood Pressure	98.7
Cancer (excluding skin)	94.8
Asthma	95.7
Coronary Heart Disease	99.2
Chronic Obstructive Pulmonary Disease	99.4
Diagnosed Diabetes	98.9
Life Expectancy at Birth	84.7
Cognitively Disabled	82.5
Physically Disabled	94.1

Heart Attack ER Admissions	95.5
Mental Health Not Good	92.6
Chronic Kidney Disease	99.0
Obesity	98.0
Pedestrian Injuries	45.9
Physical Health Not Good	99.4
Stroke	99.1
Health Risk Behaviors	—
Binge Drinking	5.2
Current Smoker	88.4
No Leisure Time for Physical Activity	94.4
Climate Change Exposures	—
Wildfire Risk	38.7
SLR Inundation Area	0.0
Children	17.1
Elderly	90.8
English Speaking	40.4
Foreign-born	65.9
Outdoor Workers	98.2
Climate Change Adaptive Capacity	—
Impervious Surface Cover	77.7
Traffic Density	31.4
Traffic Access	23.0
Other Indices	—
Hardship	10.7
Other Decision Support	—
2016 Voting	74.5

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	30.0
Healthy Places Index Score for Project Location (b)	88.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Construction: Construction Phases	Project Specific
Construction: Off-Road Equipment	Project Specific
Operations: Vehicle Data	Anticipated trip rate based on 4 additional employees
Operations: Fleet Mix	Anticipated Fleet Mix
Construction: Dust From Material Movement	Project specific
Construction: Trips and VMT	Project specific

APPENDIX B – OPERATIONAL EQUIPMENT SPECIFICATIONS

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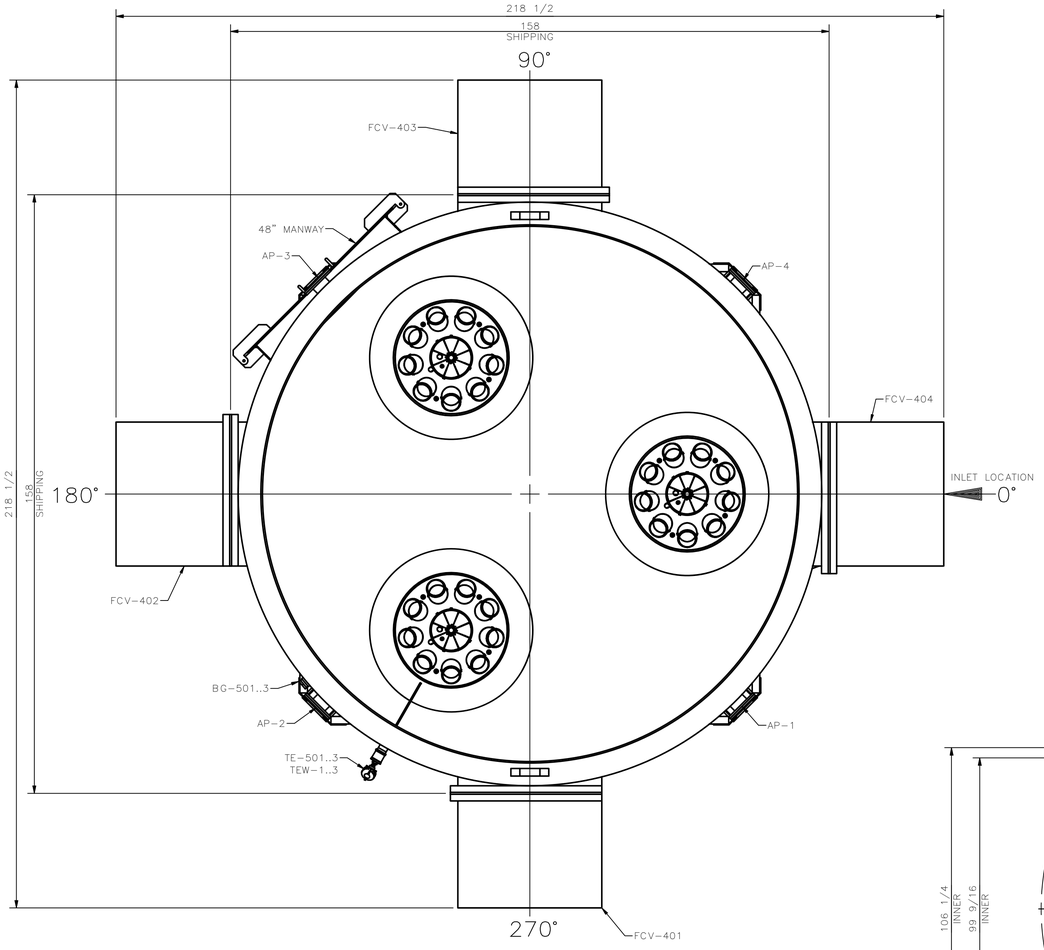
Equipment Data Sheet

120.0 MMBTU Flare

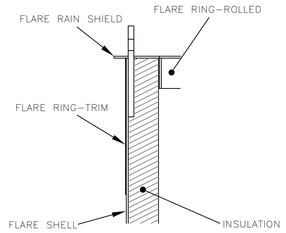
Spec. # 2125
Sheet # 1 Of 1
By: Kristi Wade
Date: 05 April 2024

Reference Designator or Item # **Off-Spec RNG Low NOx Enclosed Flare**

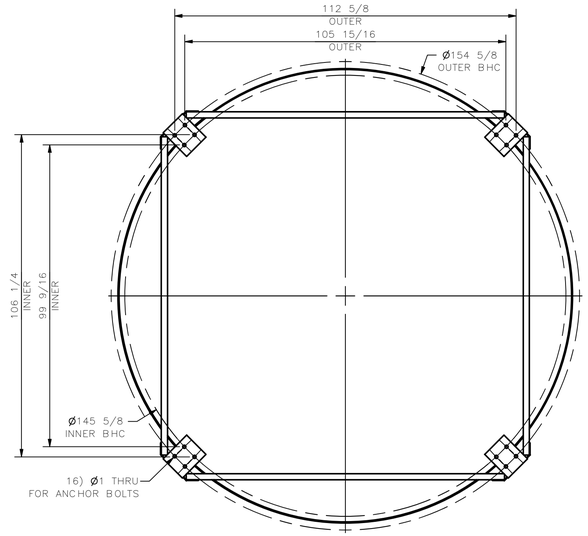
Quantity	1
Manufacturer or Approved Equal	PEI
Model #	FL-150-50-EN
RNG Max Capacity	120.0 MMBtu/h
RNG Min Capacity	24.0 MMBtu/h
Turn Down Ratio	5:1
Emissions Compliance Design Criteria	≤ 0.06 lb/MMBtu NOx
Temperature/Retention Time	Minimum 1400 Deg F for 0.6 Seconds
Maximum Skin Temperature	250 °F
Inlet Centerline Height	TBD
Flare Shell Height, O.D., Thickness	50', 150", 0.4375", ASTM A-36
Air Entrance Louvers	4 each – 91" w x 24" h, Automatic Controls
Flare floor, feet, manway, lift lug	ASTM-A-36
Top Ring & Shield	304L S.S.
Flare Insulation	4" Ceramic Fiber
Insulation Attachment	Inconel/SS 310 Studs & Retainers
Insulation Layers	3 ea. - Overlapping
Insulation Density	2" 4 lb/ft^3 and 2" 8 lb/ft^3
Inlet Nozzle Size	12" ANSI 150# Flange Pattern
Flare Burner Manifold & Associated Parts	304L S.S.
Combustion Air Blower Connected HP	< 200 HP
External Ladder	OSHA & ANSI A14.3 Standards
Manway Opening Size	24" x 24"
Flare Reference Drawing	PA-001-1363
Flare Reference Emissions Rule	SCAQMD Rule 1118.1 Other Flared Gas
COMMENTS or NOTES:	



PLAN VIEW
SCALE 1:20

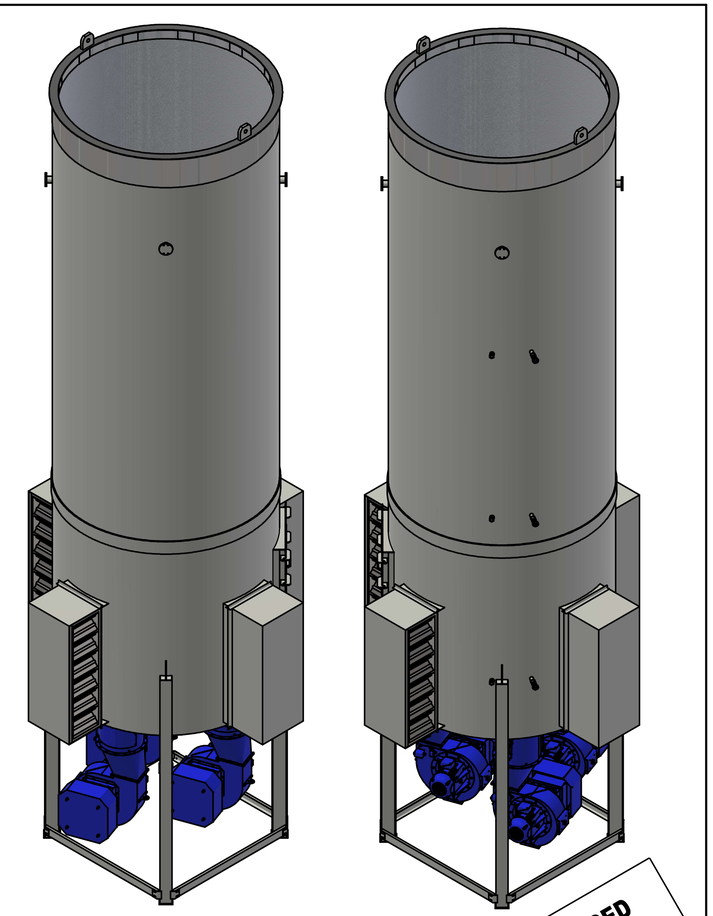


TYP TOP CROSS SECTION
SCALE: NTS



FOOT LAYOUT
SCALE 1:25

PRELIMINARY
FOR REVIEW/INFO.
ONLY
PERENNIAL ENERGY, LLC



ISOMETRIC VIEWS
SCALE 1:50

REDUCED
FROM ORIGINAL
SIZE

NOTE:
1. CLASSIFIED AREAS ARE SPECIFICALLY NOTED. ALL OTHER AREAS ARE UNCLASSIFIED.
2. SKIDS MUST BE LEVEL 1/8" SIDE TO SIDE, 1/4" END TO END.
3. CONTACT PERENNIAL ENERGY FOR INTERIM MAINTENANCE PROCEDURES IF EQUIPMENT IS NOT RUNNING WITHIN 21 DAYS OF ARRIVAL ON SITE.
4. INSTALLED HEIGHT OF TOUCHSCREEN (HMI) SHOULD BE 66" ABOVE FINISHED GRADE AT OPERATOR LOCATION. IF THE PANEL IS MOUNTED ON A PAD THAT IS ABOVE SURROUNDING GRADE, INFORM PEI TO ALLOW FOR ADJUSTMENT IN HMI ELEVATION.
5. REMOVE SHIPPING STANDS, BRACES, AND COVERS PRIOR TO INSTALLATION.
6. UNLESS OTHERWISE NOTED, USE ON GAS WITH MORE THAN 1500 PPM, H2S VOIDS WARRANTY.
7. BLOWERS 50HP AND ABOVE MUST HAVE SKID FRAME RAILS UNDER THE BLOWER SOLIDLY SHIMMED OR GROUTED TO A SUITABLE CONCRETE PAD.
8. TO ASSEMBLY DIMENSIONS SHOWN ARE NOT ACTUAL SHIPPING DIMENSIONS, CONFIRM FIELD DIMENSIONS PRIOR TO ORDERING THE PROPER SHIPPING PERMITS.
9. DO NOT USE THIS DRAWING FOR LOCATION OF CAST IN PLACE ANCHORS.

LTR	DESCRIPTION	DATE	APPROVED
0			

REVISIONS

APPLICABLE JOB NO(S). 2125
FRB LANDFILL RNG OFF-SPEC FLARE

PEI PERENNIAL ENERGY
1375 COUNTY ROAD 8690
WEST PLAINS, MO 65775
www.PerennialEnergy.com

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ENGINEERING SIGNATURES

DESIGNED BY: K.WADE	DATE: 4/19/24
DRAWN BY: D.SMITH	DATE: 4/19/24

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
FRACT .XX ANGLES
±1/16 ±.03 ±0°30

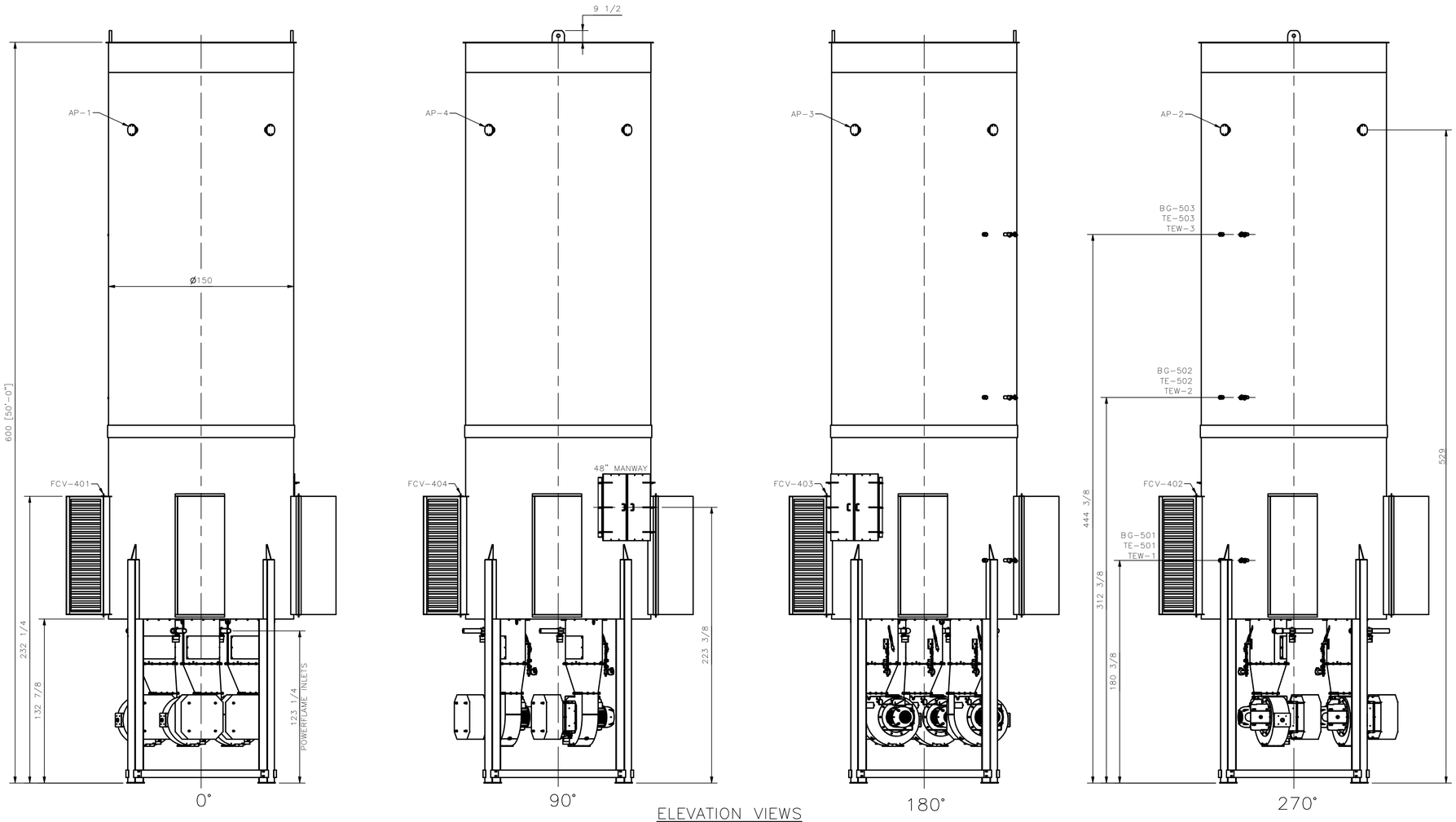
TITLE:
FLARE TOP ASSEMBLY
150"OD x 600" TALL

SIZE: D
DWG. NO.: PA-001-1363

MATERIAL: AS NOTED
SCALE: AS NOTED
FILE NO. PA-001-1363.dwg
SHEET 1 OF 2

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4/19/2024 10:07:32 AM O:\ACAD\2101-2150\2125 FRB Landfill RNG Off-Spec Flare\PA-001-1363.dwg D.SMITH



ELEVATION VIEWS
SCALE 1:50

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LTR	DESCRIPTION	DATE	APPROVED
0			

REVISIONS

APPLICABLE JOB NO(S): 2125
FRB LANDFILL RNG OFF-SPEC FLARE

PERENNIAL ENERGY
1375 COUNTY ROAD 8690
WEST PLAINS, MO 65775
www.PerennialEnergy.com

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ENGINEERING SIGNATURES

DESIGNED BY: K.WADE	DATE: 4/19/24
DRAWN BY: D.SMITH	DATE: 4/19/24

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FRACT ±1/16 .XX ±.03 ANGLES ±0°30

MATERIAL: AS NOTED

TITLE:
FLARE TOP ASSEMBLY 150"OD x 600" TALL

SIZE: D
DWG. NO.: PA-001-1363

SCALE: AS NOTED | FILE NO. PA-001-1363.dwg | SHEET 2 OF 2

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4/19/2024 10:07:32 AM O:\ACAD\2101-2150\2125 FRB Landfill RNG Off-Spec Flare\PA-001-1363.dwg D.SMITH

Equipment Data Sheet

Job # **2126-TOU**
Sheet # **1** Of **1**

By: **Kristi Wade**

Date: **14 May 2024**

32.9 MMBTU/H Thermal Oxidizer

Reference Designator or Item # **TOU**

Quantity	1
Manufacturer or Approved Equal	PEI
Model #	FL-108X76-50-TP
Max Heat Rate	32.9 MMBtu/h @ 1,050 Btu/scf HHV
Min Heat Rate	6.58 MMBtu/h @ 1,050 Btu/scf HHV
Turn Down Ratio	5:1
Emissions Compliance Design Criteria NG Supplemental Fuel Burner only	0.024 lb/MMBtu NOx, 1000 PPM CO
Emissions Compliance Design Criteria NG Supplemental Fuel Burner with Process Gas	0.035lb/MMBtu NOx, 0.08 lb/MMBtu CO 0.006 lb/MMBtu VOC
Temperature/Retention Time	1400 Deg F for 0.6 Seconds
Maximum Skin Temperature	250 °F
Inlet Centerline Height	TBD
TOU Shell Height, O.D., Thickness	50', 108" x 76", 3/8", ASTM A-36
Air Entrance Louvers	4 each, Automatic Controls
TOU floor, feet, manway, lift lug	ASTM-A-36
Top Ring & Shield	SS 304L
TOU Insulation	4" Ceramic Fiber
Insulation Attachment	Inconel Studs & Retainers
Insulation Layers	3 ea. - Overlapping
Insulation Density	2" 4 lb/ft^3 and 2" 8 lb/ft^3
Inlet Nozzle Size	10" (Waste Stream 1), 6" (Waste Stream 2), 3" (Natural Gas Stream) ANSI 150# Flange Pattern
TOU Burner Manifold & Associated Parts	304L SS
External Ladder & Fall Arrest Assembly	OSHA §1910.29 (D) (i) & ANSI A14.3 Standards
Manway Opening Size	36" x 36"
TOU Reference Drawings	PA-001-1380, ME-009-0667
TOU Reference Emissions Rule	SCAQMD Rule 1147

COMMENTS or NOTES:

NOX emission rates are exclusive of fixed nitrogen in the fuel or injected in condensate, leachate, or other sources. Design assumes, the gas quality will have less than 2% O2, less than 1500 ppmv of H2S, 0 ppmv NH3, and 0% H. If gas constituents are more than the above, please contact Perennial Energy to discuss options and/or changes to the quoted equipment.

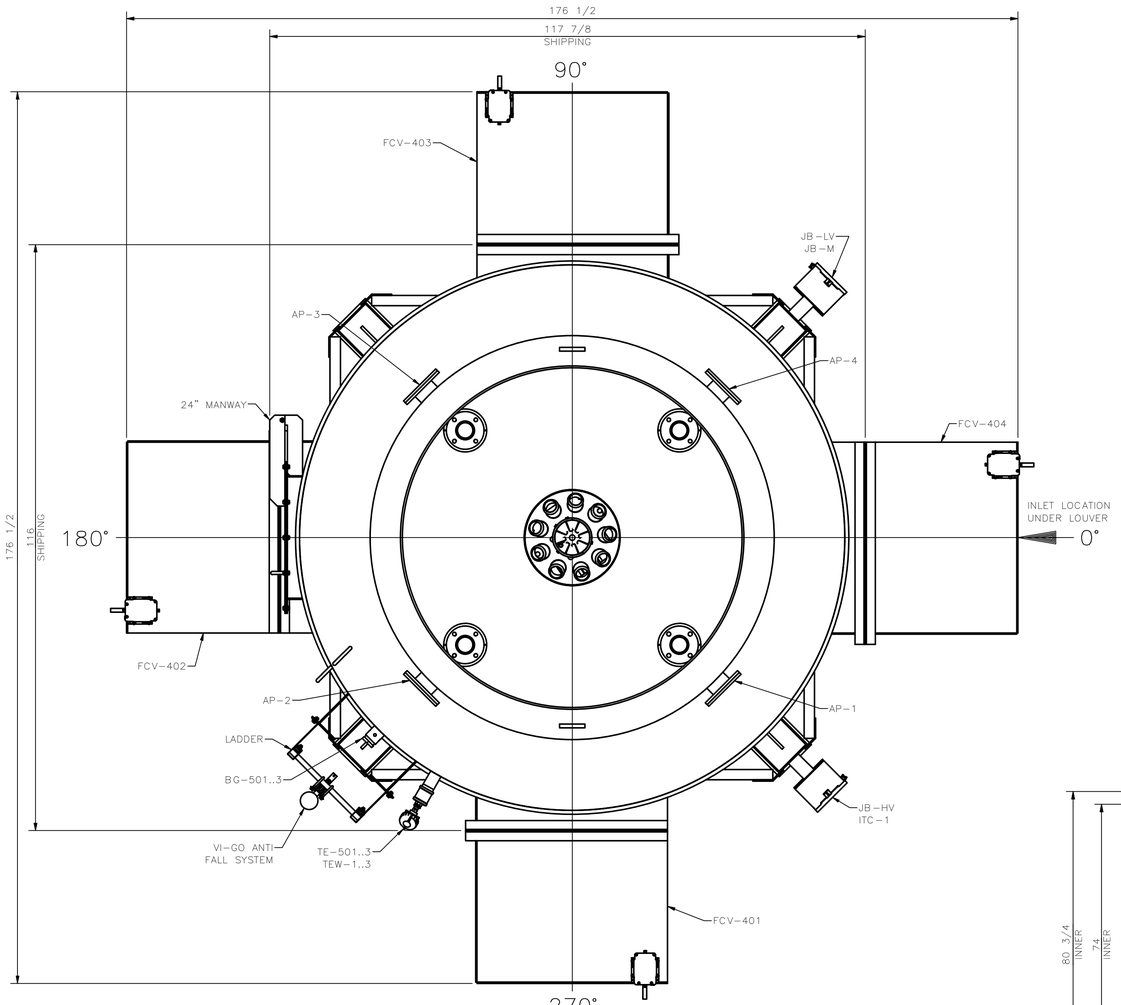
Please note: Mineral based particulates, such as wind-blown dust or silica, can be entrained into the ambient cooling and quenching air or purge air streams and passed into the combustor. As non-combustible matter, they will be passed into the exhaust stream and will be measured as particulate emissions, but are not generated by the combustion process. Additionally, Siloxanes will burn to SiO2. PEI makes no guarantees regarding these particulates, or particulates formed from the combustion of other non-methane constituents in the gas stream.

COMMENTS or NOTES:

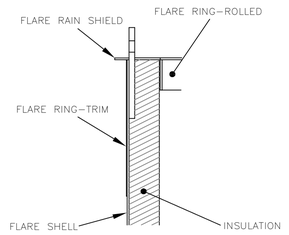
NOX emission rates are exclusive of fixed nitrogen in the fuel or injected in condensate, leachate, or other sources.

Please note: Mineral based particulates, such as wind-blown dust or silica, can be entrained into the ambient cooling and quenching air or purge air streams and passed into the combustor. As non-combustible matter, they will be passed into the exhaust stream and will be measured as particulate emissions, but are not generated by the combustion process. Additionally, Siloxanes will burn to SiO_2. PEI makes no guarantees regarding these particulates, or particulates formed from the combustion of other non-methane constituents in the gas stream.

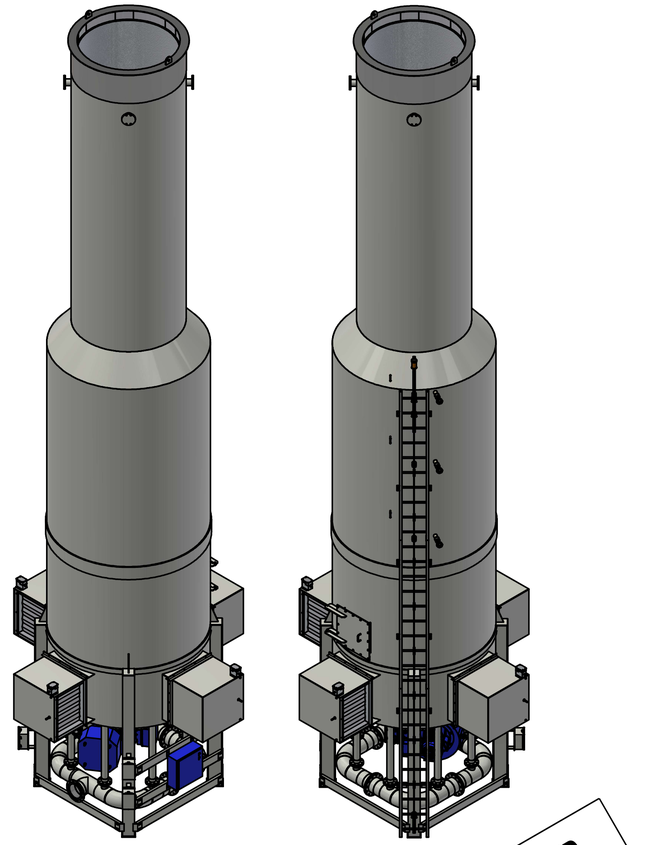
Design assumes, the gas quality will have less than 2% O_2, less than 1500 ppmv of H_2S, 0 ppmv NH_3, and 0% H. If gas constituents are more than the above, please contact Perennial Energy to discuss options and/or changes to the quoted equipment.



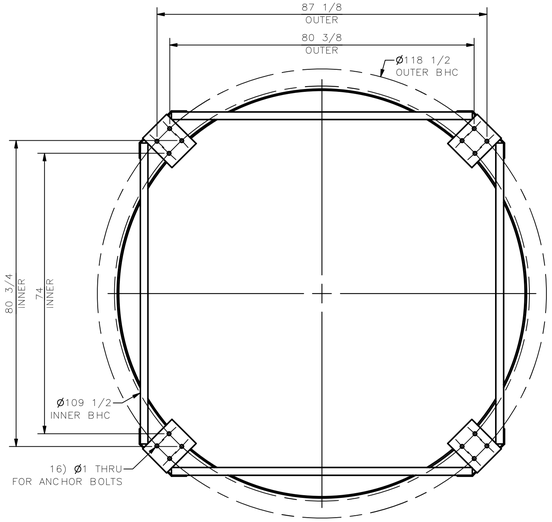
PLAN VIEW
SCALE 1:15



TYP TOP CROSS SECTION
SCALE: NTS



ISOMETRIC VIEWS
SCALE 1:50



FOOT LAYOUT
SCALE 1:20

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NOTE:
1. CLASSIFIED AREAS ARE SPECIFICALLY NOTED. ALL OTHER AREAS ARE UNCLASSIFIED.
2. SKIDS MUST BE LEVEL 1/8" SIDE TO SIDE, 1/4" END TO END.
3. CONTACT PERENNIAL ENERGY FOR INTERIM MAINTENANCE PROCEDURES IF EQUIPMENT IS NOT RUNNING WITHIN 21 DAYS OF ARRIVAL ON SITE.
4. INSTALLED HEIGHT OF TOUCHSCREEN (HMI) SHOULD BE 66" ABOVE FINISHED GRADE AT OPERATOR LOCATION. IF THE PANEL IS MOUNTED ON A PAD THAT IS ABOVE SURROUNDING GRADE, INFORM PEI TO ALLOW FOR ADJUSTMENT IN HMI ELEVATION.
5. REMOVE SHIPPING STANDS, BRACES, AND COVERS PRIOR TO INSTALLATION.
6. UNLESS OTHERWISE NOTED, USE ON GAS WITH MORE THAN 1500 PPM, H2S VOIDS WARRANTY.
7. BLOWERS 50HP AND ABOVE MUST HAVE SKID FRAME RAILS UNDER THE BLOWER SOLIDLY SHIMMED OR GROUTED TO A SUITABLE CONCRETE PAD.
8. TO ASSEMBLY DIMENSIONS SHOWN ARE NOT ACTUAL SHIPPING DIMENSIONS, CONFIRM FIELD DIMENSIONS PRIOR TO ORDERING THE PROPER SHIPPING PERMITS.
9. DO NOT USE THIS DRAWING FOR LOCATION OF CAST IN PLACE ANCHORS.

LTR	DESCRIPTION	DATE	APPROVED
0			

REVISIONS

APPLICABLE JOB NO(S). 2126
FRB LANDFILL RNG TOU

PERENNIAL ENERGY
1375 COUNTY ROAD 8690
WEST PLAINS, MO 65775
www.PerennialEnergy.com

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DRAWN BY: D.SMITH DATE: 4/18/24

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FRACT ±1/16 .XX ±.03 ANGLES ±0°30

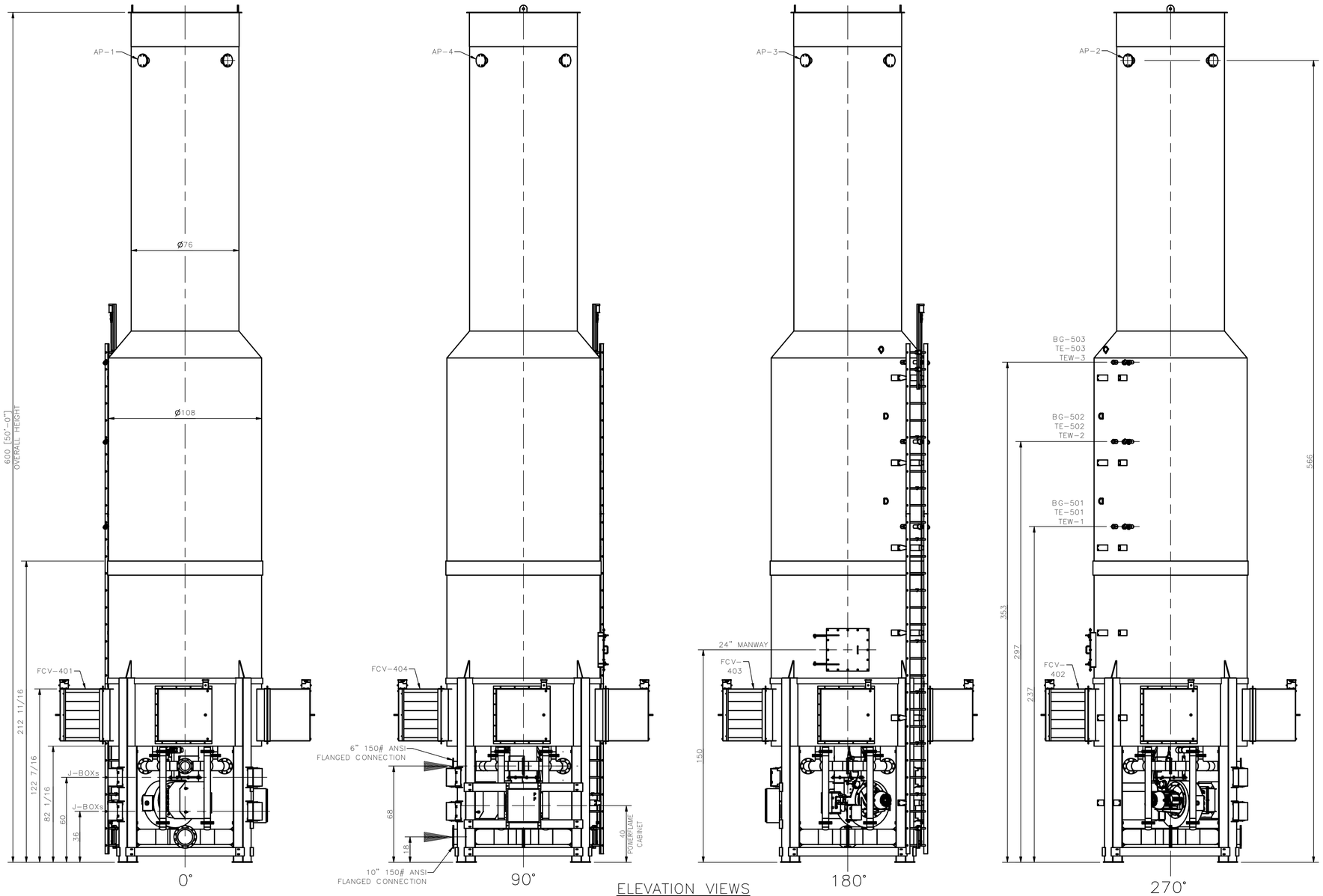
TITLE:
TOU TOP ASSEMBLY 108"OD x 600" TALL

SIZE D | DWG. NO. PA-001-1380

MATERIAL: AS NOTED | SCALE: AS NOTED | FILE NO. PA-001-1380.dwg | SHEET 1 OF 2

4/18/2024 8:18:07 AM O:\ACAD\2101-2150\2126 FRB Landfill RNG TOU\PA-001-1380.dwg D.SMITH

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ELEVATION VIEWS
SCALE 1:40

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LTR	DESCRIPTION	DATE	APPROVED
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REVISIONS

APPLICABLE JOB NO(S). 2126
FRB LANDFILL RNG TOU

PERENNIAL ENERGY
1375 COUNTY ROAD 8690
WEST PLAINS, MO 65775
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ENGINEERING SIGNATURES

DESIGNED BY: K.WADE	DATE: 4/18/24
DRAWN BY: D.SMITH	DATE: 4/18/24

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
FRACT .XX ANGLES
±1/16 ±.03 ±0°30

MATERIAL: AS NOTED

TITLE:
TOU TOP ASSEMBLY
108"OD x 600" TALL

SIZE: D
DWG. NO. PA-001-1380

SCALE: AS NOTED
FILE NO. PA-001-1380.dwg
SHEET 2 OF 2

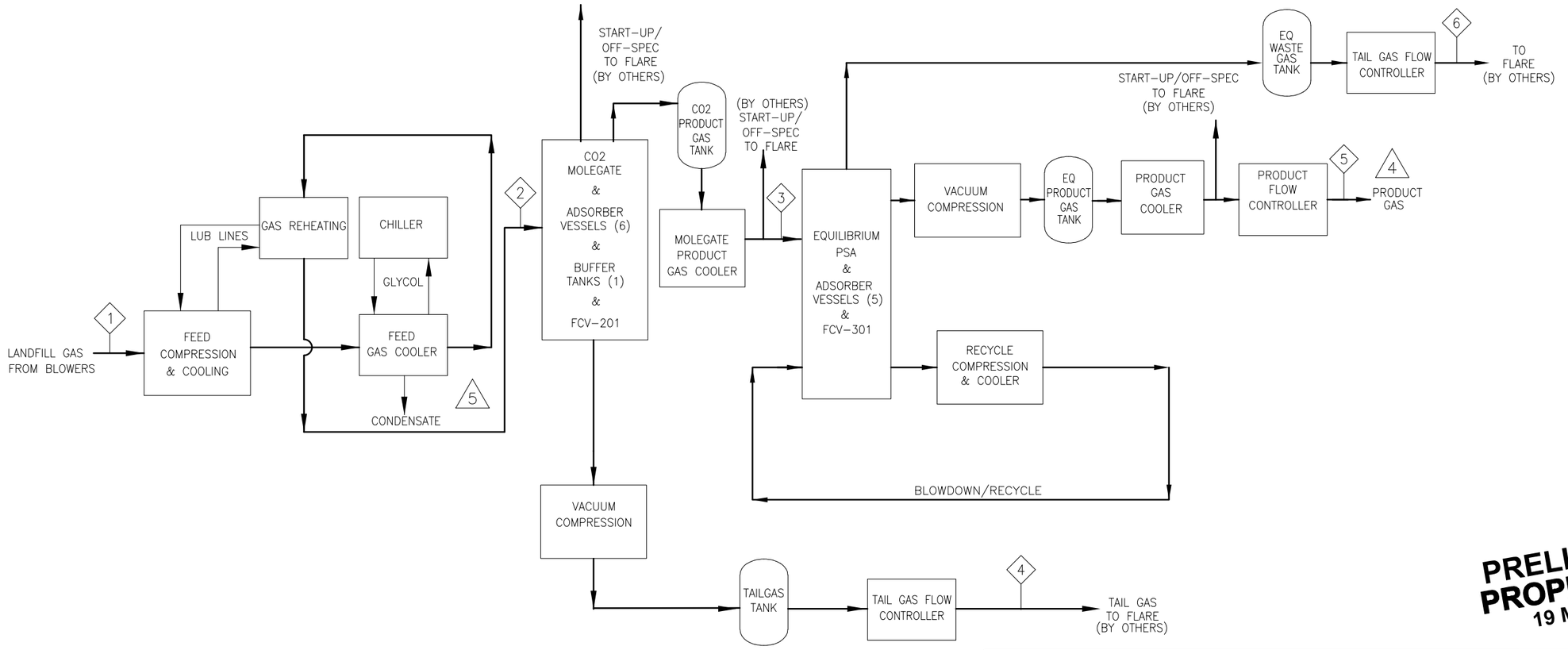
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4/18/2024 8:18:07 AM O:\ACADF\2101-2150\2126 FRB Landfill RNG TOU\PA-001-1380.dwg D.SMITH

NOTES: UNLESS OTHERWISE SPECIFIED

1. MAXIMUM FLOWS ARE SHOWN.
   SIMILAR FLOW RATIOS ARE EXPECTED IN TURNDOWN.
2. AVERAGE PRODUCT FLOW FROM THE SYSTEM IS SHOWN.
   SOME FLOW VARIATION IS EXPECTED.
3. TAIL GAS COMPOSITION WILL VARY WITH INLET CONCENTRATIONS AND DURING PLANT STARTUIP WHEN TAIL GAS METHANE CONCENTRATION CAN EXCEED 50% FOR A SHORT PERIOD OF TIME.
4. PRODUCT GAS SPECIFICATION
   TEMPERATURE: 40–120°F
   (3) CONSECUTIVE GC READINGS BEFORE SHUT–IN
   HIGHER HEATING VALUE (HHV): > 970 BTU/SCF
   CARBON DIOXIDE (CO2) CONTENT: <3.0%
   HYDROGEN SULFIDE (H2S) CONTENT: <4 PPM (0.25 GR/100SCF)
   TOTAL INERTS (N2+O2+CO2) CONTENT: <4.0%
   OXYGEN (O2) CONTENT: <0.20%
   NITROGEN (N2) CONTENT: <3.0%
   WATER (H2O) CONTENT: <7 LBS/MMSCF (<147 PPM)
5. CONDENSATION CONTAINS TRACE CO2 AND OIL
   CONDENSATE FLOW RATE: ~3,248 GPD
6. FEED COMPRESSOR DISCHARGE DEW POINT: 170°F
7. BDL IN THE MASS BALANCE REPRESENTS BELOW DETECTABLE LIMITS

STREAM	1 FEED GAS (DRY BASIS)	1 FEED GAS (WET BASIS)	2 CO2 PSA FEED	3 CO2 PSA PRODUCT	4 CO2 PSA TAIL GAS	5 EQ PSA PRODUCT	6 EQ PSA TAIL GAS
FLOW (SCFM)		6,000	5,604	3,295	2,309	2,412	883
PRESSURE (PSIG)		0	110	100	2	20	3
PRESSURE (PSIA)		14.67	124.67	114.67	16.67	34.67	17.67
TEMPERATURE °F		100	150	114	180	114	120
C1 (VOL%)	45.00	41.98	44.94	73.38	4.36	96.21	10.96
N2 (VOL%)	13.64	12.72	13.62	23.17	0.00	1.90	81.30
CO2 (VOL%)	40.05	37.36	40.00	1.25	95.29	1.71	0.00
O2 (VOL%)	1.30	1.21	1.30	2.21	0.00	0.18	7.75
H2S (PPM)	85	79	85	<4	206	< 4	< 4
H2O (VOL%)	SATURATED	6.72	0.14	<147 PPM	0.33	<147 PPM	<147 PPM
HHV		424	454	741	44	972	111



GENERAL DATA	
LOCATION	IRVINE, CA
ELEVATION (FEET)	72
BARO PRESSURE (PSIA)	14.67
AMBIENT TEMP (°F)	20 TO 104 °F

REVISIONS				
REV	DESCRIPTION	DATE	DRAWN	APPROVED

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19 MAY 2023

APPLICATION	
NEXT ASSY	USED ON

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TOLERANCES
DECIMALS ANGLES
.X= ±.1 ±0 30'
.XX= ±.02 FRACTIONS
.XXX= ±.010 ±1/32

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CONTRACT NO.

APPROVALS	DATE
DRAWN BAT	05/19/23
CHECKED	
ENGINEERED T.RUSSELL	05/19/23
DESIGN ACTIVITY	
APPROVED	

GUILD ASSOCIATES, INC.
DUBLIN, OHIO 43016

TITLE
PFD
LANDFILL GAS CLEANUP

SIZE	CODE IDENT. NO.	DWG. NO.	REV.
D	4X630	MGXXX–00009	3

SCALE N/A | WEIGHT | SHEET 1 OF 1

MGXXX–00009 SH 1 REV 3

Donald Barkley

From: Tina Darjazanie
Sent: Friday, February 2, 2024 3:14 PM
To: Vahe Baboomian
Cc: James Adams (JAdams@YorkeEngr.com); Donald Barkley
Subject: FW: FRB- Bowerman RNG TOU Spec Sheet

Vahe,
Please review and let me know if this is different than before and if we need to modify the model and our report.

Yorke Service Areas Include: Air Quality, Storm Water, Hazardous Waste, Industrial Hygiene-Safety, and CEQA Technical Reports.
For a more detailed list: www.YorkeEngr.com/Services.

Tina Darjazanie, MSEnvE | Long Beach Office
Senior Engineer
O: (949) 248-8490 | M: (949) 324-9041
TDarjazanie@YorkeEngr.com | V-card Link

Yorke Engineering, LLC | Corporate Office
31726 Rancho Viejo Road, Suite 218, San Juan Capistrano, CA 92675
Phone: (949) 248-8490 | Fax: (949) 248-8499
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From: Matthew Unger <munger@montaukrenewables.com>
Sent: Friday, February 2, 2024 3:10 PM
To: Tina Darjazanie <tdarjazanie@yorkeengr.com>
Subject: Fwd: FRB- Bowerman RNG TOU Spec Sheet

EXTERNAL EMAIL: This email originated from outside YorkeEngr.com. Please use caution.

See below from PEI.

Matt Unger
Senior Environmental Specialist

Phone: (412) 779-8548
Munger@montaukrenewables.com

5313 Campbells Run Road, Suite 200
Pittsburgh, PA 15205

www.montaukrenewables.com
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From: Kristi Wade <kwade@perennialenergy.com>
Sent: Friday, February 2, 2024 5:41:49 PM
To: Matthew Unger <munger@montaukrenewables.com>
Cc: Colby Staggs <cstaggs@perennialenergy.com>
Subject: RE: FRB- Bowerman RNG TOU Spec Sheet

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Matt,
If they are referring to the Auxiliary fuel, we have the revised flows below (highlighted). I wanted to send all of the following information in case they needed any clarification on our re-sizing.

	"Start-up Stream" CO2 PSA Tail Gas Stream	*"Steady-State" CO2 PSA Tail Gas Stream*	*"Steady-State" EQ PSA Tail Gas Stream*
Flow (SCFM)	1,100	2,315	885
Pressure (psig)	2.0 to 5.0 psig	2.0	3.0
Temperature (°F)	180	180	120
CH4 %	40 %	4.36 %	10.96 %
CO2 %	59.67 %	95.29 %	0.0 %
N2 %	0.0 %	0.0 %	81.30 %
O2%	0.0 %	0.0 %	7.75 %
H_2S (PPM)	206	206	< 4
H_2O Content	0.33 %	0.33 %	< 147 PPM
Heat Rate at 1,050 Btu/scf HHV	27.7 MMBtu/hr	6.4 MMBtu/hr	6.1 MMBtu/hr

The **Thermal Oxidizer (TOU)** is designed for a total capacity of **32.9 MMBtu/hr** at 1,050 Btu/scf HHV. The TOU is designed to handle the above Start-up Stream from the CO2 PSA System (27.7 MMBtu/hr) and the combined "Steady State" Tail Gas streams from the CO2 PSA and EQ PSA Systems (12.5 MMBtu/hr) as well as an additional ***natural gas*** supplemental fuel stream of up to about **260 scfm**.

Stream Condition Description	Design TOU Heat Rate	Calculated Design Case Supplemental Fuel Usage (Considering Natural Gas at 5 psig)

Start-up *(Start-up Stream only for ~30 to 45 minutes, 1 hour max)*	**32.9 MMBtu/hr** at 1,050 Btu/scf	- Assume approx. **83 scfm** of natural gas, or minimum turndown of process burner (Approx. **5.2 MMBtu/hr** at 1,050 Btu/scf)
Normal Operation *(Both Steady State streams from the CO2 PSA Tail and EQ PSA Systems)*	**28.9 MMBtu/hr** at 1,050 Btu/scf	- Approx. **130 to 260 scfm** of natural gas at 1600 to 1800 °F - Approx. **8.2 to 16.4 MMBtu/hr** at 1,050 Btu/scf

Calculated Heat Rate at Each Process Condition		
	Start-up	**Normal Operation** *(Steady State)*
Total Heat Rate	**32.9 MMBtu/hr** at 1,050 Btu/scf	**28.9 MMBtu/hr** at 1,050 Btu/scf
Supplemental Fuel Usage (Considering Natural Gas at 5 psig)	**5.2 MMBtu/hr** at 1,050 Btu/scf	**16.4 MMBtu/hr** at 1,050 Btu/scf
CO2 PSA Tail Gas Stream Heat Rate	**27.7 MMBtu/hr** at 1,050 Btu/scf	**6.4 MMBtu/hr** at 1,050 Btu/scf
EQ PSA Tail Gas Stream Heat Rate	N/A	**6.1 MMBtu/hr** at 1,050 Btu/scf

Please let us know if you have any more questions!

Kristi Wade
417-505-7181

From: Matthew Unger <munger@montaukrenewables.com>
Sent: Thursday, February 1, 2024 11:51 AM
To: Kristi Wade <kwade@perennialenergy.com>
Subject: FW: FRB- Bowerman RNG TOU Spec Sheet

Kristi,

Please see the email below from our permitting contractor. Do you have this information on the pilot gas?

Thank you,

Matt Unger
Senior Environmental Specialist

Phone: (412) 779-8548
munger@montaukrenewables.com

5313 Campbells Run Road, Suite 200
Pittsburgh, PA 15205

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www.montaukrenewables.com

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From: Tina Darjazanie <tdarjazanie@yorkeengr.com>
Sent: Thursday, February 1, 2024 12:41 PM
To: Matthew Unger <munger@montaukrenewables.com>
Cc: Vahe Baboomian <vbaboomian@yorkeengr.com>
Subject: RE: FRB- Bowerman RNG TOU Spec Sheet

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Hi Matt,

The previous TOU rated at 24.1 MMBtu/hr had a pilot gas design fuel usage between 106 -199 scfm – where we used the 199 scfm fuel usage rate to calculate emissions. Please see below based on an email from 10/02/2023.

> The **Thermal Oxidizer (TOU)** is designed for a total capacity of **24.1 MMBtu/hr**. The TOU is designed to handle the provided tail gas conditions as well as an additional ***natural gas*** supplemental fuel stream of up to about **199 scfm**.

Stream Condition Description	Design TOU Heat Rate (Considering a HHV of 1,010 Btu/scf)	Tail Gas Heat Rate (Considering HHV of 1,010 Btu/scf)	Calculated Design Case Supplemental Fuel Usage (Considering Natural Gas at 5 psig)
Both Streams	24.1 MMBtu/hr	12.0 MMBtu/hr	- About **106 to 199 scfm** of natural gas at 1600 to 1800 °F (or about **6.4 to 12.1 MMBtu/hr** at 1,010 Btu/scf)

Does the revised TOU rated at 32.9 MMBtu/hr have the same pilot gas design fuel usage? If not, can you please provide the updated pilot gas fuel usage?

Thanks,

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For a more detailed list: www.YorkeEngr.com/Services.

Tina Darjazanie, MSEnvE | Long Beach Office
Senior Engineer
O: (949) 248-8490 | M: (949) 324-9041
TDarjazanie@YorkeEngr.com | V-card Link

Donald Barkley

From: Kristi Wade <kwade@perennialenergy.com>
Sent: Wednesday, April 24, 2024 2:41 PM
To: Donald Barkley
Cc: Vahe Baboomian
Subject: RE: Bowerman RNG - PEI Flare/TOU Specification Clarification

Follow Up Flag: Flag for follow up
Flag Status: Flagged

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Don,
Yes, I was accounting for the insulation which is 4" thick as well as a shell thickness of 3/8" on each unit. I see now that we had 7/16" thick on the off spec flare. This makes the ID of the flare 141 1/8". Please use this exhaust diameter for the off spec flare.

For the natural gas pilot, I am getting confirmation from the burner vendor for the Btu rating.

Kristi Wade
417-505-7181

From: Donald Barkley <dbarkley@yorkeengr.com>
Sent: Wednesday, April 24, 2024 12:22 PM
To: Kristi Wade <kwade@perennialenergy.com>
Cc: Vahe Baboomian <vbaboomian@yorkeengr.com>
Subject: RE: Bowerman RNG - PEI Flare/TOU Specification Clarification

HI Kristi,

Thanks for the information. Can you clarify how the inside diameters are derived for the 150" OD Flare, with 0.4375 shell thickness, and the 76" OD TOU, with 0.375 shell thickness. Are the inside diameters accounting for insulation? If so, can you please supply the insulation thickness for the TOU and the Flare.

Also, before we run the modeling again, we just wanted to confirm that the natural gas pilot on the Flare is still rated at 100,000 BTU/hr.

Thanks,
Don

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Don Barkley, BSMechE, PE | San Juan Capistrano Office
Senior Engineer
O: (949) 248-8490 | M: (949) 426-4943
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From: Kristi Wade <kwade@perennialenergy.com>
Sent: Tuesday, April 23, 2024 2:22 PM
To: Vahe Baboomian <vbaboomian@yorkeengr.com>; Colby Staggs <cstaggs@perennialenergy.com>; Brad Alexander <balexander@perennialenergy.com>
Cc: Matthew Unger <Munger@montaukrenewables.com>; Donald Barkley <dbarkley@yorkeengr.com>; James Adams <jadams@yorkeengr.com>
Subject: RE: Bowerman RNG - PEI Flare/TOU Specification Clarification

EXTERNAL EMAIL: This email originated from outside YorkeEngr.com. Please use caution.

Vahe,
One modification to my response below. Please change the natural gas consumption on the TOU to a **maximum of 280 SCFM.**

Thank you!

Kristi Wade
417-505-7181

From: Kristi Wade
Sent: Tuesday, April 23, 2024 3:52 PM
To: 'Vahe Baboomian' <vbaboomian@yorkeengr.com>; Colby Staggs <cstaggs@perennialenergy.com>; Brad Alexander <balexander@perennialenergy.com>
Cc: Matthew Unger <Munger@montaukrenewables.com>; Donald Barkley <dbarkley@yorkeengr.com>; James Adams <jadams@yorkeengr.com>
Subject: RE: Bowerman RNG - PEI Flare/TOU Specification Clarification

Vahe,
See answers below in red. Please let me know if you have any questions.

Kristi Wade
417-505-7181

From: Vahe Baboomian <vbaboomian@yorkeengr.com>
Sent: Monday, April 22, 2024 3:00 PM
To: Kristi Wade <kwade@perennialenergy.com>
Cc: Matthew Unger <Munger@montaukrenewables.com>; Donald Barkley <dbarkley@yorkeengr.com>; James Adams <jadams@yorkeengr.com>
Subject: Bowerman RNG - PEI Flare/TOU Specification Clarification

Hello Kristi,

Can you please provide us with the following information for the most recent Flare and TOU revision. Also, can you please confirm if the process flow diagram will be updated due to the Flare/TOU revisions – namely the flow rates through streams A and B?

Flare:

- Exhaust temperature and exhaust flow rate (in acfm) at the exhaust point; 150,000 acfm @ 1018 deg F
- Please confirm if the new Flare will have an exhaust height of 50 feet. Confirmed. The flare height is 50 ft overall.
  Please note the exhaust diameter (ID of flare) is 141 ¼" since the OD of the shell is 150".

TOU

- Exhaust temperature and exhaust flow rate (in acfm) at the exhaust point; 39,000 acfm @ 1000 deg F
- Please confirm if the new TOU will have an exhaust diameter of 76"; The OD of the TOU is 76", which makes the exhaust diameter (ID) 67 ¼".
- Supplemental fuel (natural gas) flow rate – we currently have 260 scfm on file. Has this changed with the newest revision? 260 SCFM of natural gas is correct for the TOU.

Thank you,
Vahe

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Vahe Baboomian

From: Kristi Wade <kwade@perennialenergy.com>
Sent: Thursday, April 25, 2024 3:23 PM
To: Vahe Baboomian; Matthew Unger
Cc: Donald Barkley; Tina Darjazanie
Subject: RE: Bowerman RNG - PEI Flare/TOU Specification Clarification

EXTERNAL EMAIL: This email originated from outside YorkeEngr.com. Please use caution.

Vahe,
Yes, you can use the conservative estimate with a continuous pilot at 100,000 Btu/hr.

Kristi Wade
417-505-7181

From: Vahe Baboomian <vbaboomian@yorkeengr.com>
Sent: Thursday, April 25, 2024 3:33 PM
To: Matthew Unger <Munger@montaukrenewables.com>; Kristi Wade <kwade@perennialenergy.com>
Cc: Donald Barkley <dbarkley@yorkeengr.com>; Tina Darjazanie <tdarjazanie@yorkeengr.com>
Subject: RE: Bowerman RNG - PEI Flare/TOU Specification Clarification

Hi Matt,

Yes, I was going to assume continuous operation as a conservative estimate. Just wanted to confirm the BTU/hr rating hasn't changed since there have been subtle differences in the latest flare and TOU design that need to be updated in the model.

Best,
Vahe

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From: Matthew Unger <munger@montaukrenewables.com>
Sent: Thursday, April 25, 2024 1:27 PM

To: Vahe Baboomian <vbaboomian@yorkeengr.com>; Kristi Wade <kwade@perennialenergy.com>
Cc: Donald Barkley <dbarkley@yorkeengr.com>; Tina Darjazanie <tdarjazanie@yorkeengr.com>
Subject: Re: Bowerman RNG - PEI Flare/TOU Specification Clarification

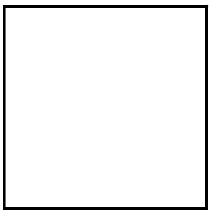
EXTERNAL EMAIL: This email originated from outside YorkeEngr.com. Please use caution.

To not delay the permit, could we assume continuous pilot as worst case scenario ?

Matt Unger
Southern Regional Environmental Manager

Phone: (412) 779-8548
Munger@montaukrenewables.com

5313 Campbells Run Road, Suite 200
Pittsburgh, PA 15205



www.montaukrenewables.com

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From: Vahe Baboomian <vbaboomian@yorkeengr.com>
Sent: Thursday, April 25, 2024 4:25:47 PM
To: Kristi Wade <kwade@perennialenergy.com>
Cc: Donald Barkley <dbarkley@yorkeengr.com>; Tina Darjazanie <tdarjazanie@yorkeengr.com>; Matthew Unger <munger@montaukrenewables.com>
Subject: RE: Bowerman RNG - PEI Flare/TOU Specification Clarification

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Hi Kristi,

Yes, we need confirmation on the pilot gas BTU/hr rating since we need to calculate the hourly and yearly emissions that come from the pilot gas.

Thanks,
Vahe

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From: Kristi Wade <kwade@perennialenergy.com>
Sent: Thursday, April 25, 2024 12:42 PM
To: Vahe Baboomian <vbaboomian@yorkeengr.com>
Cc: Donald Barkley <dbarkley@yorkeengr.com>; Tina Darjazanie <tdarjazanie@yorkeengr.com>; Matthew Unger <Munger@montaukrenewables.com>
Subject: RE: Bowerman RNG - PEI Flare/TOU Specification Clarification

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Nothing back from them yet. I will let you know as soon as they respond.

Are you just needing the BTU/hr rating? There have been discussions whether we needed a continuous pilot or not. Will this make a difference in your modeling results?

Kristi Wade
417-505-7181

From: Vahe Baboomian <vbaboomian@yorkeengr.com>
Sent: Thursday, April 25, 2024 12:56 PM
To: Kristi Wade <kwade@perennialenergy.com>
Cc: Donald Barkley <dbarkley@yorkeengr.com>; Tina Darjazanie <tdarjazanie@yorkeengr.com>; Matthew Unger <Munger@montaukrenewables.com>
Subject: RE: Bowerman RNG - PEI Flare/TOU Specification Clarification

Hi Kristi,

Any updates on confirming if the natural gas pilot on the Flare is still rated at 100,000 BTU/hr? We need this confirmed to finalize our modeling results.

Vahe Baboomian

From: Kristi Wade <kwade@perennialenergy.com>
Sent: Wednesday, April 24, 2024 2:41 PM
To: Donald Barkley
Cc: Vahe Baboomian
Subject: RE: Bowerman RNG - PEI Flare/TOU Specification Clarification

Follow Up Flag: Flag for follow up
Flag Status: Flagged

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Don,
Yes, I was accounting for the insulation which is 4" thick as well as a shell thickness of 3/8" on each unit. I see now that we had 7/16" thick on the off spec flare. This makes the ID of the flare 141 1/8". Please use this exhaust diameter for the off spec flare.

For the natural gas pilot, I am getting confirmation from the burner vendor for the Btu rating.

Kristi Wade
417-505-7181

From: Donald Barkley <dbarkley@yorkeengr.com>
Sent: Wednesday, April 24, 2024 12:22 PM
To: Kristi Wade <kwade@perennialenergy.com>
Cc: Vahe Baboomian <vbaboomian@yorkeengr.com>
Subject: RE: Bowerman RNG - PEI Flare/TOU Specification Clarification

HI Kristi,

Thanks for the information. Can you clarify how the inside diameters are derived for the 150" OD Flare, with 0.4375 shell thickness, and the 76" OD TOU, with 0.375 shell thickness. Are the inside diameters accounting for insulation? If so, can you please supply the insulation thickness for the TOU and the Flare.

Also, before we run the modeling again, we just wanted to confirm that the natural gas pilot on the Flare is still rated at 100,000 BTU/hr.

Thanks,
Don

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Senior Engineer
O: (949) 248-8490 | M: (949) 426-4943
DBarkley@YorkeEngr.com | V-card Link

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DG150

GAS ENGINE TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1800	RATING STRATEGY:	EMERGENCY
COMPRESSION RATIO:	10.5	PACKAGE TYPE:	WITH RADIATOR
AFTERCOOLER TYPE:	ATAAC	RATING LEVEL:	STANDBY
INLET MANIFOLD AIR TEMP (°F):	131	FUEL:	NAT GAS
JACKET WATER OUTLET (°F):	176	FUEL SYSTEM:	LPG IMPCO WITH AIR FUEL RATIO CONTROL
ASPIRATION:	TA		
COOLING SYSTEM:	JW, OC, AC	FUEL PRESSURE RANGE(psig):	0.3-0.4
CONTROL SYSTEM:	EIS	FUEL METHANE NUMBER:	85
EXHAUST MANIFOLD:	DRY	FUEL LHV (Btu/scf):	905
COMBUSTION:	INTEGRATED CATALYST	ALTITUDE CAPABILITY AT 79°F INLET AIR TEMP. (ft):	2152
FAN POWER (bhp):	13	POWER FACTOR:	0.8
		VOLTAGE(V):	208-600

RATING		NOTES	LOAD	100%	75%	50%
PACKAGE POWER	(WITH FAN)	(1)(2)	ekW	150	113	75
PACKAGE POWER	(WITH FAN)	(1)(2)	kVA	188	140	94
ENGINE POWER	(WITHOUT FAN)	(2)	bhp	253	190	127
GENERATOR EFFICIENCY		(1)	%	83.8	85.4	88.8
PACKAGE EFFICIENCY(@ 1.0 Power Factor)	(ISO 3046/1)	(3)	%	29.6	27.8	28.3
THERMAL EFFICIENCY		(4)	%	44.9	48.4	48.6
TOTAL EFFICIENCY (@ 1.0 Power Factor)		(5)	%	74.5	76.2	76.9

ENGINE DATA						
PACKAGE FUEL CONSUMPTION	(ISO 3046/1)	(6)	Btu/ekW-hr	11512	12253	12046
PACKAGE FUEL CONSUMPTION	(NOMINAL)	(6)	Btu/ekW-hr	11512	12253	12046
ENGINE FUEL CONSUMPTION	(NOMINAL)	(6)	Btu/bhp-hr	6813	7252	7132
AIR FLOW (77°F, 14.7 psia)	(WET)	(7)(8)	ft3/min	320	237	170
AIR FLOW	(WET)	(7)(8)	lb/hr	1417	1049	754
FUEL FLOW (60°F, 14.7 psia)			scfm	32	25	17
COMPRESSOR OUT PRESSURE			in Hg(abs)	88.2	73.6	62.5
COMPRESSOR OUT TEMPERATURE			°F	303	228	163
AFTERCOOLER AIR OUT TEMPERATURE			°F	130	86	82
INLET MAN. PRESSURE		(9)	in Hg(abs)	76.3	62.0	51.4
INLET MAN. TEMPERATURE	(MEASURED IN PLENUM)	(10)	°F	130	86	82
TIMING		(11)	°BTDC	16	20	26
EXHAUST TEMPERATURE - ENGINE OUTLET		(12)	°F	1304	1221	1110
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(8)(13)	ft3/min	1177	836	556
EXHAUST GAS MASS FLOW	(WET)	(8)(13)	lb/hr	1504	1119	799

REGULATORY INFORMATION

AGENCY	TIER/STAGE	REGULATION	LOCALITY		MAX LIMITS	YEAR IN	YEAR OUT
EPA		S.I. STATIONARY EMERGENCY - NATURAL GAS	U.S. (EXCL CALIF)	(14)	g/bhp-hr - NOx: 2.0 CO: 4.0 VOC: 1	2011	----

ENERGY BALANCE DATA						
LHV INPUT		(15)	Btu/min	28781	22974	15064
HEAT REJECTION TO JACKET WATER (JW)		(16)(22)	Btu/min	4896	3639	2427
HEAT REJECTION TO ATMOSPHERE	(INCLUDES GENERATOR)	(17)	Btu/min	4527	3391	2045
HEAT REJECTION TO LUBE OIL (OC)		(18)(23)	Btu/min	470	518	357
HEAT REJECTION TO EXHAUST (LHV TO 77°F)		(19)(20)	Btu/min	8661	7774	5123
HEAT REJECTION TO EXHAUST (LHV TO 248°F)		(19)	Btu/min	7528	6938	4525
HEAT REJECTION TO AFTERCOOLER (AC)		(21)(23)	Btu/min	1126	685	277

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1. (Standard reference conditions of 77°F, 29.60 in Hg barometric pressure.) No overload permitted at rating shown. Consult the altitude deration factor chart for applications that exceed the rated altitude or temperature.

Emission levels are at the Caterpillar provided catalyst outlet. Values are based on engine operation at steady state conditions. Tolerances specified are dependent upon fuel quality. Fuel methane number cannot vary more than ± 3.

For notes information consult page three.

FUEL USAGE GUIDE

CAT METHANE NUMBER	84	100
SET POINT TIMING	16	16
DERATION FACTOR	1	1

ALTITUDE DERATION FACTORS AT RATED SPEED

INLET AIR TEMP °F	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	1	1	0.99	0.97	0.95	0.93	0.90	0.88	0.86	0.83	0.81	0.79	0.77
120	1	1	1	0.98	0.96	0.93	0.91	0.89	0.87	0.84	0.82	0.80	0.77
110	1	1	1	0.98	0.96	0.93	0.91	0.89	0.87	0.84	0.82	0.80	0.77
100	1	1	1	0.98	0.96	0.93	0.91	0.89	0.87	0.84	0.82	0.80	0.77
90	1	1	1	0.98	0.96	0.93	0.91	0.89	0.87	0.84	0.82	0.80	0.77
80	1	1	1	0.98	0.96	0.93	0.91	0.89	0.87	0.84	0.82	0.80	0.77
70	1	1	1	0.98	0.96	0.93	0.91	0.89	0.87	0.84	0.82	0.80	0.77
60	1	1	1	0.98	0.96	0.93	0.91	0.89	0.87	0.84	0.82	0.80	0.77
50	1	1	1	0.98	0.96	0.93	0.91	0.89	0.87	0.84	0.82	0.80	0.77

ALTITUDE (FEET ABOVE SEA LEVEL)

AFTERCOOLER HEAT REJECTION FACTORS (ACHRF)

INLET AIR TEMP °F	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	1.34	1.39	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45
120	1.25	1.31	1.36	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37	1.37
110	1.17	1.22	1.27	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28
100	1.09	1.14	1.19	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
90	1	1.05	1.10	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
80	1	1	1.02	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03
70	1	1	1	1	1	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1	1	1	1	1	1
50	1	1	1	1	1	1	1	1	1	1	1	1	1

ALTITUDE (FEET ABOVE SEA LEVEL)

FUEL USAGE GUIDE:
This table shows the derate factor and full load set point timing required for a given fuel. Note that deration and set point timing adjustment may be required as the methane number decreases. Methane number is a scale to measure detonation characteristics of various fuels. The methane number of a fuel is determined by using the Caterpillar methane number calculation.

ALTITUDE DERATION FACTORS:
This table shows the deration required for various air inlet temperatures and altitudes. Use this information along with the fuel usage guide chart to help determine actual engine power for your site. The derate factors shown assume a specific air-to-core temperature rise and zero additional air flow restriction on the standard packaged radiator. Refer to TMI Systems Data for fan air flow and air-to-core temperature rise values. Increased fan airflow restriction or a different air-to-core rise value requires a Special Rating Request to determine actual engine power at your site. Additional rating may be available with a larger, custom radiator.

ACTUAL ENGINE RATING:
To determine the actual rating of the engine at site conditions, one must consider separately, limitations due to fuel characteristics and air system limitations. The Fuel Usage Guide deration establishes fuel limitations. The Altitude/ Temperature deration factors and RPC(reference the Caterpillar Methane Program) establish air system limitations. RPC comes into play when the Altitude/Temperature deration is less than 1.0 (100%). Under this condition, add the two factors together. When the site conditions do not require an Altitude/Temperature derate (factor is 1.0), it is assumed the turbocharger has sufficient capability to overcome the low fuel relative power, and RPC is ignored. To determine the actual power available, take the lowest rating between 1) and 2).
1) Fuel Usage Guide Deration
2) 1 - ((1 - Altitude / Temperature Deration) +(1 - RPC))

AFTERCOOLER HEAT REJECTION FACTORS(ACHRF):
To maintain a constant air inlet manifold temperature, as the inlet air temperature goes up, so must the heat rejection. As altitude increases, the turbocharger must work harder to overcome the lower atmospheric pressure. This increases the amount of heat that must be removed from the inlet air by the aftercooler. Use the aftercooler heat rejection factor (ACHRF) to adjust for inlet air temp and altitude conditions. See note (22) for application of this factor in calculating the heat exchanger sizing criteria. Failure to properly account for these factors could result in detonation and cause the engine to shutdown or fail.

NOTES:
1. Generator efficiencies, power factor, and voltage are based on standard generator. [Package Power (ekW) is calculated as: (Engine Power (bkW) - Fan Power (bkW)) x Generator Efficiency], [Package Power (kVA) is calculated as: (Engine Power (bkW) - Fan Power (bkw)) x Generator Efficiency / Power Factor]
2. Rating is with one engine driven jacket water pump. Tolerance is (+)3, (-)0% of full load.
3. Package Efficiency published in accordance with ISO 3046/1, based on a 1.0 power factor.
4. Thermal Efficiency is calculated based on energy recovery from the jacket water, lube oil, and exhaust to 248°F with engine operation at ISO 3046/1 Package Efficiency, and assumes unburned fuel is converted in an oxidation catalyst.
5. Total efficiency is calculated as: Package Efficiency + Thermal Efficiency. Tolerance is ±10% of full load data.
6. ISO 3046/1 Package fuel consumption tolerance is (+)5, (-)0% at the specified power factor. Nominal package and engine fuel consumption tolerance is ± 5.0% of full load data at the specified power factor.
7. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.
8. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.
9. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.
10. Inlet manifold temperature is a set point value.
11. Timing indicated is for use with the minimum fuel methane number specified. Consult the appropriate fuel usage guide for timing at other methane numbers.
12. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.
13. Exhaust flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 6 %.
14. Gaseous emissions data measurements are consistent with those described in EPA 40 CFR PART 60 SUBPART JJJJ and ISO 8178 for measuring VOC, CO, and NOx. Gaseous emissions values are weighted cycle averages and are in compliance with the stationary regulations.
15. LHV rate tolerance is ± 5.0%.
16. Heat rejection to jacket water value displayed includes heat to jacket water alone. Value is based on treated water. Tolerance is ± 10% of full load data.
17. Heat rejection to atmosphere based on treated water. Tolerance is ± 50% of full load data.
18. Lube oil heat rate based on treated water. Tolerance is ± 20% of full load data.
19. Exhaust heat rate based on treated water. Tolerance is ± 10% of full load data.
20. Heat rejection to exhaust (LHV to 77°F) value shown includes unburned fuel and is not intended to be used for sizing or recovery calculations.
21. Heat rejection to aftercooler tolerance is ±5% of full load data.
22. Total Jacket Water Circuit heat rejection is calculated as: JW x 1.1. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.
23. Total Lube Oil Cooler Circuit heat rejection is calculated as: OC x 1.2. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.
24. Total Aftercooler Circuit heat rejection is calculated as: AC x ACHRF x 1.05. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.



Image shown may not reflect actual configuration.

Sound Attenuated and Weather Protective Enclosures

DG100 – DG200 (100 – 200 ekW Gas)

FEATURES

Robust/Highly Corrosion Resistant Construction

- Factory installed on skid base
- Caterpillar white/yellow paint
- Environmentally friendly, polyester powder baked paint
- 18 gauge Steel, 12 gauge 5052 grade Aluminum
- Zinc plated fasteners
- Stainless steel hinges
- Internally mounted exhaust silencing system
- Designed and tested to comply with UL 2200 Listed generator set package
- Comply with ASCE /SEI 7 for Wind Loads up to 100 (Steel) and 150 mph (Aluminum)
- Optional seismic certification offered
- Compression door latches providing solid door seal with door stopper

Excellent Access

- Large cable entry area for installation ease
- Accommodates side mounted single or multiple breakers
- Single door on left & rear side of the package
- Dual doors on right hand side
- Doors vertically hinged allow 180° opening rotation
- Doors capable of lift off at 90° opening rotation
- For non-routine service access are removable panels
- Standard Lube oil drain valve, coolant drain/valve piped to the exterior of the skid base
- Radiator fill cover

Security and Safety

- Lockable (keyed or padlock) doors which give full access to control panel and breaker
- Cooling fan and battery charging alternator fully guarded
- Oil fill and battery can only be reached via lockable access
- Optional externally mounted emergency stop button
- Designed for spreader bar lifting to ensure safety
- Stub-up area is rodent proof

Options

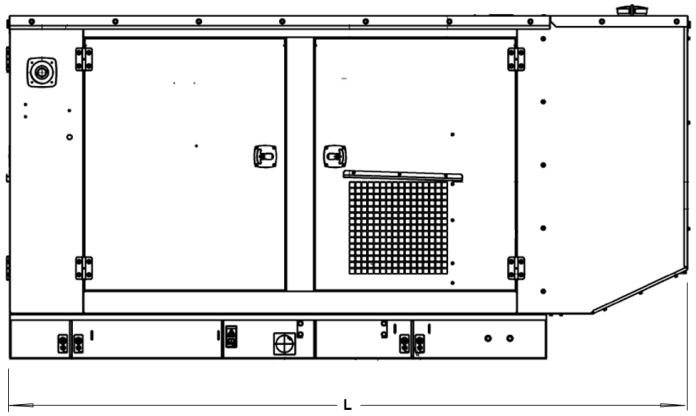
- Skid base compatible
- DC lighting package (Optional)

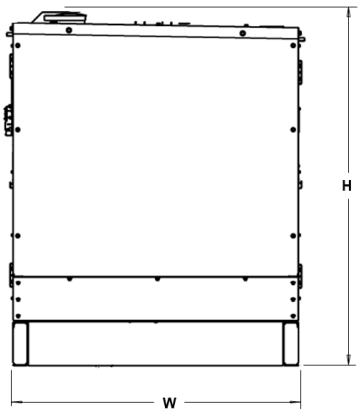
Weights & Dimensions

A. Package Weights and Dimensions

Enclosure Type	Genset Model	Length "L"		Width "W"		Height "H"		Package Weight	
		mm	in	mm	in	mm	in	kg	lb
Open Set on Skid Base (Wide)	DG100	2442	96	1297	51	1449	57	1364	3007
	DG125	2442	96	1297	51	1449	57	1464	3226
	DG150	2892	114	1396	55	1734	68	1657	3653
	DG175	2985	117.5	1600	63	1789	71	1780	3924
	DG200	2985	117.5	1600	63	1789	71	1780	3924
Sound Attenuated Level-2 Enclosure on Skid Base (Steel)	DG100	3100	122	1230	48	1606	63	1700	3748
	DG125	3100	122	1230	48	1606	63	1800	3968
	DG150	3348	132	1445	57	1875	74	2051	4522
	DG175	3624	143	1626	64	1987	78	2302	5075
	DG200	3624	143	1626	64	1987	78	2302	5075
Sound Attenuated Level-3 Enclosure on Skid Base (Steel)*	DG100	3100	122	1230	48	1606	63	1764	3889
	DG125	3100	122	1230	48	1606	63	1864	4109
	DG150	3348	132	1445	57	1875	74	2085	4597
	DG175*	3624	143	1626	64	1987	78	–	–
	DG200*	3624	143	1626	64	1987	78	–	–
Sound Attenuated Level-2 Enclosure on Skid Base (Aluminum)	DG100	3100	122	1230	48	1606	63	1579	3481
	DG125	3100	122	1230	48	1606	63	1679	3701
	DG150	3348	132	1445	57	1875	74	1906	4202
	DG175	3624	143	1626	64	1987	78	2145	4729
	DG200	3624	143	1626	64	1987	78	2145	4729
Sound Attenuated Level-3 Enclosure on Skid Base (Aluminum)*	DG100	3100	122	1230	48	1606	63	1654	3646
	DG125	3100	122	1230	48	1606	63	1754	3866
	DG150	3348	132	1445	57	1875	74	1938	4273
	DG175*	3624	143	1626	64	1987	78	–	–
	DG200*	3624	143	1626	64	1987	78	–	–
Weather Protective Enclosure on Skid Base (Steel)	DG100	2442	96	1297	51	1449	57	1564	3448
	DG125	2442	96	1297	51	1449	57	1664	3668
	DG150	2892	114	1445	57	1875	74	1919	4231
	DG175	3624	143	1626	64	2027	80	2072	4568
	DG200	3624	143	1626	64	2027	80	2072	4568
Sound Attenuated Level-2 Cold Weather Enclosure on Skid Base (Steel)*	DG100	3100	122	1230	48	1606	63	1710	3769
	DG125	3100	122	1230	48	1606	63	1810	3990
	DG150	3348	132	1445	57	1875	74	2057	4535
	DG175	3624	143	1626	64	1987	78	2332	5141
	DG200	3624	143	1626	64	1987	78	2332	5141
Sound Attenuated Level-3 Cold Weather Enclosure on Skid Base (Steel)	DG100	3100	122	1230	48	1606	63	1772	3906
	DG125	3100	122	1230	48	1606	63	1872	4127
	DG150	3349	132	1446	57	1876	74	2091	4610
	DG175*	3624	143	1626	64	1987	78	–	–
	DG200*	3624	143	1626	64	1987	78	–	–

*Preliminary Data – Subject to change without notice.
Weights include Genset, Enclosure (where applicable)





B. Component Weights to Calculate Package Weights

Standby Ratings/ Genset Models	Wide Skid Base		Sound Attenuated Enclosure (L2) (Steel)		Sound Attenuated Enclosure (L2) (Aluminum)		Weather Protective Enclosure		SA Cold Weather Enclosure (L2)	
ekW	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb
100 (DG100)	143	315	336 / 400	741 / 881	215 / 290	474 / 639	200	450	346 / 408	763 / 900
125 (DG125)	143	315	336 / 400	741 / 881	215 / 290	474 / 639	200	450	346 / 408	763 / 900
150 (DG150)*	255	515	394 / 428	869 / 944	249 / 281	549 / 620	262	578	400 / 434	882 / 957
175 (DG175)*	273	602	522 / –	1150 / –	365 / -	804 / –	292	643	470 / –	1036 / –
200 (DG200)*	273	602	522 / –	1150 / -	365 / –	804 / –	292	643	470 / –	1036 / –

*Preliminary Data – Subject to change without notice.

C. Enclosure Sound Pressure Levels (SPL) for Sound Attenuated Steel and Aluminum Enclosures

Standby Ratings/ Genset Models	SPL at 7m (23 ft) at 100% load (L2)
ekW	dBA
100 (DG100)	75
125 (DG125)	75
150 (DG150)	75
175 (DG175)	75
200 (DG200)	75

Standby Ratings / Genset Models	SPL at 7m (23 ft) at 100% load (L3)
ekW	dBA
100 (DG100)	70
125 (DG125)	70
150 (DG150)	70
175 (DG175)	70
200 (DG200)	70

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LEHE21113-04 (10/23)

APPENDIX C – CONSTRUCTION HRA MODELING RESULTS

Model
Cancer Risk
Chronic Risk

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Maximum Cancer Risk by Pollutant at PMI, MEIR, MEIW and Sensitive Receptor
Bowerman RNG Facility - Construction - Elevated Terrain AERMOD Run

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3174	receptor #	17	receptor #	9
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,314.83	3,730,951.10	431,458.26	3,730,677.33	434,243.77	3,731,189.79
		1-Year Cancer Risk	Contribution (%)	1-Year Cancer Risk	Contribution (%)	1-Year Cancer Risk	Contribution (%)
-	ALL	8.52E-05	100%	4.01E-06	100%	9.39E-07	100.00%
9901	DPM	8.52E-05	100.00%	4.01E-06	100.00%	9.39E-07	100.00%

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Cancer Risk by Source for All Pollutants Combined at PMI, MEIR, MEIW and Sensitive Receptor
Bowerman RNG Facility - Construction - Elevated Terrain AERMOD Run

Sources	Source Description	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3174	receptor #	17	receptor #	9
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,314.83	3,730,951.10	431,458.26	3,730,677.33	434,243.77	3,731,189.79
		1-Year Cancer Risk	Contribution (%)	1-Year Cancer Risk	Contribution (%)	1-Year Cancer Risk	Contribution (%)
ALL	--	8.52E-05	100%	4.01E-06	100%	9.39E-07	100%
PIPELINE	Pipeline Construction	8.38E-07	0.98%	3.84E-06	95.67%	5.22E-07	55.67%
RNG_FAC	Renewable Natural Gas Facility Construction	8.43E-05	99.02%	1.74E-07	4.33%	4.16E-07	44.33%

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Maximum Chronic Hazard Index by Pollutant at PMI, MEIR, MEIW and Sensitive Receptor
Bowerman RNG Facility - Construction - Elevated Terrain AERMOD Run

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3174	receptor #	17	receptor #	9
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,314.83	3,730,951.10	431,458.26	3,730,677.33	434,243.77	3,731,189.79
		Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)
-	ALL	9.58E-02	100.00%	4.51E-03	100.00%	1.30E-02	100.00%
9901	DPM	9.58E-02	100.00%	4.51E-03	100.00%	1.30E-02	100.00%

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Chronic Hazard Index by Source for All Pollutants Combined at PMI, MEIR, MEIW and Sensitive Receptor
Bowerman RNG Facility - Construction - Elevated Terrain AERMOD Run

Sources	Source Description	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3174	receptor #	17	receptor #	9
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,314.83	3,730,951.10	431,458.26	3,730,677.33	434,243.77	3,731,189.79
		Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)
ALL	--	9.58E-02	100%	4.51E-03	100%	1.30E-02	100%
PIPELINE	Pipeline Construction	9.43E-04	0.98%	4.32E-03	95.67%	7.22E-03	55.66%
RNG_FAC	Renewable Natural Gas Facility Construction	9.49E-02	99.02%	1.95E-04	4.33%	5.75E-03	44.33%

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Maximum Cancer Risk by Pollutant at PMI, MEIR, and MEIW
FRB Landfill RNG Facility - Construction - Flat Terrain AERMOD Run

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3183	receptor #	17	receptor #	3110
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,190	3,730,990	431,458	3,730,677	434,171	3,731,089
		1-Year Cancer Risk	Contribution (%)	1-Year Cancer Risk	Contribution (%)	1-Year Cancer Risk	Contribution (%)
-	ALL	1.38E-04	100%	4.39E-06	100%	2.51E-06	100%
9901	DPM	1.38E-04	100.00%	4.39E-06	100.00%	2.51E-06	100.00%

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Cancer Risk by Source for All Pollutants Combined at PMI, MEIR, and MEIW
FRB Landfill RNG Facility - Construction - Flat Terrain AERMOD Run

Sources	Source Description	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3183	receptor #	17	receptor #	3110
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,190	3,730,990	431,458	3,730,677	434,171	3,731,089
		1-Year Cancer Risk	Contribution (%)	1-Year Cancer Risk	Contribution (%)	1-Year Cancer Risk	Contribution (%)
ALL	--	1.38E-04	100%	4.39E-06	100%	2.51E-06	100%
PIPELINE	Pipeline Construction	1.80E-06	1.30%	4.16E-06	94.81%	1.78E-07	7.10%
RNG_FAC	Renewable Natural Gas Facility Construction	1.36E-04	98.70%	2.28E-07	5.19%	2.34E-06	92.90%

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Maximum Chronic Hazard Index by Pollutant at PMI, MEIR, MEIW and Sensitive Receptor
FRB Landfill RNG Facility - Construction - Flat Terrain AERMOD Run

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3183	receptor #	17	receptor #	3110
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,190	3,730,990	431,458	3,730,677	434,171	3,731,089
		Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)
-	ALL	1.55E-01	100%	4.93E-03	100%	3.48E-02	100%
9901	DPM	1.55E-01	100.00%	4.93E-03	100.00%	3.48E-02	100.00%

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Chronic Hazard Index by Source for All Pollutants Combined at PMI, MEIR, MEIW and Sensitive Receptor
FRB Landfill RNG Facility - Construction - Flat Terrain AERMOD Run

Sources	Source Description	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3183	receptor #	17	receptor #	3110
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,190	3,730,990	431,458	3,730,677	434,171	3,731,089
		Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)
ALL	--	1.55E-01	100%	4.93E-03	100%	3.48E-02	100%
PIPELINE	Pipeline Construction	2.02E-03	1.30%	4.68E-03	94.81%	2.47E-03	7.10%
RNG_FAC	Renewable Natural Gas Facility Construction	1.53E-01	98.70%	2.56E-04	5.19%	3.23E-02	92.90%

APPENDIX D – EMISSION CALCULATIONS FROM OPERATIONS

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Facility: Bowerman Power LFG, LLC

Bowerman Power LFG, LLC / FRB
RNG Facility CEQA Operational Emissions

Appendix D Operational Emissions - Thermal Oxidizer Unit

Table D.1 Data (Thermal Oxidizer)

Stream ID[1]	Stream Max Capacity[1] (scfm)	Methane Content in Tail Gas Stream[1] (Vol.%)	Stream Max Capacity[2] (mmBtu/hr)	Stream HHV[3] (mmBtu/mmscf)	Hours per Day	Days per Year	Stream Consumption[4] (mmscf/hr)	Stream Max Consumption[5] (mmscf/yr)
Plant Inlet	6,000	--	--	--	24	365	0.3600	3,153.60
Tail Gas Stream 1	2,309	4.36%	6.34	45.78			0.1385	1,213.61
Tail Gas Stream 2	883	10.96%	6.10	115.08			0.0530	464.10
Supplemental Fuel	280	--	17.64	--			0.0168	147.17
Normal Operations Total Heat Input (mmBtu/hr)			30.1					
Start-Up TG Stream 1	1,100	40.00%	27.7	420.00			0.0660	--
Start-Up Suppl. Fuel	83	--	5.2	--			0.0050	--
Start-Up Total Heat Input (mmBtu/hr)			32.9					

[1] Plant Inlet flowrate and Tail Gas Stream 1 and 2 flowrates and methane content from TOU and Flare Gases PFD in Appendix B. Supplemental Fuel flowrate from Perennial.

[2] Tail Gas Stream 1, Tail Gas Stream 2
Stream Max Capacity (mmBtu/hr) = Stream Max Capacity (scfm) x Methane Content in Tail Gas Stream (Vol.%) x 60 / 1,000,000 x NG HHV (mmBtu/mmscf)
NG HHV 1,050 mmBtu/mmscf
Supplemental Fuel
Stream Max Capacity (mmBtu/hr) = Stream Max Capacity (scfm) x 60 / 1,000,000 x NG HHV (mmBtu/mmscf)

[3] Stream HHV (mmBtu/mmscf) = Stream Max Capacity (mmBtu/hr) / (Stream Max Capacity (scfm) x 60 / 1,000,000)

[4] Stream Consumption (mmscf/h) = Stream Max Capacity (scfm) x 60 / 1,000,000

[5] Stream Consumption (mmscf/yr) = Stream Max Capacity (mmscf/hr) x Hours per Day x Days per Year

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Facility: Bowerman Power LFG, LLC

Bowerman Power LFG, LLC / FRB
RNG Facility CEQA Operational Emissions

Appendix D Operational Emissions - Thermal Oxidizer Unit

Table D.2 Thermal Oxidizer Criteria Pollutant Emission Factors and Emissions

Criteria Pollutant	Plant Inlet (ppmv)	Exhaust Content (ppmv @ 3% O2)	Emission Factor[6] (lb/mmscf)	Emission Factor[7] (lb/mmBtu)	Hourly Emissions[8] (lb/hr)	Daily Emissions[9] (lb/day)	Annual Emissions[10] (lb/yr)
NOx[1]	--	29	--	0.035	1.0528	25.27	9,222.31
CO[2]	--	106	--	0.080	2.4063	57.75	21,079.57
VOC[3]	--	--	--	0.006	0.1805	4.33	1,580.97
SOx, Tail Gas[4]	85	--	14.354	--	5.1673	124.01	--
	60	--	10.132	--	3.6475	87.54	31,952.04
SOx, Supplemental Fuel[4]	--	--	0.60	--	0.0101	0.24	88.30
PM10[5]	--	--	7.5	0.007	0.2149	5.16	1,882.10

[1] NOx emission factor from Rule 1147, Table 2, "Afterburner, Degassing Unit, Thermal Oxidizer, Catalytic Oxidizer or Vapor Incinerator," is 0.024 lb/MMBTU/hr when combusting only natural gas as the supplemental fuel.
The emission limit is proposed to be 0.035 lb NOx/MMBTU, as the BACT/LAER limit for a RNG Processing Plant that burns low-BTU tail gases in addition to the supplemental fuel of natural gas.
[Exhaust Content (ppmv @ 3% O2)]

[2] CO emission factor from equipment specification sheet design criteria. Reference is provided in Appendix B.
The emission limit is proposed to be 0.080 lb NOx/MMBTU, as the BACT/LAER limit for a RNG Processing Plant that burns low-BTU tail gases in addition to the supplemental fuel of natural gas.
[Exhaust Content (ppmv @ 3% O2)]

[3] Proposed BACT/LAER for VOC is the South Coast AQMD BACT/LAER determination for A/N 614468 [Flare I-6 AT OCWR, FRB (Facility ID 69646)].
[Emission Factor (lb/mmBtu)]

[4] Tail Gas
The South Coast AQMD BACT/LAER determination for A/N 614468 requires sulfur content no higher than: 85 ppmv, averaged daily; and 60 ppmv, averaged monthly.
These values are used for the Tail Gas emission calculations.
[Plant Inlet (ppmv)]
Supplemental Fuel
South Coast AQMD Default
[lb/mmscf]

[5] Proposed Emission Factor for PM10 is derived from the South Coast AQMD default emission factor for external combustion.
[Emission Factor (lb/mmBtu)]

[6] SOx, Tail Gas
Emission Factor (lb/mmscf) = Plant Inlet (ppmv) x SOx MW (lb/lbmol) / Molar Volume (scf/lbmol)

SOx MW	64	lb/lbmol
Molar Volume	379	scf/lbmol, @ 60 Deg F

[7] NOx, CO
Emission Factor (lb/mmBtu) = Exhaust Content (ppmv @ 3% O2) x 20.9 / (20.9 - 3) x F-Factor (dscf/mmBtu) x MW / Molar Volume / 1,000,000

F-Factor	8,710	dscf/mmBtu
NOx MW	46	
CO MW	28	

[8] NOx, CO, VOC, PM10
Hourly Emissions (lb/hr) = Emission Factor (lb/mmBtu) x Total Heat Input (mmBtu/hr)
SOx, Tail Gas
Hourly Emissions (lb/hr) = Emission Factor (lb/mmscf) x Plant Inlet (mmscf/hr)
SOx, Supplemental Fuel
Hourly Emissions (lb/hr) = Emission Factor (lb/mmscf) x Supplemental Fuel (mmscf/hr)

[9] Daily Emissions (lb/day) = Hourly Emissions (lb/hr) x Hours per Day

[10] Annual Emissions (lb/yr) = Hourly Emissions (lb/hr) x Hours per Day x Days per Year

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Appendix D Operational Emissions - Thermal Oxidizer Unit

Table D.3 **AQIA Emission Rates**

	1-Hour Averaging Period		8-Hour Averaging Period		24-Hour Averaging Period		Annual Averaging Period	
Pollutant	**lb/hr[1]**	**g/s[2]**	**lb/8-hr[3]**	**g/s[4]**	**lb/24-hr[5]**	**g/s[6]**	**lb/yr[7]**	**g/s[8]**
NO2	1.053E+00	1.328E-01	--	--	--	--	9.22E+03	1.328E-01
SO2	5.177E+00	6.529E-01	--	--	1.243E+02	6.529E-01	3.20E+04	4.613E-01
CO	2.406E+00	3.035E-01	1.925E+01	3.035E-01	--	--	--	--
PM10	--	--	--	--	5.156E+00	2.710E-02	1.88E+03	2.710E-02
PM2.5	--	--	--	--	5.156E+00	2.710E-02	1.88E+03	2.710E-02

[1] 1-Hour Averaging Period (lb/hr) = Emission Rate (lb/hr)
[2] 1-Hour Averaging Period (g/s) = 1-Hour Averaging Period (lb/hr) x 454 / 3,600
[3] 8-Hour Averaging Period (lb/8-hr) = 1-Hour Averaging Period (lb/hr) x 8 Hours
[4] 8-Hour Averaging Period (g/s) = 8-Hour Averaging Period (lb/8-hr) / 8 Hours x 454 / 3,600
[5] 24-Hour Averaging Period (lb/24-hr) = 1-Hour Averaging Period (lb/hr) x 24 Hours
[6] 24-Hour Averaging Period (g/s) = 24-Hour Averaging Period (lb/24-hr) / 24 Hours x 454 / 3,600
[7] Annual Averaging Period (lb/yr) = 1-Hour Averaging Period (lb/hr) x 24 hours x 365 days
[8] Annual Averaging Period (g/s) = Annual Averaging Period (lb/yr) / 8,760 Hours x 454 / 3,600

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Appendix D Operational Emissions - Thermal Oxidizer Unit

Table D.4 Thermal Oxidizer Toxic Air Contaminant Emission Factors and Emissions

Toxic Air Contaminant	CAS No.	Molecular Weight (lb/lbmol)	Tail Gas 1 Inlet Concentration[1] (ppbv)	Tail Gas 1 Emission Factor[2] (lb/mmscf)	Natural Gas Emission Factor[3] (lb/mmscf)	Hourly Emissions[4] (lb/hr)	Annual Emissions[5] (lb/yr)	
Vinyl Chloride	75014	62.5	271	8.94E-04	--	1.24E-04	1.09E+00	V4
1,1-Dichloroethene	75354	96.94	34.3	1.75E-04	--	2.44E-05	2.13E-01	V5
Methylene Chloride	75092	84.93	1203	5.39E-03	--	7.49E-04	6.56E+00	M13
1,1-Dichloroethane	75343	98.96	30.5	1.59E-04	--	2.21E-05	1.94E-01	D6
Chloroform	67663	119.38	8	5.04E-05	--	7.00E-06	6.13E-02	C11
1,2-Dichloroethane	107062	98.96	364	1.90E-03	--	2.64E-04	2.31E+00	E6
1,1,1-Trichloroethane	71556	133.4	16.9	1.19E-04	--	1.65E-05	1.45E-01	M8
Benzene	71432	78.11	3680	1.52E-02	5.80E-03	2.27E-03	1.99E+01	B1
Trichloroethylene	79016	131.4	207	1.44E-03	--	1.99E-04	1.75E+00	T8
Toluene	108883	92.14	12901	6.27E-02	2.65E-02	9.47E-03	8.30E+01	T3
Tetrachloroethene	127184	165.83	671	5.87E-03	--	8.16E-04	7.14E+00	P2
Chlorobenzene	108907	112.56	8062	4.79E-02	--	6.65E-03	5.83E+01	C10
Xylenes	1330207	106.16	8735	4.89E-02	1.97E-02	7.36E-03	6.45E+01	X1
Formaldehyde	50000	--	--	--	1.23E-02	3.53E-04	3.09E+00	F2
Total PAHs (excluding	1151	--	--	--	1.00E-04	2.87E-06	2.51E-02	P41
Naphthalene	91203	--	--	--	3.00E-04	8.60E-06	7.54E-02	P62
Acetaldehyde	75070	--	--	--	3.10E-03	8.89E-05	7.79E-01	A1
Acrolein	107028	--	--	--	2.70E-03	7.74E-05	6.78E-01	A3
Ammonia	7664417	--	--	--	3.20E+00	9.18E-02	8.04E+02	A9
Ethyl Benzene	100414	--	--	--	6.90E-03	1.98E-04	1.73E+00	E3
Hexane	110543	--	--	--	4.60E-03	1.32E-04	1.16E+00	H6

Stream ID	Component	Flowrate (scfm)
Tail Gas Stream 1	Total	2,315
	CH_4	100.93
Tail Gas Stream 2	CH_4	97.00
Supplemental Fuel	--	280

Tail Gas 1 Flowrate (scfm)	2,315
Natural Gas Flowrate (scfm)	477.93

[1] Tail Gas 1 Inlet Concentration (ppbv) from June 2022 LFG analysis.

[2] Tail Gas 1 Emission Factor (lb/mmscf) = Tail Gas 1 Inlet Concentration (ppbv) / 1,000 x Molecular Weight (lb/lbmol) / Molar Volume (scf/lbmol) x [1 - Control Efficiency (%)]

Molar Volume 379 scf/lbmol, @ 60 Deg F

Control Efficiency 98% Rule 1150.1

[3] TAC calculations assume that emissions from the methane component of the tail gas streams may be calculated from the default emission factors for natural gas combustion.
Emission Factors are from South Coast AQMD Default Emission Factors for Natural Gas Combustion in External Combustion Equipment rated between 10 and 100 mmBtu/hr

[4] Hourly Emissions (lb/hr) = Tail Gas 1 Emission Factor (lb/mmscf) x Tail Gas 1 Flowrate (scfm) x 60 / 1,000,000 + Natural Gas Emission Factor (lb/mmscf) x Natural Gas Flowrate (scfm) x 60 / 1,000,000

[5] Annual Emissions (lb/yr) = Hourly Emissions (lb/hr) x Hours per Day x Days per Year

Hours per Day 24

Days per Year 365

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Appendix D Operational Emissions - Thermal Oxidizer Unit

Table D.5 Thermal Oxidizer GHG Emission Factors and Emissions

Stream ID[1]	Stream Max Capacity[1] (scfm)	Component	Component Vol.%	Component Flowrate[2] (scfm)	GHG	Emission Factor[3] (lb/mmBtu)	Emission Factor[4] (lb/mmscf)	Annual Emissions[5] (lb/yr)	Daily Emissions (lb/day)	MT/yr	CO2e Eq[1]	CO2e[4] (MT/yr)
Tail Gas Stream 1	2,309	CO_2	95.29%	2,200.2	CO_2	--	116,121.37	134,288,485	367,914	60,901.81	1	60,901.81
		CH_4	4.36%	100.67	CO_2	116.94	122,787.00	6,497,079	17,800	2,946.52	1	2,946.52
					CH_4	2.2E-03	2.31	122.23	0.33	0.06	25	1.39
					N_2O	2.20E-04	0.23	12.22	0.03	0.01	298	1.65
Tail Gas Stream 2	883	CO_2	0.00%	0.00	CO_2	--	116,121.37	0	0	0.00	1	0.00
		CH_4	10.96%	96.78	CO_2	116.94	122,787.00	6,245,669.55	17,111	2,832.50	1	2,832.50
					CH_4	2.2E-03	2.31	117.50	0.32	0.05	25	1.33
					N_2O	2.20E-04	0.23	11.75	0.03	0.01	298	1.59
Supplemental Fuel	280	--	--	--	CO_2	1.17E+02	122,787.00	18,070,317.22	49,507.72	8,195.16	1	8,195.16
					CH_4	2.2E-03	2.31	339.96	0.93	0.15	25	3.85
					N_2O	2.20E-04	0.23	34.00	0.09	0.02	298	4.59
										Total CO2e (MT/yr)		74,890.39

[1] Tail Gas Stream 1 and 2 flowrates and composition from Material Balance in Appendix B. Supplemental Fuel flowrate from Perennial.

[2] Component Flowrate (scfm) = Stream Max Capacity (scfm) x Component Vol.%

[3] GHG calculations assume that emissions from the methane component of the tail gas streams may be calculated from the default emission factors for natural gas combustion.
Emission factors and CO2e Eq are from SCAQMD 'Combustion Emission Estimator'.
http://www.aqmd.gov/docs/default-source/permitting/ceqa-2017/ghg-estimator-(2018-11).xlsx?sfvrsn=6

[4] CO_2, Tail Gas
The CO_2 in the tail gas streams passes through the thermal oxidizer.
Emission Factor (lb/mmscf) = Density (lb/scf) x 1,000,000
Density (lb/scf) = MW / Molar Volume

CO_2 MW	44.01	lb/lbmol
Molar Volume	379	scf/lbmol, @ 60 Deg F

CH_4 / Supplemental Fuel
Emission Factor (lb/mmscf) = Emission Factor (lb/mmBtu) x HHV (mmBtu/mmscf)

HHV	1,050	mmBtu/mmscf

[5] Tail Gas
Annual Emissions (lb/yr) = Component Flowrate (scfm) x 60 / 1,000,000 x Hours per Day x Days per Year x Emission Factor (lb/mmscf)
Supplemental Fuel
Annual Emissions (lb/yr) = Stream Max Capacity (scfm) x 60 / 1,000,000 x Hours per Day x Days per Year x Emission Factor (lb/mmscf)

Hours per Day	24
Days per Year	365

[6] CO2e (MT/yr) = Annual Emissions (lb/yr) x CO2e Eq / 2,205

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Appendix D Operational Emissions - Off-Spec Flare

Table D.6 Data (Flare)

Flare Equipment	Stream Max Capacity[1] (scfm)	Stream Max Capacity[1] (mmbtu/hr)	Hours per Day	Annual Capacity Factor (%)	Hours per Year[2]	Gas Consumption[3] (mmscf/hr)	Gas Consumption[4] (mmscf/yr)
Other Flare Gas (Off-Spec)	2,700	120	24	10%	876	0.1620	141.91
Pilot Gas (Natural Gas)	1.59	0.1		100%	8760	0.0000952	0.8343
Total Heat Input (mmbtu/hr)	120.1			Total Gas Consumption (mmscf/hr)		0.16210	

[1] Off-Spec Flare Gas Stream Max Capacity (mmBtu/hr) from Perennial (Appendix B).
Pilot Gas (Natural Gas)
Stream Max Capacity (scfm) = Stream Max Capacity (mmBtu/hr) / 60 / NG HHV (mmBtu/mmscf) x 1,000,000
NG HHV 1,050 mmbtu/mmscf

[2] Hours per Year = 24 Hours per Day x 365 Days per Year x Annual Capacity Factor (%)

[3] Gas Consumption (mmscf/hr) = Stream Max Capacity (scfm) x 60 min/hr / 1,000,000

[4] Gas Consumption (mmscf/yr) = Gas Consumption (mmscf/hr) x Hours per Day x Days per Year

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Appendix D Operational Emissions - Off-Spec Flare

Table D.7 Flare Criteria Pollutant Emission Factors and Emissions - At Maximum LFG Stream[1]

Criteria Pollutant	Flare Gas Content (ppmv)	Emission Factor[4] (lb/mmscf)	Emission Factor (lb/mmbtu)	Hourly Emissions[6] (lb/hr)	Daily Emissions[7] (lb/day)	Annual Emissions[6] (lb/yr)
NOx[2]	--	--	0.06	7.2060	172.94	6,359.76
CO[3]	--	--	0.06	7.2060	172.94	6,359.76
VOC[3]	--	--	0.006	0.7206	17.29	635.98
SOx[4]	85	14.354	--	2.3253	55.81	--
	60	10.132	--	1.6414	39.39	1,437.84
SOx[4]	--	0.60	--	0.0001	0.001	0.50
PM10[5]	--	6.1	--	0.9888	23.73	870.7523

[1] Maximum LFG Stream (Off-Spec Flare Gas and Pilot Gas combustion) included for informational purposes only. Off-Spec Flare wil only be operate in case of a system upset or if RNG is off-spec. Flare will not be concurrently operated with the Thermal Oxidizer.

[2] NOx emission factor from Rule 1118.1, Table 1, for "Other Flare Gas." The flare manufacturer has guaranteed that the flare will operate in compliance with this emission limit.

[3] The VOC and CO emission factors are the South Coast AQMD BACT/LAER determination for A/N 614468.

[4] Flare Gas

The South Coast AQMD BACT/LAER determination for A/N 614468 requires sulfur content no higher than: 85 ppmv, averaged daily; and 60 ppmv, averaged monthly.
Hourly and daily emissions are estimated from 85 ppmv; annual, monthly, and 30-day average emissions are estimated from 60 ppmv.
This is expected to be a conservative estimate since sulfur compounds are removed upstream of the flare.
Emission Factor (lb/mmscf) = Content (ppmv) x SOx MW (lb/lbmol) / Molar Volume (scf/lbmol)

SOx MW	64	lb/lbmol
Molar Volume	379	scf/lbmol, @ 60 Deg F

Pilot Gas
South Coast AQMD Default

[5] The PM10 emission factor is the South Coast AQMD BACT/LAER determination for A/N 614468.

[6] NOx, CO, and VOC
Hourly Emissions (lb/hr) = Emission Factor (lb/mmBtu) x Total Heat Input (mmBtu/hr)
Annual Emissions (lb/yr) = Emission Factor (lb/mmBtu) x (Off-Spec Flare Gas Steam Max Capacity (mmBtu/hr) x Hours Per Year + Pilot Gas Steam Max Capacity (mmBtu/hr) x Hours Per Year)
SOx, Flare Gas
Hourly Emissions (lb/hr) = Emission Factor (lb/mmscf) x Flare Gas Consumption (mmscf/hr)
Annual Emissions (lb/yr) = Hourly Emissions (lb/hr) x Hours per Year
SOx, Pilot Gas
Hourly Emissions (lb/hr) = Emission Factor (lb/mmscf) x Pilot Gas Consumption (mmscf/hr)
Annual Emissions (lb/yr) = Hourly Emissions (lb/hr) x Hours per Year
PM10
Hourly Emissions (lb/hr) = Emission Factor (lb/mmscf) x Total Gas Consumption (mmscf/hr)
Annual Emissions (lb/yr) = Emission Factor (lb/mmscf x (Off-Spec Flare Gas Consumption (mmscf/hr) x Hours Per Year + Pilot Gas Consumption (mmscf/hr) x Hours Per Year)

[7] Daily Emissions (lb/day) = Hourly Emissions (lb/hr) x Hours per Day

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Appendix D Operational Emissions - Off-Spec Flare

Table D.8 Flare Criteria Pollutant Emission Factors and Emissions - Pilot Gas Only[1]

Criteria Pollutant	Flare Gas Content (ppmv)	Emission Factor[4] (lb/mmscf)	Emission Factor (lb/mmbtu)	Hourly Emissions[6] (lb/hr)	Daily Emissions[7] (lb/day)	Annual Emissions[6] (lb/yr)
NOx[2]	--	--	0.06	0.0060	0.14	52.56
CO[3]	--	--	0.06	0.0060	0.14	52.56
VOC[3]	--	--	0.006	0.0006	0.01	5.26
SOx[4]	--	0.60	--	0.0001	0.001	0.50
PM10[5]	--	6.1	--	0.0006	0.01	5.09

[1] Off-Spec Flare Gas not included since the flare will not be used concurrently with the Thermal Oxidizer, under which condition, only pilot gas consumption would occur at flare.

[2] NOx emission factor from Rule 1118.1, Table 1, for "Other Flare Gas." The flare manufacturer has guaranteed that the flare will operate in compliance with this emission limit.

[3] The VOC and CO emission factors are the South Coast AQMD BACT/LAER determination for A/N 614468.

[4] Pilot Gas
South Coast AQMD Default

[5] The PM10 emission factor is the South Coast AQMD BACT/LAER determination for A/N 614468.

[6] NOx, CO, and VOC
Hourly Emissions (lb/hr) = Emission Factor (lb/mmBtu) x Pilot Gas Steam Max Capacity (mmBtu/hr)
Annual Emissions (lb/yr) = Emission Factor (lb/mmBtu) x Pilot Gas Steam Max Capacity (mmBtu/hr) x Hours Per Year

SOx, Pilot Gas
Hourly Emissions (lb/hr) = Emission Factor (lb/mmscf) x Pilot Gas Consumption (mmscf/hr)
Annual Emissions (lb/yr) = Hourly Emissions (lb/hr) x Hours per Year

PM10
Hourly Emissions (lb/hr) = Emission Factor (lb/mmscf) x Pilot Gas Consumption (mmscf/hr)
Annual Emissions (lb/yr) = Emission Factor (lb/mmscf x Pilot Gas Consumption (mmscf/hr) x Hours Per Year

[7] Daily Emissions (lb/day) = Hourly Emissions (lb/hr) x Hours per Day

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Appendix D Operational Emissions - Off-Spec Flare

Table D.9 **AQIA Emission Rates**

	1-Hour Averaging Period		8-Hour Averaging Period		24-Hour Averaging Period		Annual Averaging Period	
Pollutant	**lb/hr[1]**	**g/s[2]**	**lb/8-hr[3]**	**g/s[4]**	**lb/24-hr[5]**	**g/s[6]**	**lb/yr[7]**	**g/s[8]**
NO2	6.000E-03	7.567E-04	--	--	--	--	5.256E+01	7.567E-04
SO2	5.714E-05	7.206E-06	--	--	1.371E-03	7.206E-06	5.006E-01	7.206E-06
CO	6.000E-03	7.567E-04	4.800E-02	7.567E-04	--	--	--	--
PM10	--	--	--	--	1.394E-02	7.326E-05	5.089E+00	7.326E-05
PM2.5	--	--	--	--	1.394E-02	7.326E-05	5.089E+00	7.326E-05

[1] 1-Hour Averaging Period (lb/hr) = Emission Rate (lb/hr)
[2] 1-Hour Averaging Period (g/s) = 1-Hour Averaging Period (lb/hr) x 454 / 3,600
[3] 8-Hour Averaging Period (lb/8-hr) = 1-Hour Averaging Period (lb/hr) x 8 Hours
[4] 8-Hour Averaging Period (g/s) = 8-Hour Averaging Period (lb/8-hr) / 8 Hours x 454 / 3,600
[5] 24-Hour Averaging Period (lb/24-hr) = 1-Hour Averaging Period (lb/hr) x 24 Hours
[6] 24-Hour Averaging Period (g/s) = 24-Hour Averaging Period (lb/24-hr) / 24 Hours x 454 / 3,600
[7] NO2 and SO2:
Annual Averaging Period (lb/yr) = 1-Hour Averaging Period (lb/hr) x Annual Hours of Opeation :
Pilot Gas (Natural Gas) Annual Operating Hours 8,760
PM10 and PM2.5:
Annual Averaging Period (lb/yr) = Emission Factor (lb/mmscf x Pilot Gas Consumption (mmscf/hr) x Hours Per Year
[8] Annual Averaging Period (g/s) = Annual Averaging Period (lb/yr) / 8,760 Hours x 454 / 3,600

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Appendix D Operational Emissions - Off-Spec Flare

Table D.10 Flare GHG Emission Factors and Emissions - At Maximum LFG Stream[1]

GHG	Emission Factor[2] (lb/mmBtu)	Emission Factor[3] (lb/mmscf)	Gas Consumption (mmscf/yr)[4]	Daily Emissions (lb/day)[5]	Annual Emissions[6] (lb/yr)	MT/yr	CO2e Eq[2]	CO2e[7] (MT/yr)
CO_2	116.94	122,787	142.75	48,020.24	17,527,388.18	7,948.93	1	7,948.93
CH_4	2.200E-03	2.31		0.9034	329.74	0.15	25	3.74
N_2O	2.200E-04	0.23		0.0903	32.97	0.01	298	4.46
							Total CO2e (MT/yr)	7,957.12

[1] Maximum LFG Stream (Off-Spec Flare Gas and Pilot Gas combustion) included for informational purposes only. Off-Spec Flare wil only be operate in case of a system upset or if RNG is off-spec. Flare will not be concurrently operated with the Thermal Oxidizer.
[2] Emission factors and CO2e Eq are from SCAQMD 'Combustion Emission Estimator'.
http://www.aqmd.gov/docs/default-source/permitting/ceqa-2017/ghg-estimator-(2018-11).xlsx?sfvrsn=6
Fuel Type: Natural Gas
[3] Emission Factor (lb/mmscf) = Emission Factor (lb/mmBtu) x HHV (mmBtu/mmscf)
HHV 1,050 mmBtu/mmscf
[4] Gas Consumption (mmscf/yr) is total gas consumed from both off-spec flare and pilot gas combustion
[5] Daily Emissions (lb/day) = Annual Emissions (lb/yr) / 365 days
[6] Annual Emissions (lb/yr) = Emission Factor (lb/mmscf) x Gas Consumption (mmscf/yr)
[7] CO2e (MT/yr) = Annual Emissions (lb/yr) x CO2e Eq / 2,205

Table D.11 Flare GHG Emission Factors and Emissions - Pilot Gas Only[1]

GHG	Emission Factor[2] (lb/mmBtu)	Emission Factor[3] (lb/mmscf)	Gas Consumption (mmscf/yr)[4]	Daily Emissions (lb/day)[5]	Annual Emissions[6] (lb/yr)	MT/yr	CO2e Eq[2]	CO2e[7] (MT/yr)
CO_2	116.94	122,787	0.83	170.99	102,439.44	46.46	1	46.46
CH_4	2.200E-03	2.31		0.0032	1.93	0.00	25	0.02
N_2O	2.200E-04	0.23		0.0003	0.19	0.00	298	0.03
							Total CO2e (MT/yr)	46.51

[1] Off-Spec Flare Gas not included since the flare will not be used concurrently with the Thermal Oxidizer, under which condition, only pilot gas consumption would occur at flare.
[2] Emission factors and CO2e Eq are from SCAQMD 'Combustion Emission Estimator'.
http://www.aqmd.gov/docs/default-source/permitting/ceqa-2017/ghg-estimator-(2018-11).xlsx?sfvrsn=6
Fuel Type: Natural Gas
[3] Emission Factor (lb/mmscf) = Emission Factor (lb/mmBtu) x HHV (mmBtu/mmscf)
HHV 1,050 mmBtu/mmscf
[4] Gas Consumption (mmscf/yr) is total gas consumed from both off-spec flare and pilot gas combustion
[5] Daily Emissions (lb/day) = Annual Emissions (lb/yr) / 365 days
[6] Annual Emissions (lb/yr) = Emission Factor (lb/mmscf) x Gas Consumption (mmscf/yr)
[7] CO2e (MT/yr) = Annual Emissions (lb/yr) x CO2e Eq / 2,205

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Appendix D Operational Emissions - Off-Spec Flare

Table D.12 Flare Toxic Air Contaminant Emission Factors and Emissions - At Maximum LFG Stream[1]

Toxic Air Contaminant	CAS No.	Emission Factor[1] (lb/mmscf)	Hourly Emissions Controlled[3] (lb/hr)	Annual Emissions Controlled[4] (lb/yr)	
Benzene	71432	0.159	2.58E-02	2.27E+01	B1
Ethylbenzene	100414	1.444	2.34E-01	2.06E+02	E3
Hexane	110543	0.029	4.70E-03	4.14E+00	H6
Toluene	108883	0.058	9.40E-03	8.28E+00	T3
Xylenes	1330207	0.029	4.70E-03	4.14E+00	X1
Formaldehyde	50000	1.169	1.89E-01	1.67E+02	F2
Acetaldehyde	75070	0.043	6.97E-03	6.14E+00	A1
Acrolein	107028	0.01	1.62E-03	1.43E+00	A3
Naphthalene	91203	0.011	1.78E-03	1.57E+00	P62
Total PAH (excluding Naphthalene)	1151	0.003	4.86E-04	4.28E-01	P41

Gas Consumption (mmscf/hr)	Gas Consumption (mmscf/yr)
0.16	142.75

[1] Maximum LFG Stream (Off-Spec Flare Gas and Pilot Gas combustion) included for informational purposes only. Off-Spec Flare wil only be operate in case of a system upset or if RNG is off-spec. Flare will not be concurrently operated with the Thermal Oxidizer.
[2] Emission Factors are from South Coast AQMD Default Emission Factors for Natural Gas Combustion in Flare
[3] Hourly Emissions (lb/hr) = Emission Factor (lb/mmscf) x Gas Consumption (mmscf/hr)
[4] Annual Emissions (lb/yr) = Emission Factor (lb/mmscf) x Gas Consumption (mmscf/yr)

Table D.13 Flare Toxic Air Contaminant Emission Factors and Emissions - Pilot Gas Only[1]

Toxic Air Contaminant	CAS No.	Emission Factor[2] (lb/mmscf)	Hourly Emissions Controlled[3] (lb/hr)	Annual Emissions Controlled[4] (lb/yr)	
Benzene	71432	0.159	1.51E-05	1.33E-01	B1
Ethylbenzene	100414	1.444	1.38E-04	1.20E+00	E3
Hexane	110543	0.029	2.76E-06	2.42E-02	H6
Toluene	108883	0.058	5.52E-06	4.84E-02	T3
Xylenes	1330207	0.029	2.76E-06	2.42E-02	X1
Formaldehyde	50000	1.169	1.11E-04	9.75E-01	F2
Acetaldehyde	75070	0.043	4.10E-06	3.59E-02	A1
Acrolein	107028	0.01	9.52E-07	8.34E-03	A3
Naphthalene	91203	0.011	1.05E-06	9.18E-03	P62
Total PAH (excluding	1151	0.003	2.86E-07	2.50E-03	P41

Gas Consumption (mmscf/hr)	Gas Consumption (mmscf/yr)
0.0001	0.83

[1] Off-Spec Flare Gas not included since the flare will not be used concurrently with the Thermal Oxidizer, under which condition, only pilot gas consumption would occur at flare.
[2] Emission Factors are from South Coast AQMD Default Emission Factors for Natural Gas Combustion in Flare
[3] Hourly Emissions (lb/hr) = Emission Factor (lb/mmscf) x Gas Consumption (mmscf/hr)
[4] Annual Emissions (lb/yr) = Emission Factor (lb/mmscf) x Gas Consumption (mmscf/yr)

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Appendix D Operational Emissions - Generator Set with ICE

Table D.14 Data (Emergency ICE)

Engine Rating[1] (hp)	Fuel Consumption[1] (scf/hr)	Hours per Day (Maximum Permitted Usage)	Hours per Year (Maximum Permitted Usage)	Fuel Consumption[2] (mmscf/hr)	Fuel Consumption[3] (mmscf/yr)
253	1,655	24	200	0.001655	0.3310

[1] Engine Rating (hp) and Fuel Consumption (scf/hr) from manufacturer's specification at 100% load.
Fuel Consumption (scf/hr) = Fuel Consumption (scf/hr) @ 905 mmBtu/mmscf x 905 mmBtu/mmscf / NG HHV (mmBtu/mmscf)

Fuel Consumption	1,920	scf/hr, @ 905 mmBtu/mmscf and 32 scfm at 100% load
NG HHV	1,050	mmBtu/mmscf

[2] Fuel Consumption (mmscf/hr) = Fuel Consumption (scf/hr) / 1,000,000
[3] Fuel Consumption (mmscf/yr) = Fuel Consumption (mmscf/hr) x Hours per Year (Maximum Permitted Usage)

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Appendix D Operational Emissions - Generator Set with ICE

Table D.15 Emergency ICE Criteria Pollutant Emission Factors and Emissions

Criteria Pollutant	EPA Certified Emissions (g/bhp-hr)	Emission Factor (lb/mmscf)	Hourly Emissions[3] (lb/hr)	Daily Emissions[4] (lb/day)	Annual Emissions[5] (lb/yr)
NOx[1]	0.3	--	0.1672	4.01	33.44
CO[1]	0.5	--	0.2786	6.69	55.73
VOC[1]	0.049	--	0.0273	0.66	5.46
SOx[2]	--	0.60	0.0010	0.024	0.20
PM10[2]	--	10	0.0165	0.40	3.31

[1] Certification Emission Levels (g/bhp-hr) for EPA Family PORGB10.3ET1 from
https://www.epa.gov/system/files/documents/2024-02/large-spark-ignition-2011-present.xlsx
Note: VOC is shown as 0.0 g/bhp-hr. Emission calculations assume 0.049 g/bhp-hr.
Horsepower Rating and Fuel Consumption from Gas Engine Technical Data Sheet, Caterpillar DG 150 ICE, at 100% load with no fan

[2] South Coast AQMD Default Emission Factor (lb/mmscf) for Natural Gas Combustion in Internal Combustion Engine

[3] NOx, CO, and VOC
Hourly Emissions (lb/hr) = EPA Certified Emissions (g/bhp-hr) x Engine Rating (bhp) / 454 g/lb
SOx and PM10
Hourly Emissions (lb/hr) = Emission Factor (lb/mmscf) x Fuel Consumption (mmscf/hr)

[4] Daily Emissions (lb/day) = Hourly Emissions (lb/hr) x Hours per Day

[5] Annual Emissions (lb/yr) = Hourly Emissions (lb/hr) x Hours per Year

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Appendix D Operational Emissions - Generator Set with ICE

Table D.16 **AQIA Emission Rates**

	1-Hour Averaging Period		8-Hour Averaging Period		24-Hour Averaging Period		Annual Averaging Period	
Pollutant	**lb/hr[1]**	**g/s[2]**	**lb/8-hr[3]**	**g/s[4]**	**lb/24-hr[5]**	**g/s[6]**	**lb/yr[7]**	**g/s[8]**
NO2	1.672E-01	2.108E-02	--	--	--	--	3.344E+01	4.814E-04
SO2	9.929E-04	1.252E-04	--	--	2.383E-02	1.252E-04	1.986E-01	2.859E-06
CO	2.786E-01	3.514E-02	2.229E+00	3.514E-02	--	--	--	--
PM10	--	--	--	--	3.972E-01	2.087E-03	3.310E+00	4.765E-05
PM2.5	--	--	--	--	3.972E-01	2.087E-03	3.310E+00	4.765E-05

[1] 1-Hour Averaging Period (lb/hr) = Emission Rate (lb/hr)
[2] 1-Hour Averaging Period (g/s) = 1-Hour Averaging Period (lb/hr) x 454 / 3,600
[3] 8-Hour Averaging Period (lb/8-hr) = 1-Hour Averaging Period (lb/hr) x 8 hr/day
[4] 8-Hour Averaging Period (g/s) = 8-Hour Averaging Period (lb/8-hr) / 8 Hours x 454 / 3,600
[5] 24-Hour Averaging Period (lb/24-hr) = 1-Hour Averaging Period (lb/hr) x Hours per Day (Maximum Permitted Usage)
Hours per Day (Maximum Permitted Usage) 24.0
[6] 24-Hour Averaging Period (g/s) = 24-Hour Averaging Period (lb/24-hr) / 24 Hours x 454 / 3,600
[7] Annual Averaging Period (lb/yr) = 1-Hour Averaging Period (lb/hr) x Hours per Year (Maximum Permitted Usage)
Hours per Year (Maximum Permitted Usage) 200
[8] Annual Averaging Period (g/s) = Annual Averaging Period (lb/yr) / 8,760 Hours x 454 / 3,600

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Appendix D Operational Emissions - Generator Set with ICE

Table D.17 Emergency ICE Toxic Air Contaminant Emission Factors and Emissions

Toxic Air Contaminant	CAS No.	Emission Factor Uncontrolled[1] (lb/mmscf)	Hourly Emissions Controlled[2] (lb/hr)	Annual Emissions Controlled[3] (lb/yr)
Benzene	71432	1.61	2.66E-03	5.33E-01
1,3-Butadiene	106990	0.676	1.12E-03	2.24E-01
Carbon Tetrachloride	56235	0.0181	3.00E-05	5.99E-03
Ethylene Dibromide	106934	0.0217	3.59E-05	7.18E-03
1,2-Dichloroethane	107062	0.0115	1.90E-05	3.81E-03
Formaldehyde	50000	20.9	3.46E-02	6.92E+00
Methylene Chloride	75092	0.042	6.95E-05	1.39E-02
Benz(a)anthracene	56553	0	0.00E+00	0.00E+00
Benzo(a)pyrene	50328	0	0.00E+00	0.00E+00
Benzo(b)fluoranthene	205992	0	0.00E+00	0.00E+00
Benzo(k)fluoranthene	207089	0	0.00E+00	0.00E+00
Chrysene	218019	0	0.00E+00	0.00E+00
Indeno(1,2,3-c,d)pyrene	193395	0	0.00E+00	0.00E+00
Naphthalene	91203	0.099	1.64E-04	3.28E-02
Vinyl Chloride	75014	0.00732	1.21E-05	2.42E-03
1,1,2,2-Tetrachloroethane	79345	0.0258	4.27E-05	8.54E-03
1,1,2-Trichloroethane	79005	0.0156	2.58E-05	5.16E-03
Acetaldehyde	75070	2.85	4.72E-03	9.43E-01
Acrolein	107028	2.68	4.44E-03	8.87E-01
Ammonia	7664417	3.2	5.30E-03	1.06E+00
Chloroform	67663	0.014	2.32E-05	4.63E-03
Ethylbenzene	100414	0.0253	4.19E-05	8.37E-03
n-Hexane	110543	0	0.00E+00	0.00E+00
Methanol	67561	3.12	5.16E-03	1.03E+00
Styrene	100425	0.0121	2.00E-05	4.00E-03
Toluene	108883	0.569	9.42E-04	1.88E-01
Xylene	1330207	0.199	3.29E-04	6.59E-02

Fuel Consumption (mmscf/hr)	Fuel Consumption (mmscf/yr)
0.001655	0.3310

[1] Emission Factors are from South Coast AQMD Default Emission Factors for Natural Gas Combustion in Lean-Burn ICE
[2] Hourly Emissions (lb/hr) = Emission Factor (lb/mmscf) x Hourly Fuel Consumption (mmscf/hr)
[3] Annual Emissions (lb/yr) = Emission Factor (lb/mmscf) x Annual Fuel Consumption (mmscf/yr)

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Appendix D Operational Emissions - Generator Set with ICE

Table D.18 Emergency ICE GHG Emission Factors and Emissions

GHG	Emission Factor[1] (lb/mmBtu)	Emission Factor[2] (lb/mmscf)	Fuel Consumption (mmscf/yr)	Daily Emissions (lb/day)	Annual Emissions[3] (lb/yr)	MT/yr	CO2e Eq[1]	CO2e[4] (MT/yr)
CO_2	116.94	122,787.00	0.3310	111.34	40,638.99	18.43	1	18.43
CH_4	2.2E-03	2.31		0.0021	0.76	0.00	25	0.009
N_2O	2.20E-04	0.23		0.0002	0.08	0.00	298	0.010
							Total CO2e (MT/yr)	18.45

[1] Emission factors and CO2e Eq are from SCAQMD 'Combustion Emission Estimator'.
http://www.aqmd.gov/docs/default-source/permitting/ceqa-2017/ghg-estimator-(2018-11).xlsx?sfvrsn=6
Fuel Type: Natural Gas

[2] Emission Factor (lb/mmscf) = Emission Factor (lb/mmBtu) x HHV (mmBtu/mmscf)
HHV 1,050 mmBtu/mmscf

[3] Annual Emissions (lb/yr) = Emission Factor (lb/mmscf) x Fuel Consumption (mmscf/yr)

[4] CO2e (MT/yr) = Annual Emissions (lb/yr) x CO2e Eq / 2,205

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Appendix D — Operational Emissions - RNG Facility Fugitive GHG Emissions

Table D.19 Fugitive Methane GHG Emission Factors and Emissions

GHG	CO2 Content Relative to Methane (Mass %)[2]	Fugitive Gas Leak Rate[3] (lb/hr)	Daily Emissions (lb/day)	Annual Emissions[4] (lb/yr)	MT/yr	CO2e Eq[5]	CO2e[5] (MT/yr)
CO_2	4.88%	0.1502	3.60	1,315.48	0.60	1	0.60
CH_4	--	3.0793	73.9040	26,974.95	12.23	25	305.838
N_2O	--	--	--	--	--	298	--
						Total CO2e (MT/yr)	306.44

[1] Emission factors are from SCAQMD Guidelines for Reporting VOC Emissions from Component Leaks - Method 2 - Correlation Equation Method (below)
https://www.aqmd.gov/docs/default-source/planning/annual-emission-reporting/guidelreportvocemiscomleaks.pdf
Calculated fugitive emissions are considered total hydrocarbon and equivalent to CH4

SCAQMD Guidelines for Reporting VOC Emissions from Component Leaks - Method 2 - Correlation Equation Method	
Component Type	**Correlation Equation Fugitive Leak Rate (lb/hr per component)**
Valves/All	5.19E-04
Pump seals/All	5.35E-03
Others/All	1.04E-03
Connectors/All	3.27E-04
Flanges/All	7.98E-04
Open-ended lines/All	3.77E-04
Screening Value*	500

*Screening Value of 500 ppmv was chosen per Rule 1150.1 component leak threshold

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Appendix D Operational Emissions - RNG Facility Fugitive GHG Emissions

[2] CO2 MW 44.01 lb/lbmol
CH4 MW 16.04 lb/lbmol
Molar Volume 177.56 cf/lbmol @ 114 Deg F and 34.67 psia (see Process Point 5 in PFD in Appendix b Page: 8)
Density of Gas = MW x Molar Volume
CO2 Density 0.2479 lb/cf @ 114 Deg F and 34.67 psia
CH4 Density 0.0903 lb/cf @ 114 Deg F and 34.67 psia
Molar Volume of Gas in Stream = Gas Composition (%) x Molar Volume
CO2 Composition 1.71 Vol % (see Process Point 5 in PFD in Appendix b Page: 8)
CH4 Composition 96.21 Vol % (see Process Point 5 in PFD in Appendix b Page: 8)
CO2 Molar Volume 3.04 cf/lbmol @ 114 Deg F and 34.67 psia
CH4 Molar Volume 170.83 cf/lbmol @ 114 Deg F and 34.67 psia
Molar Volume of Gas in Stream = Density x Molar Volume of Gas in Stream (CO2 or CH4)
CO2 Molar Mass 0.7526 lb/lbmol of Gas
CH4 Molar Mass 15.4321 lb/lbmol of Gas
CO2 Content Relative to Methane = CO2 Molar Mass / CH4 Molar Mass x 100

[3] Fugitive Methane Leak Rate calculated based on component counts provided by Tent and SoCalGas. All components shown are aboveground and under positive pressure. Pressure Relief Valves, Orifice Meters, and Regulators use the 'Others/All' component type emission factor. All other components use the corresponding SCAQMD component types.

RNG Facility				Point of Receipt Station	
Gas Service		Condensate Service		Gas Service	
Component Type	Number of Components	Component Type	Number of	Component Type	Number of Components
Connectors	3600	Valves	300	Connectors	560
Block Valves	575	Flanges	125	Block Valves	197
Control Valves	275	Connector	1850	Control Valves	3
Pressure Relief Valves	75	Open Ended Line	100	Pressure Relief Valves	4
Orifice Meter	N/A	Pump	0	Orifice Meter	1
Regulator	50	Other	0	Regulator	11
Open-ended line	350	--	--	Open-ended line	0

[4] Annual Emissions (lb/yr) =Fugitive Gas Leak Rate (lb/hr) x Annual Hours of Active Leaking
Annual Hours of Active Leaking 8,760

[5] CO2e (MT/yr) = Annual Emissions (lb/yr) x CO2e Eq / 2,205
CO2e Eq are from SCAQMD 'Combustion Emission Estimator'.
http://www.aqmd.gov/docs/default-source/permitting/ceqa-2017/ghg-estimator-(2018-11).xlsx?sfvrsn=6

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RNG Facility CEQA Operational Emissions

Appendix D Operational Emissions - RNG Facility Product Gas Combustion GHG Emissions

Table D.20 Product Gas GHG Emission Factors and Emissions

Stream ID[1]	Stream Max Capacity[1] (scfm)	Component[2]	Component Vol.%[1]	Component Flowrate[3] (scfm)	GHG	Emission Factor[4] (lb/mmBtu)	Emission Factor[5] (lb/mmscf)	Annual Emissions[6] (lb/yr)	Daily Emissions (lb/day)	MT/yr	CO2e Eq[4]	CO2e[7] (MT/yr)
Product Gas Stream	2,412	CO_2	1.71%	41.25	CO_2	--	116,121.37	2,517,335	6,897	1,141.65	1	1,141.65
		CH_4	96.21%	2,320.59	CO_2	116.94	122,787.00	149,763,252	410,310	67,919.84	1	67,919.84
					CH_4	2.2E-03	2.31	2,817.51	7.72	1.28	25	31.94
					N_2O	2.20E-04	0.23	281.75	0.77	0.13	298	38.08
										Total CO2e (MT/yr)		69,131.51

[1] Product Gas Stream flowrate, methane, and carbon dioxide content from PFD in Appendix B (page 8, Process Point 5).
[2] CO_2 in Product Gas Stream is not combusted, and is "passed-though".
[3] Component Flowrate (scfm) = Stream Max Capacity (scfm) x Component Vol.%
[4] GHG calculations assume that emissions from the methane component of the tail gas streams may be calculated from the default emission factors for natural gas combustion.
Emission factors and CO2e Eq are from SCAQMD 'Combustion Emission Estimator'.
http://www.aqmd.gov/docs/default-source/permitting/ceqa-2017/ghg-estimator-(2018-11).xlsx?sfvrsn=6
[5] CO_2, Product Gas
The CO_2 in the product gas streams passes through and is not combusted.
Emission Factor (lb/mmscf) = Density (lb/scf) x 1,000,000
Density (lb/scf) = MW / Molar Volume

CO_2 MW	44.01	lb/lbmol
Molar Volume	379	scf/lbmol, @ 60 Deg F

CH_4 Product Gas
Emission Factor (lb/mmscf) = Emission Factor (lb/mmBtu) x HHV (mmBtu/mmscf)

HHV	1,050	mmBtu/mmscf

[6] Annual Emissions (lb/yr) = Component Flowrate (scfm) x 60 / 1,000,000 x Hours per Day x Days per Year x Emission Factor (lb/mmscf)

Hours per Day	24
Days per Year	365

[7] CO2e (MT/yr) = Annual Emissions (lb/yr) x CO2e Eq / 2,205

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Appendix D Baseline Emissions - Flare Station

Table D.21 Flare Data (Flare Station)

Flare ID	LFG Consumption 2023 Peak Day[1] (scf/day)	LFG Consumption 2024 Peak Day[1] (scf/day)	LFG Consumption Baseline[2] (scf/day)	LFG Consumption Baseline[3] (mmscf/day)
Flare I-1	1,833,383	1,922,651	1,922,651	1.92
Flare I-2	1,837,937	1,896,137	1,896,137	1.90
Flare I-3	651,385	1,949,541	1,949,541	1.95
Flare I-4	1,296,872	8,705	8,705	0.01
Flare I-5	5,001,479	5,300,661	5,300,661	5.30
Flare I-6[4]	0	0	0	0.00
Total	10,621,056	11,077,694	11,077,694	11.08

Note: The baseline shown in Table D.18 is approximately
7,693 *scfm*
The averages for calendar years 2023 and 2024, respectively are
3,140 *scfm*
3,906 *scfm*
The RNG facility is designed for
6,000 *scfm*

[1] This data represents the highest daily total LFG consumption in calendar years 2023 and 2024. The highest daily total LFG consumption in calendar year 2023 occurred on July 11, 2023. The highest daily total LFG consumption in calendar year 2024 occurred on May 7, 2024.

[2] The baseline LFG consumption for the flare station is defined as the day with the highest daily total LFG consumption. The highest daily total LFG consumption occurred in 2024. Baseline emissions are calcuated from the highest daily total LFG consumption in 2024.

[3] LFG Consumption Baseline (mmscf/day) = LFG Consumption Baseline (scf/day) / 1,000,000.

[4] Flare I-6 operated in calendar year 2023 and 2024, but not on the daily with highest daily total LFG consumption. Flare I-6 is excluded from Table D.19.

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Appendix D Baseline Emissions - Flare Station

Table D.22 Flare Station Criteria Pollutant Emission Factors and Emissions

Flare ID	LFG Consumption Baseline (mmscf/day)	Parameters	NOx	CO	VOC	SOx	PM10/PM2.5[1]
Flares I-1, I-2, I-3, and I-4	--	Maximum Hourly Emissions[2] (lb/hr)	2.7	2.1	0.78	1.3	1.28
		Maximum LFG Consumption[2] (scfm)	1700	1700	1700	1700	1700
Flare I-5	--	Maximum Hourly Emissions[2] (lb/hr)	7.2	5.6	1.9	3.2	3.15
		Maximum LFG Consumption[2] (scfm)	4200	4200	4200	4200	4200
Flare I-1	1.92	Emission Factor[3] (lb/mmscf)	26.47	20.59	7.65	12.75	12.55
		Emissions[4] (lb/day)	50.89	39.58	14.70	24.50	24.13
Flare I-2	1.90	Emission Factor[3] (lb/mmscf)	26.47	20.59	7.65	12.75	12.55
		Emissions[4] (lb/day)	50.19	39.04	14.50	24.17	23.79
Flare I-3	1.95	Emission Factor[3] (lb/mmscf)	26.47	20.59	7.65	12.75	12.55
		Emissions[4] (lb/day)	51.61	40.14	14.91	24.85	24.46
Flare I-4	0.01	Emission Factor[3] (lb/mmscf)	26.47	20.59	7.65	12.75	12.55
		Emissions[4] (lb/day)	0.23	0.18	0.07	0.11	0.11
Flare I-5	5.30	Emission Factor[3] (lb/mmscf)	28.57	22.22	7.54	12.70	12.50
		Emissions[4] (lb/day)	151.45	117.79	39.97	67.31	66.26
Totals	--	Emissions	304.37	236.73	84.14	140.94	138.75

[1] For combustion sources, PM10 = PM2.5.

[2] Emission factors are derived from A/N 543222, the current Permit to Operate for the flare station.
Maximum LFG consumption rate for Flares I-1, I-2, I-3, and I-4 are from Condition No. 11. Maximum LFG consumption rate for Flare I-5 is from Condition No. 12.
Maximum hourly emission rates for Flares I-1, I-2, I-3, and I-4 are from Condition No. 30. Maximum hourly emission rates for Flare I-5 are from Condition No. 31.

[3] Emission Factor (lb/mmscf) = Maximum Hourly Emissions (lb/hr) / (Maximum LFG Consumption (scfm) x 60 / 1,000,000)

[4] Emissions (lb/day) = LFG Consumption Baseline (mmscf/day) x Emission Factor (lb/mmscf)

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Appendix D Baseline Emissions Flare Station

Table D.23 Flare Station GHG Emission Factors and Emissions

Stream ID[1]	Stream Max Capacity[1] (scfm)	Component[2]	Component Vol.%[1]	Component Flowrate[3] (scfm)	GHG	Emission Factor[4] (lb/mmBtu)	Emission Factor[5] (lb/mmscf)	Annual Emissions[6] (lb/yr)	Daily Emissions (lb/day)	MT/yr	CO2e Eq[4]	CO2e[7] (MT/yr)
Feed Gas Stream	6,000	CO_2	37.36%	2,241.60	CO_2	--	116,121.37	136,812,454	374,829	62,046.46	1	62,046.46
		CH_4	41.98%	2,518.80	CO_2	116.94	122,787	162,555,411	445,357	73,721.27	1	73,721.27
					CH_4	2.2E-03	2.31	3,058.17	8.38	1.39	25	34.67
					N_2O	2.20E-04	0.23	305.82	0.84	0.14	298	41.33
										Total CO2e (MT/yr)		135,843.74

[1] Feed Gas Stream flowrate, methane, and carbon dioxide content from PFD in Appendix B (page 8, Process Point 1).

[2] CO_2 in Feed Gas Stream is not combusted, and is "passed-though" to flares.

[3] Component Flowrate (scfm) = Stream Max Capacity (scfm) x Component Vol.%

[4] GHG calculations assume that emissions from the methane component of the tail gas streams may be calculated from the default emission factors for natural gas combustion.
Emission factors and CO2e Eq are from SCAQMD 'Combustion Emission Estimator'.
http://www.aqmd.gov/docs/default-source/permitting/ceqa-2017/ghg-estimator-(2018-11).xlsx?sfvrsn=6

[5] CO_2, Feed Gas
The CO_2 in the product gas streams passes through and is not combusted.
Emission Factor (lb/mmscf) = Density (lb/scf) x 1,000,000

Density (lb/scf) = MW / Molar Volume

CO_2 MW	44.01	lb/lbmol
Molar Volume	379	scf/lbmol, @ 60 Deg F

CH_4 Feed Gas
Emission Factor (lb/mmscf) = Emission Factor (lb/mmBtu) x HHV (mmBtu/mmscf)

HHV	1,050	mmBtu/mmscf

[6] Annual Emissions (lb/yr) = Component Flowrate (scfm) x 60 / 1,000,000 x Hours per Day x Days per Year x Emission Factor (lb/mmscf)

Hours per Day	24
Days per Year	365

[7] CO2e (MT/yr) = Annual Emissions (lb/yr) x CO2e Eq / 2,205

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Appendix D Project to Baseline GHG Comparison

Table D.24 Project to Baseline GHG Comparison - Device Breakdown

Emission Source		GHG Emissions (MT/yr)				
		CO_2	CH_4	N_2O	R	Total CO2e
[A]	**Baseline Existing LFG Flare Station Emissions[1]**	**135,768**	**1.39**	**0.14**	**--**	**135,844**
[B]	TOU[2] (from Tail Gas)	66,681	0.11	0.01	--	66,687
[C]	Product Gas Combustion[3]	69,061	1.28	0.13	--	69,132
[D] = [B] + [C]	**Total GHGs associated with Proposed Landfill Gas Usage[4]**	**135,742**	**1.39**	**0.14**	**--**	**135,818**
[E]	TOU[2] (from Pilot Gas)	8,195.16	0.15	0.02	--	8,204
[F]	Flare[5] (from Pilot Gas)	46	0.00	0.00	--	46.51
[G]	Emergency Engine[6]	18	0.00	0.00	--	18.45
[H]	Fugitive Emissions[7]	1	12.23	--	--	306.44
[I]	Construction[8]	40	0.00	0.00	0.02	40.70
[J]	Miscellaneous Operational Sources[9]	148	0.46	0.01	0.98	162.17
[K] = [B + C + E + F + G + H + I + J]	**Proposed Project**	**144,191**	**14.23**	**0.16**	**1.00**	**144,596**
[L] = [K] - [A]	**Proposed Project - Baseline Existing LFG Flare Emissions**	**8,423**	**12.85**	**0.02**	**1.00**	**8,752**
[M]					SCAQMD GHG Threshold	10,000
Is [L] > [M]?					**Significant?**	**No**

[1] Baseline existing flare station emissions based on total inlet flow rate of 6,000 scfm, the equivalent fuel rate being directed to the proposed RNG facility (Appendix B (page 8, Process Point 1), Continuous operation. The total inlet flow rate was separated into CO_2 and CH_4 components in the stream, with CO_2 emissions directly emitted from the flare and CH_4 combustion estimated using natural gas GHG emission factors.

[2] Proposed TOU: 2,309 scfm Process Gas 1 (~6.3 mmBtu/hr) + 883 scfm Process Gas 2 (~6.1 mmBtu/hr) + 280 scfm Supplemental Fuel (~17.6 mmBtu/hr), Continuous operation. The control of process gas is exclusively through the thermal oxidizer or the flare. Maximum GHG emissions results from the combustion of process gas from the TOU and Flare were evaluated in Appendix D. The combustion from the TOU, representing the maximum potential GHG emissions and normal operations is shown in this table.

[3] Product gas combustion: 2,412 scfm product gas stream flowrate from PFD in Appendix B (page 8, Process Point 5), Continuous operation.

[4] Note that the total GHGs associated with Proposed LFG usage is roughly equivalent to the GHGs from baseline LFG Flare Station

[5] Proposed Flare: ~1.6 scfm Supplemental Fuel (0.1 mmBtu/hr), Continuous operation. Off-Spec Flare Gas not included since the flare will not be used concurrently with the Thermal Oxidizer, under which condition, only pilot gas consumption would occur at flare. Off-Spec Flare wil only be operate in case of a system upset or if RNG is off-spec.

[6] Proposed Engine: Engine is natural gas fired and used for maintenance and testing.

[7] Fugitive Emissions: Component counts from Tent Engineering and SoCalGas, using SCAQMD Guidelines for Reporting VOC Emissions from Component Leaks, Continuous Leaking https://www.aqmd.gov/docs/default-source/planning/annual-emission-reporting/guidelreportvocemiscomleaks.pdf

[8] Construction emissions are amortized over 30 years.

[9] Miscellaneous Operational Sources: Include Mobile, Area, and Energy sources from CalEEMod.

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Appendix D Project to Baseline GHG Comparison

Table D.25 **Daily Emissions (RNG Normal Operating Case)**

Emission Source		Criteria Pollutant Emissions on Peak Operating Day [8] (lb/day)					
		VOC	NO_x	CO	SO_x [9]	PM_{10} [10]	$PM_{2.5}$ [10]
[A]	Baseline Existing LFG Flare Emissions [1]	84.14	304.37	236.73	140.94	138.75	138.75
[B]	Proposed TOU[2]	4.33	25.27	57.75	124.26	5.16	5.16
[C]	Proposed Flare[3]	0.01	0.14	0.14	0.001	0.01	0.01
[D]	Proposed Engine[4]	0.66	4.01	6.69	0.02	0.40	0.40
[E]	Proposed Miscellaneous Operational Sources[5]	0.83	0.32	1.59	0.00	0.12	0.05
[F] = [B + C + D + E]	**Proposed Project[6]**	**5.83**	**29.74**	**66.17**	**124.28**	**5.69**	**5.62**
[G] = [F] - [A]	**Proposed Project - Baseline Existing LFG Flare Emissions**	**-78.31**	**-274.63**	**-170.56**	**-16.65**	**-133.07**	**-133.07**
[H]	SCAQMD Mass Daily Thresholds for Operation [7]	55	55	550	150	150	150
Is [G] > [H]?	Significant?	No	No	No	No	No	No

1 Baseline is calculated as the emissions from associated with the highest daily LFG consumption at the FRB Landfill's flare station for the prior two calendar years (2023, 2024).

2 Proposed TOU: 2,309 scfm Tail Gas 1 (~6.3 mmBtu/hr) + 883 scfm Tail Gas 2 (~6.1 mmBtu/hr) + 280 scfm Supplemental Fuel (~17.6 mmBtu/hr), 24 hours. Further information regarding tail gas compositions and fuel heat ratings are provided in Appendices B and D.

3 Proposed Flare: ~1.6 scfm Supplemental Fuel (0.1 mmBtu/hr), 24 hours.

4 Proposed Engine: Engine is natural gas fired and used for maintenance and testing.

5 Proposed Miscellaneous Operational Sources: Includes Mobile, Area, and Energy sources from CalEEMod.

6 Proposed Project: Proposed TOU + Proposed Flare + Proposed Engine + Proposed Miscellaneous Operational Sources.

7 Source: SCAQMD (2023).

8 Peak operating day with emergency engine usage is shown here. A typical day would not involve emergency generator usage, which is limited to maintenance and testing hours only.

9 SOx EF is based on daily/hourly BACT basis (85 ppm or 14.354 lb/mmscf). Proposed TOU SOx emissions include 100% of the Landfill Tail Gas SOx emissions + SOx from supplemental fuel. Proposed Flare SOx emissions include SOx from supplemental fuel.

10 Total PM10 / PM2.5 comprises fugitive dust plus engine exhaust.

APPENDIX E – OPERATIONAL AQIA MODELING RESULTS

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Appendix E Air Quality Impact Analysis

Source Locations



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Appendix E Air Quality Impact Analysis

Table E.1 Source Parameters

Source ID	Source Description	Source Type	Orientation	UTM E (m)	UTM N (m)	Release Height (ft)	Exit Temperature (Deg F)	Inside Diameter (ft)	Exhaust Flow (acfm)	Exit Velocity (mps)
FLARE[1]	Flare	Point	Vertical	434,255.01	3,730,882.74	50	1,018	11.77	150,000	7.003
ICE	CAT DG150 Backup Generator ICE	Point	Vertical	434,246.91	3,730,967.73	6.15	1,304	0.4167	1,177	43.852
TOU[1]	PEI Thermal Oxidizer - Pilot Gas	Point	Vertical	434,255.52	3,730,894.15	50	1,000	5.6	39,000	8.044

1. FLARE and TOU exit temperature, inside diameter, and exhaust flow rate are provided by Perenial (email 04/23/2024; Appendix B).
2. All other physical source parameters are from Equipment Data sheets (Appendix B).

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Appendix E Air Quality Impact Analysis

Table E.2 Models

Dispersion Modeling
AERMOD v 24142
AERMET v 22112
AERMAP v 24142
Software Interface:
Lakes Environmental Software; AERMOD View™, Version 13.0.0

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Table E.3 Dispersion Model Options/Assumptions

Parameter	Value				Comments
Control Pathway					
Regulatory Options	Default	☒	Non-Default	☐	--
Output Type	Concentration	☒	Dry Deposition	☐	--
	Total Deposition	☐	Wet Deposition	☐	
Depletion Options	Dry Depletion	☐	Wet Depletion	☐	--
	Disable Dry Depletion	☐	Disable Wet Depletion	☐	
Pollutant	Other				--
Averaging Time Options	1-Hour (H1H); 8-Hour (H1H); 24-Hour (H1H); Annual (Avg)				Model output also includes the max annual average for each MET year.
Dispersion Coefficient	Rural	☒	Urban	☐	Please refer to Section 4.1.5 of the main document.
Terrain Height Options	Elevated		☒		--
	Non-Default Regulatory Options				
	Flat	☐	Flat & Elevated	☒	
Receptor Elevations / Hill Heights	Run AERMOD using the AERMAP Receptor Output file (*.ROU)				--

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Table E.3 Dispersion Model Options/Assumptions

Parameter	Value				Comments
Source Pathway					
Building Downwash	Include	☒	Exclude	☐	--
Background Concentrations	Include	☐	Exclude	☒	This project does not consider background concentrations.
Source Groups	CO1	Includes: FLCO18, ICECO1, TOCO18			--
	CO8	Includes: FLCO18, ICECO8, TOCO18			
	NO21	Includes: FLNO21, ICENO21, TONO21AN			
	NO2ANN	Includes: FLNO2AN, ICENO2AN, TONO21AN			
	PM24	Includes: FLPM24, ICEPM24, TOPM24AN			
	PMANN	Includes: FLPMAN, ICEPMAN, TOPM24AN			
	SO21	Includes: FLSO2124, ICESO21, TOSO21H24H			
	SO224	Includes: FLSO2124, ICESO224, TOSO21H24H			
	SO2ANN	Includes: FLSO2AN, ICESO2AN, TOSO2AN			
Urban Groups	\				Please refer to Section 4.1.5 of the main document.
Variable Emissions	N/A				Run assumes continuous operation.

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Appendix E Air Quality Impact Analysis

Table E.3 Dispersion Model Options/Assumptions

Parameter	Value				Comments
Receptor Pathway					
Flagpole Receptors	Include	☐	Exclude	☒	Per current South Coast AQMD guidance, all receptors should be set to ground-level.
Multi-Tier Receptor Grid	Grid Origin: Centroid of Sources Polygon				Onsite gridded receptors are disabled, but discrete receptors were placed on the administrative building on the landfill.
	Tier		Distance from Center (m)	Tier Spacing (m)	
	1 2		1000 5000	50 250	
Plant Boundary	Receptor Spacing: 10 m				

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Appendix E Air Quality Impact Analysis

Table E.3 Dispersion Model Options/Assumptions

Parameter	Value				Comments
Meteorology Pathway					
Meteorological Data	Station: Mission Viejo Years: 2017-2021 Base Elevation of Surface Station: 168 m				Meteorological data downloaded from the South Coast AQMD website.
Terrain Pathway					
Data File	USGS_NED_13_n34w118.tif				NED GEOTIFF Digital Terrain Files. Resolution: 1/3-arcsecond (10 meters).
AERMAP Domain Options	Not Specified	☐	User-Defined Domain	☒	Elevations and hill heights are calculated from a region measuring 10,000 meters by 10,000 meters centered on the facility. Source and building base elevations were set to 800 ft to match existing flare station elevation. This was done since the hill is going to be filled and leveled off with the existing flare station.

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Appendix E Air Quality Impact Analysis

Table E.4 AQIA Results

Standard	Background Data Source	2021	2022	2023	Background Concentration (Conc. Units)	Modeled Concentration (ug/m3)	Modeled Concentration (Conc. Units)	Bkg. + Modeled Concentration (Conc. Units)	Ambient Air Quality Standard (Conc. Units)	CEQA Significant Change Threshold (Conc. Units)	Result
NO2; Concentration Units = ppb											
California 1-Hr	SCAQMD; 17	67.1	53	50.9	67.1	31.21	16.59	83.7	180	--	Bkg. + Modeled Concentration < AAQS
California Annual	SCAQMD; 17	12.4	11.8	10.5	12.4	0.35	0.18	12.6	30	--	Bkg. + Modeled Concentration < AAQS
Federal Annual	SCAQMD; 17	12.4	11.8	10.5	12.4	0.35	0.18	12.6	53	--	Bkg. + Modeled Concentration < AAQS
SO2; Concentration Units = ppb			.	.							
California 1-Hr	EPA; Site ID 060371103	2.2	6.5	7.7	7.7	1.07E+02	40.8868	48.6	250	--	Bkg. + Modeled Concentration < AAQS
Federal 1-Hr	EPA; Site ID 060371103	2	2	2	2.0	7.95E+01	30.3715	32.4	75	--	Bkg. + Modeled Concentration < AAQS
California 24-Hr	EPA; Site ID 060371103	1.2	1.2	2.3	2.3	1.35E+01	5.1567	7.5	40	--	Bkg. + Modeled Concentration < AAQS
CO; Concentration Units = ppm											
California 1-Hr	SCAQMD; 17	2.1	2.4	2.5	2.5	5.20E+01	0.0454	2.5	20	--	Bkg. + Modeled Concentration < AAQS
Federal 1-Hr	SCAQMD; 17	2.1	2.4	2.5	2.5	5.20E+01	0.0454	2.5	35	--	Bkg. + Modeled Concentration < AAQS
California 8-Hr	SCAQMD; 17	1.5	1.4	1.6	1.6	3.03E+01	0.0265	1.6	9	--	Bkg. + Modeled Concentration < AAQS
Federal 8-Hr	SCAQMD; 17	1.5	1.4	1.6	1.6	3.03E+01	0.0265	1.6	9	--	Bkg. + Modeled Concentration < AAQS
PM10; Concentration Units = ug/m3											

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Appendix E Air Quality Impact Analysis

24-Hr	SCAQMD; 17	115	90	146	146	9.13E-01	0.913	--	--	2.5	Modeled Concentration < CEQA Significant Change Threshold
Annual	SCAQMD; 17	22.9	22.3	24	24	7.06E-02	0.071	--	--	1	Modeled Concentration < CEQA Significant Change Threshold
PM2.5; Concentration Units = ug/m3											
24-Hr	SCAQMD; 17	36.70	22.10	22.00	26.93	9.13E-01	0.913	--	--	2.5	Modeled Concentration < CEQA Significant Change Threshold

C (ppb) = C (ug/m3) x 24.45 / MW
C (ppm) = C (ug/m3) x 0.02445 / MW

MW NO2	46
MW SO2	64
MW CO	28

'SCAQMD' data from the District's historical Air Quality Data Tables.
http://www.aqmd.gov/home/air-quality/historical-air-quality-data/historical-data-by-year
'EPA' data from EPA's Monitor Values Report.
https://www.epa.gov/outdoor-air-quality-data/monitor-values-report

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Appendix E Air Quality Impact Analysis

Table E.5 AQIA Results

Pollutant	Averaging Time	Federal or State Standard	Modeled Concentration (Concentration Units)	Background Concentration (Concentration Units)	Modeled + Background Concentration (Concentration Units)	CEQA Threshold (Concentration Units)	Significance
NO_2 (Concentration Units = ppb)	1-Hour[F]	California[1]	16.591	67.1	83.7	180	No
	Annual[E]	Federal	0.184	12.4	12.6	53	No
		California	0.184	12.4	12.6	30	No
CO (Concentration Units = ppm)	1-Hour[F]	Federal	0.045	2.5	2.5	35	No
		California	0.045	2.5	2.5	20	No
	8-Hour[F]	Federal	0.026	1.6	1.6	9	No
		California	0.026	1.6	1.6	9	No
SO_2 (Concentration Units = ppb)	1-Hour[E]	Federal	30.371	2	32.4	75	No
		California	40.887	7.7	48.6	250	No
	24-Hour[E]	California	5.157	2.3	7.5	40	No
PM_{10} (Concentration Units = µg/m3)	24-Hour[F]	SCAQMD CEQA Significant Change Threshold	0.913	–	–	2.5	No
	Annual[E]		0.071	–	–	1	
$PM_{2.5}$ (Concentration Units = µg/m3)	24-Hour[F]		0.913	–	–	2.5	

1. The modeled concentration presented is the model predicted maximum hourly value using full NO_2 conversion.

ELEVATED TERRAIN AERMOD RUN

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Concentration - Source Group: CO1

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	50.15632	ug/m^3	433997.53	3731155.50	304.82	0.00	541.06	3/18/2021, 5
8-HR	1ST	23.47395	ug/m^3	434198.03	3731003.57	238.42	0.00	541.06	12/30/2021, 8
24-HR	1ST	11.50703	ug/m^3	434198.03	3731003.57	238.42	0.00	541.06	12/30/2021, 24
1-HR	4TH	37.79519	ug/m^3	434275.31	3731022.10	228.16	0.00	541.06	12/8/2019, 20
1-HR	8TH	37.43145	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	5/6/2020, 21
ANNUAL		1.79817	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y1		1.84644	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y2		1.81827	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y3		1.82922	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y4		1.74200	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y5		1.75490	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	

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Concentration - Source Group: CO8

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	50.15632	ug/m^3	433997.53	3731155.50	304.82	0.00	541.06	3/18/2021, 5
8-HR	1ST	23.47395	ug/m^3	434198.03	3731003.57	238.42	0.00	541.06	12/30/2021, 8
24-HR	1ST	11.50703	ug/m^3	434198.03	3731003.57	238.42	0.00	541.06	12/30/2021, 24
1-HR	4TH	37.79519	ug/m^3	434275.31	3731022.10	228.16	0.00	541.06	12/8/2019, 20
1-HR	8TH	37.43145	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	5/6/2020, 21
ANNUAL		1.79817	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y1		1.84644	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y2		1.81827	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y3		1.82922	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y4		1.74200	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y5		1.75490	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	

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Concentration - Source Group: NO21

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	23.41134	ug/m^3	434275.31	3731022.10	228.16	0.00	541.06	7/16/2019, 2
8-HR	1ST	14.08170	ug/m^3	434198.03	3731003.57	238.42	0.00	541.06	12/30/2021, 8
24-HR	1ST	6.89192	ug/m^3	434198.03	3731003.57	238.42	0.00	541.06	12/30/2021, 24
1-HR	4TH	22.67280	ug/m^3	434275.31	3731022.10	228.16	0.00	541.06	12/8/2019, 20
1-HR	8TH	22.45453	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	5/6/2020, 21
ANNUAL		1.05579	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y1		1.08662	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y2		1.06514	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y3		1.07876	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y4		1.02296	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y5		1.02549	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	

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Concentration - Source Group: NO2ANN

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	21.81451	ug/m^3	433997.53	3731155.50	304.82	0.00	541.06	3/18/2021, 5
8-HR	1ST	6.65447	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	12/31/2018, 8
24-HR	1ST	2.75005	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	1/6/2019, 24
1-HR	4TH	16.20320	ug/m^3	433947.53	3731155.50	302.91	0.00	541.06	3/18/2021, 5
1-HR	8TH	14.48830	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	2/3/2019, 24
ANNUAL		0.31931	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y1		0.28338	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y2		0.32152	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y3		0.34613	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y4		0.34610	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y5		0.30966	ug/m^3	433947.53	3731055.50	310.64	0.00	541.06	

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Concentration - Source Group: PM24

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	4.46776	ug/m^3	433997.53	3731155.50	304.82	0.00	541.06	3/18/2021, 5
8-HR	1ST	1.39414	ug/m^3	434198.03	3731003.57	238.42	0.00	541.06	12/30/2021, 8
24-HR	1ST	0.69062	ug/m^3	434234.47	3731049.24	233.99	0.00	541.06	5/11/2018, 24
1-HR	4TH	3.30429	ug/m^3	433947.53	3731155.50	302.91	0.00	541.06	3/18/2021, 5
1-HR	8TH	2.96178	ug/m^3	433997.53	3731155.50	304.82	0.00	541.06	9/23/2020, 5
ANNUAL		0.11102	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y1		0.11354	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y2		0.11271	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y3		0.11206	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y4		0.10752	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	
ANNUAL Y5		0.10925	ug/m^3	434276.19	3731014.11	227.29	0.00	541.06	

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Concentration - Source Group: PMANN

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	4.44838	ug/m^3	433997.53	3731155.50	304.82	0.00	541.06	3/18/2021, 5
8-HR	1ST	1.35711	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	12/31/2018, 8
24-HR	1ST	0.56092	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	1/6/2019, 24
1-HR	4TH	3.30425	ug/m^3	433947.53	3731155.50	302.91	0.00	541.06	3/18/2021, 5
1-HR	8TH	2.95506	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	2/3/2019, 24
ANNUAL		0.06510	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y1		0.05777	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y2		0.06555	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y3		0.07057	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y4		0.07057	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y5		0.06313	ug/m^3	433947.53	3731055.50	310.64	0.00	541.06	

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Concentration - Source Group: SO21

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	107.02469	ug/m^3	433997.53	3731155.50	304.82	0.00	541.06	3/18/2021, 5
8-HR	1ST	32.65405	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	12/31/2018, 8
24-HR	1ST	13.49799	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	1/6/2019, 24
1-HR	4TH	79.49999	ug/m^3	433947.53	3731155.50	302.91	0.00	541.06	3/18/2021, 5
1-HR	8TH	71.10990	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	2/3/2019, 24
ANNUAL		1.56608	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y1		1.38974	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y2		1.57678	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y3		1.69780	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y4		1.69753	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y5		1.51862	ug/m^3	433947.53	3731055.50	310.64	0.00	541.06	

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Concentration - Source Group: SO224

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	107.02469	ug/m^3	433997.53	3731155.50	304.82	0.00	541.06	3/18/2021, 5
8-HR	1ST	32.65405	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	12/31/2018, 8
24-HR	1ST	13.49799	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	1/6/2019, 24
1-HR	4TH	79.49999	ug/m^3	433947.53	3731155.50	302.91	0.00	541.06	3/18/2021, 5
1-HR	8TH	71.10990	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	2/3/2019, 24
ANNUAL		1.56608	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y1		1.38974	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y2		1.57678	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y3		1.69780	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y4		1.69753	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y5		1.51862	ug/m^3	433947.53	3731055.50	310.64	0.00	541.06	

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Concentration - Source Group: SO2ANN

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	75.61649	ug/m^3	433997.53	3731155.50	304.82	0.00	541.06	3/18/2021, 5
8-HR	1ST	23.07140	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	12/31/2018, 8
24-HR	1ST	9.53685	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	1/6/2019, 24
1-HR	4TH	56.16998	ug/m^3	433947.53	3731155.50	302.91	0.00	541.06	3/18/2021, 5
1-HR	8TH	50.24203	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	2/3/2019, 24
ANNUAL		1.10647	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y1		0.98187	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y2		1.11402	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y3		1.19953	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y4		1.19934	ug/m^3	433947.53	3731005.50	309.63	0.00	541.06	
ANNUAL Y5		1.07293	ug/m^3	433947.53	3731055.50	310.64	0.00	541.06	

FLAT TERRAIN AERMOD RUN

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Concentration - Source Group: CO1

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	52.03446	ug/m^3	434275.31	3731022.10	168.00	0.00	168.00	7/16/2019, 2
8-HR	1ST	30.31783	ug/m^3	434198.03	3731003.57	168.00	0.00	168.00	12/30/2021, 8
24-HR	1ST	15.08990	ug/m^3	434234.47	3731049.24	168.00	0.00	168.00	5/11/2018, 24
1-HR	4TH	50.39293	ug/m^3	434275.31	3731022.10	168.00	0.00	168.00	12/8/2019, 20
1-HR	8TH	49.90842	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	5/6/2020, 21
ANNUAL		2.38572	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y1		2.45197	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y2		2.40951	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y3		2.43031	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y4		2.30982	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y5		2.32700	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	

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Concentration - Source Group: CO8

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	52.03446	ug/m^3	434275.31	3731022.10	168.00	0.00	168.00	7/16/2019, 2
8-HR	1ST	30.31783	ug/m^3	434198.03	3731003.57	168.00	0.00	168.00	12/30/2021, 8
24-HR	1ST	15.08990	ug/m^3	434234.47	3731049.24	168.00	0.00	168.00	5/11/2018, 24
1-HR	4TH	50.39293	ug/m^3	434275.31	3731022.10	168.00	0.00	168.00	12/8/2019, 20
1-HR	8TH	49.90842	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	5/6/2020, 21
ANNUAL		2.38572	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y1		2.45197	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y2		2.40951	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y3		2.43031	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y4		2.30982	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y5		2.32700	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	

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Concentration - Source Group: NO21

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	31.21475	ug/m^3	434275.31	3731022.10	168.00	0.00	168.00	7/16/2019, 2
8-HR	1ST	18.18725	ug/m^3	434198.03	3731003.57	168.00	0.00	168.00	12/30/2021, 8
24-HR	1ST	8.96233	ug/m^3	434234.47	3731049.24	168.00	0.00	168.00	5/11/2018, 24
1-HR	4TH	30.23001	ug/m^3	434275.31	3731022.10	168.00	0.00	168.00	12/8/2019, 20
1-HR	8TH	29.93927	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	5/6/2020, 21
ANNUAL		1.40204	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y1		1.44403	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y2		1.41302	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y3		1.43420	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y4		1.35777	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y5		1.36119	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	

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Concentration - Source Group: NO2ANN

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	2.96562	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	10/15/2018, 7
8-HR	1ST	1.30024	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	10/15/2018, 8
24-HR	1ST	0.83944	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	10/15/2018, 24
1-HR	4TH	2.44431	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	2/3/2020, 24
1-HR	8TH	2.18542	ug/m^3	434097.53	3730705.50	168.00	0.00	168.00	2/11/2020, 7
ANNUAL		0.10891	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y1		0.10393	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y2		0.11792	ug/m^3	434280.14	3731005.18	168.00	0.00	168.00	
ANNUAL Y3		0.10243	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y4		0.10458	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y5		0.12284	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	

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Concentration - Source Group: PM24

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	3.09038	ug/m^3	434275.31	3731022.10	168.00	0.00	168.00	7/16/2019, 2
8-HR	1ST	1.80061	ug/m^3	434198.03	3731003.57	168.00	0.00	168.00	12/30/2021, 8
24-HR	1ST	0.91278	ug/m^3	434234.47	3731049.24	168.00	0.00	168.00	5/11/2018, 24
1-HR	4TH	2.99289	ug/m^3	434275.31	3731022.10	168.00	0.00	168.00	12/8/2019, 20
1-HR	8TH	2.96413	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	5/6/2020, 21
ANNUAL		0.14706	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y1		0.15058	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y2		0.14908	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y3		0.14871	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y4		0.14232	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	
ANNUAL Y5		0.14461	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	

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Concentration - Source Group: PMANN

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	0.60387	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	10/15/2018, 7
8-HR	1ST	0.26475	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	10/15/2018, 8
24-HR	1ST	0.17013	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	10/15/2018, 24
1-HR	4TH	0.49779	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	2/3/2020, 24
1-HR	8TH	0.44473	ug/m^3	434097.53	3730705.50	168.00	0.00	168.00	2/11/2020, 7
ANNUAL		0.01993	ug/m^3	434347.53	3731055.50	168.00	0.00	168.00	
ANNUAL Y1		0.02048	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y2		0.02164	ug/m^3	434297.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y3		0.02044	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y4		0.01914	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y5		0.02201	ug/m^3	434276.19	3731014.11	168.00	0.00	168.00	

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Concentration - Source Group: SO21

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	14.51039	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	10/15/2018, 7
8-HR	1ST	6.36144	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	10/15/2018, 8
24-HR	1ST	4.07193	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	10/15/2018, 24
1-HR	4TH	11.96336	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	2/3/2020, 24
1-HR	8TH	10.68148	ug/m^3	434097.53	3730705.50	168.00	0.00	168.00	2/11/2020, 7
ANNUAL		0.47005	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y1		0.48463	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y2		0.50898	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y3		0.48256	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y4		0.45172	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y5		0.48692	ug/m^3	434297.53	3731005.50	168.00	0.00	168.00	

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Concentration - Source Group: SO224

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	14.51039	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	10/15/2018, 7
8-HR	1ST	6.36144	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	10/15/2018, 8
24-HR	1ST	4.07193	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	10/15/2018, 24
1-HR	4TH	11.96336	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	2/3/2020, 24
1-HR	8TH	10.68148	ug/m^3	434097.53	3730705.50	168.00	0.00	168.00	2/11/2020, 7
ANNUAL		0.47005	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y1		0.48463	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y2		0.50898	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y3		0.48256	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y4		0.45172	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y5		0.48692	ug/m^3	434297.53	3731005.50	168.00	0.00	168.00	

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Concentration - Source Group: SO2ANN

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start
1-HR	1ST	10.25114	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	10/15/2018, 7
8-HR	1ST	4.49406	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	10/15/2018, 8
24-HR	1ST	2.87527	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	10/15/2018, 24
1-HR	4TH	8.45115	ug/m^3	434147.53	3730755.50	168.00	0.00	168.00	2/3/2020, 24
1-HR	8TH	7.54519	ug/m^3	434097.53	3730705.50	168.00	0.00	168.00	2/11/2020, 7
ANNUAL		0.33142	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y1		0.34174	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y2		0.35897	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y3		0.34019	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y4		0.31842	ug/m^3	434347.53	3731005.50	168.00	0.00	168.00	
ANNUAL Y5		0.34199	ug/m^3	434297.53	3731005.50	168.00	0.00	168.00	

APPENDIX F – OPERATIONAL HRA MODELING RESULTS

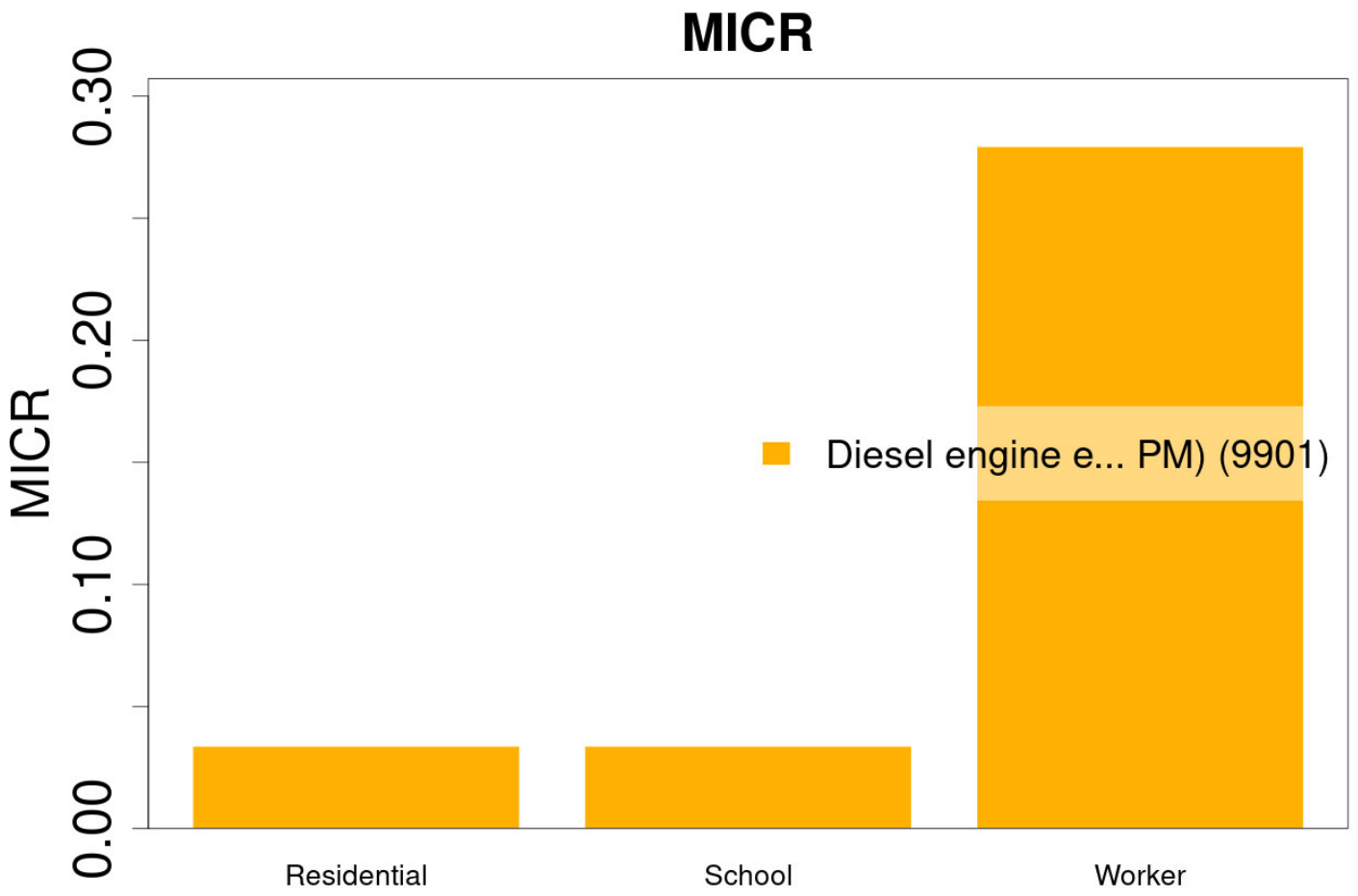
Appendix F-1
Mobile Sources
Rule 1401 HRA Tier 2 Calculator Output
Appendix F-2
Stationary Sources
HARP2 Output - Cancer Risk
HARP2 Output - Chronic Risk
HARP2 Output - Acute Risk

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Description	Value
Date & time f	2025-05-27 12:30:14
Facility Name	Facility
Deemed com	2025-05-27
Facility type s	General Non-Combustion Volume Source Equipment
Equipment ch	Building Area ≤ 3,000 ft2 & height ≤ 20 ft
Project durati	30 yrs (25 yrs for workers)
Hours of oper	24
Days of opera	7
Residential re	1000
School recept	1000
Worker recep	66.72
Meteorologic	MSVJ

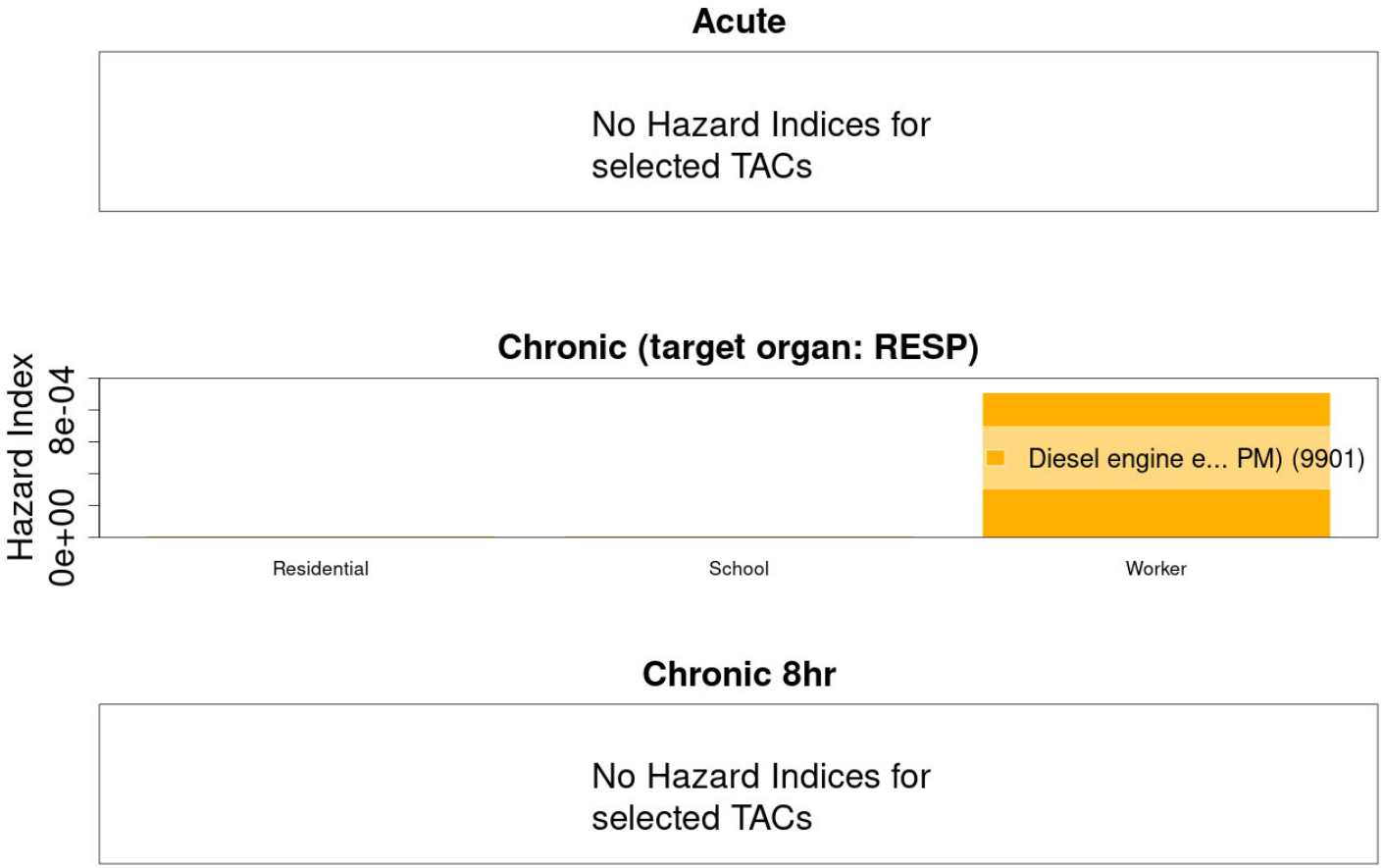
Toxic Air Cont	Max hourly EI	Max annual ER, lb/yr
Diesel engine	0.00020833	1.9

Receptor	Annual mean	MICR from Di	MICR, per mil	HQ|Chronic	HQ|Chronic 8	Max hourly cc	HQ|Acute
Residential	4.5211E-05	0.03368815	0.03368815	9.0421E-06		0.00219	
School	4.5211E-05	0.03368815	0.03368815	9.0421E-06		0.00219	
Worker	0.00454574	0.27931769	0.27931769	0.00090915		0.0803	



Receptor	MICR, per million	HQ|Chronic	HQ|Chronic 8hr	HQ|Acute
Residential	3.37E-02	9.04E-06		
School	3.37E-02	9.04E-06		
Worker	2.79E-01	9.09E-04		

Toxic Air Cont	Contribution_	maxImpacted Receptor	Type	Acute REL ug/	Chronic REL u	Chronic 8hr REL ug/m3
Diesel engine	9.0421E-06	RESP	HI Residential|Chronic		5	
Diesel engine	9.0421E-06	RESP	HI School|Chronic		5	
Diesel engine	0.00090915	RESP	HI Worker|Chronic		5	



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Maximum Cancer Risk by Pollutant at PMI, MEIR, and MEIW
FRB Landfill RNG Facility - Operations - Elevated Terrain AERMOD Run

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3162	receptor #	3136	receptor #	6
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,276	3,731,014	433,238	3,730,039	434,246	3,731,163
		30-Year Cancer Risk	Contribution (%)	30-Year Cancer Risk	Contribution (%)	25-Year Cancer Risk	Contribution (%)
-	ALL	1.51E-07	100%	6.97E-09	100%	2.54E-09	100%
50000	Formaldehyde	5.33E-08	35.26%	2.19E-09	31.40%	6.72E-10	26.43%
106990	1,3-Butadiene	4.90E-08	32.43%	2.00E-09	28.75%	6.03E-10	23.69%
71432	Benzene	2.66E-08	17.62%	1.33E-09	19.12%	8.01E-10	31.51%
1151	PAH	1.27E-08	8.42%	9.74E-10	13.98%	1.88E-10	7.41%
75070	Acetaldehyde	3.47E-09	2.30%	1.43E-10	2.05%	4.46E-11	1.75%
75014	Vinyl Chloride	1.29E-09	0.86%	8.86E-11	1.27%	8.57E-11	3.37%
91203	Naphthalene	1.47E-09	0.97%	6.12E-11	0.88%	2.03E-11	0.80%
107062	1,2-Dichloroethane	6.99E-10	0.46%	4.88E-11	0.70%	4.82E-11	1.89%
127184	Tetrachloroethene	5.39E-10	0.36%	4.03E-11	0.58%	4.23E-11	1.66%
106934	Ethylene Dibromide	6.55E-10	0.43%	2.68E-11	0.38%	8.06E-12	0.32%
79345	1,1,2,2-Tetrachloroethane	6.23E-10	0.41%	2.55E-11	0.37%	7.67E-12	0.30%
56235	Carbon Tetrachloride	3.28E-10	0.22%	1.34E-11	0.19%	4.03E-12	0.16%
75092	Methylene Chloride	1.00E-10	0.07%	6.89E-12	0.10%	6.69E-12	0.26%

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3162	receptor #	3136	receptor #	6
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,276	3,731,014	433,238	3,730,039	434,246	3,731,163
		30-Year Cancer Risk	Contribution (%)	30-Year Cancer Risk	Contribution (%)	25-Year Cancer Risk	Contribution (%)
100414	Ethyl Benzene	9.18E-11	0.06%	6.69E-12	0.10%	5.51E-12	0.22%
79005	1,1,2-Trichloroethane	1.07E-10	0.07%	4.39E-12	0.06%	1.32E-12	0.05%
79016	Trichloroethylene	4.40E-11	0.03%	3.28E-12	0.05%	3.44E-12	0.14%
67663	Chloroform	3.63E-11	0.02%	1.63E-12	0.02%	7.24E-13	0.03%
75343	1,1-Dichloroethane	3.97E-12	0.00%	2.97E-13	0.00%	3.11E-13	0.01%
75354	1,1-Dichloroethene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
71556	1,1,1-Trichloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
107028	Acrolein	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7664417	Ammonia	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
205992	Benzo(b)fluoranthene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108907	Chlorobenzene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
218019	Chrysene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
110543	Hexane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
67561	Methanol	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
100425	Styrene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108883	Toluene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
1330207	Xylenes	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%

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Cancer Risk by Source for All Pollutants Combined at PMI, MEIR, and MEIW
FRB Landfill RNG Facility - Operations - Elevated Terrain AERMOD Run

Sources	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
	receptor #	3162	receptor #	3136	receptor #	6
	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
	434,276	3,731,014	433,238	3,730,039	434,246	3,731,163
	30-Year Cancer Risk	Contribution (%)	30-Year Cancer Risk	Contribution (%)	25-Year Cancer Risk	Contribution (%)
ALL	1.51E-07	100%	6.97E-09	100%	2.54E-09	100%
TOU	2.22E-08	14.69%	1.66E-09	23.80%	9.54E-10	37.49%
FLARE	4.08E-10	0.27%	5.76E-11	0.83%	9.80E-12	0.39%
ICE	1.28E-07	85.04%	5.25E-09	75.38%	1.58E-09	62.12%

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Maximum Chronic Hazard Index by Pollutant at PMI, MEIR, MEIW and Sensitive Receptor
FRB Landfill RNG Facility - Operations - Elevated Terrain AERMOD Run

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3162	receptor #	3136	receptor #	6	receptor #	6
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,276	3,731,014	433,238	3,730,039	434,246	3,731,163	434,246	3,731,163
		Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic 8-hr Hazard Index	Contribution (%)
-	ALL	2.29E-03	100%	9.53E-05	100%	2.97E-04	100%	1.69E-04	100%
107028	Acrolein	1.73E-03	75.50%	7.13E-05	74.79%	2.12E-04	71.34%	1.06E-04	62.54%
50000	Formaldehyde	5.24E-04	22.83%	2.15E-05	22.58%	6.32E-05	21.28%	6.32E-05	37.30%
71432	Benzene	1.65E-04	7.19%	8.25E-06	8.66%	4.75E-05	15.98%	4.75E-05	28.02%
106990	1,3-Butadiene	7.59E-05	3.31%	3.10E-06	3.26%	8.93E-06	3.00%	1.98E-06	1.17%
7664417	Ammonia	3.05E-05	1.33%	2.15E-06	2.26%	2.06E-05	6.92%	0.00E+00	0.00%
106934	Ethylene Dibromide	6.09E-06	0.27%	2.49E-07	0.26%	7.16E-07	0.24%	0.00E+00	0.00%
75070	Acetaldehyde	4.61E-06	0.20%	1.90E-07	0.20%	5.66E-07	0.19%	2.64E-07	0.16%
91203	Naphthalene	2.53E-06	0.11%	1.05E-07	0.11%	3.34E-07	0.11%	0.00E+00	0.00%
108883	Toluene	1.63E-06	0.07%	1.11E-07	0.12%	1.03E-06	0.35%	5.19E-07	0.31%
127184	Tetrachloroethene	1.36E-06	0.06%	1.02E-07	0.11%	1.02E-06	0.34%	0.00E+00	0.00%
1330207	Xylenes	6.80E-07	0.03%	4.86E-08	0.05%	4.69E-07	0.16%	0.00E+00	0.00%
108907	Chlorobenzene	3.89E-07	0.02%	2.91E-08	0.03%	2.92E-07	0.10%	0.00E+00	0.00%
75092	Methylene Chloride	1.33E-07	0.01%	9.15E-09	0.01%	8.49E-08	0.03%	0.00E+00	0.00%
67561	Methanol	1.75E-07	0.01%	7.16E-09	0.01%	2.06E-08	0.01%	0.00E+00	0.00%

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Maximum Chronic Hazard Index by Pollutant at PMI, MEIR, MEIW and Sensitive Receptor
FRB Landfill RNG Facility - Operations - Elevated Terrain AERMOD Run

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3162	receptor #	3136	receptor #	6	receptor #	6
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,276	3,731,014	433,238	3,730,039	434,246	3,731,163	434,246	3,731,163
		Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic 8-hr Hazard Index	Contribution (%)
56235	Carbon Tetrachloride	1.02E-07	0.00%	4.15E-09	0.00%	1.20E-08	0.00%	0.00E+00	0.00%
107062	1,2-Dichloroethane	4.51E-08	0.00%	3.15E-09	0.00%	2.97E-08	0.01%	0.00E+00	0.00%
75354	1,1-Dichloroethene	2.04E-08	0.00%	1.52E-09	0.00%	1.53E-08	0.01%	0.00E+00	0.00%
79016	Trichloroethylene	1.95E-08	0.00%	1.45E-09	0.00%	1.46E-08	0.00%	0.00E+00	0.00%
100414	Ethyl Benzene	9.81E-09	0.00%	7.15E-10	0.00%	5.63E-09	0.00%	0.00E+00	0.00%
67663	Chloroform	1.18E-08	0.00%	5.30E-10	0.00%	2.26E-09	0.00%	0.00E+00	0.00%
100425	Styrene	3.02E-09	0.00%	1.23E-10	0.00%	3.55E-10	0.00%	0.00E+00	0.00%
110543	Hexane	1.11E-09	0.00%	8.34E-11	0.00%	8.32E-10	0.00%	0.00E+00	0.00%
71556	1,1,1-Trichloroethane	9.68E-10	0.00%	7.23E-11	0.00%	7.25E-10	0.00%	0.00E+00	0.00%
75343	1,1-Dichloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
79005	1,1,2-Trichloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
79345	1,1,2,2-Tetrachloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
205992	Benzo(b)fluoranthene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
218019	Chrysene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
1151	PAH	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
75014	Vinyl Chloride	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%

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Chronic Hazard Index by Source for All Pollutants Combined at PMI, MEIR, MEIW and Sensitive Receptor
FRB Landfill RNG Facility - Operations - Elevated Terrain AERMOD Run

Sources	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)		Maximally Exposed Individual Worker (MEIW)	
	receptor #	3162	receptor #	3136	receptor #	6	receptor #	6
	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
	434,276	3,731,014	433,238	3,730,039	434,246	3,731,163	434,246	3,731,163
	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic 8-hr Hazard Index	Contribution (%)
ALL	2.29E-03	100%	9.53E-05	100%	2.97E-04	100%	1.69E-04	100%
ICE	2.25E-03	98.12%	9.20E-05	96.60%	2.65E-04	89.13%	1.63E-04	96.00%
TOU	4.44E-05	1.93%	3.31E-06	3.48%	3.32E-05	11.19%	3.32E-05	19.62%
FLARE	2.61E-07	0.01%	3.69E-08	0.04%	2.11E-07	0.07%	1.90E-07	0.11%

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Maximum Acute Hazard Index by Pollutant at PMI, MEIR, and MEIW
FRB Landfill RNG Facility - Operations - Elevated Terrain AERMOD Run

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3208	receptor #	3141	receptor #	3132
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,275	3,731,022	433,275	3,729,974	434,185	3,731,019
		Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)
-	ALL	3.38E-01	100%	1.24E-02	100%	2.97E-01	100%
107028	Acrolein	2.48E-01	73.46%	9.06E-03	73.39%	2.18E-01	73.46%
50000	Formaldehyde	8.80E-02	26.04%	3.21E-03	26.00%	7.72E-02	26.04%
75070	Acetaldehyde	1.40E-03	0.42%	5.13E-05	0.42%	1.23E-03	0.42%
7664417	Ammonia	2.62E-04	0.08%	2.23E-05	0.18%	2.27E-04	0.08%
108883	Toluene	2.84E-05	0.01%	1.88E-06	0.02%	2.47E-05	0.01%
1330207	Xylenes	2.45E-06	0.00%	2.38E-07	0.00%	2.11E-06	0.00%
127184	Tetrachloroethene	4.38E-08	0.00%	1.97E-08	0.00%	3.34E-08	0.00%
100425	Styrene	1.33E-07	0.00%	4.86E-09	0.00%	1.17E-07	0.00%
75014	Vinyl Chloride	1.02E-08	0.00%	6.76E-10	0.00%	8.83E-09	0.00%
106990	1,3-Butadiene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
75354	1,1-Dichloroethene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
75343	1,1-Dichloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
107062	1,2-Dichloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
71556	1,1,1-Trichloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
79005	1,1,2-Trichloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3208	receptor #	3141	receptor #	3132
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,275	3,731,022	433,275	3,729,974	434,185	3,731,019
		Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)
79345	1,1,2,2-Tetrachloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
71432	Benzene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
205992	Benzo(b)fluoranthene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
56235	Carbon Tetrachloride	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108907	Chlorobenzene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
67663	Chloroform	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
218019	Chrysene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
100414	Ethyl Benzene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
106934	Ethylene Dibromide	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
110543	Hexane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
75092	Methylene Chloride	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
67561	Methanol	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
91203	Naphthalene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
1151	PAH	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
79016	Trichloroethylene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%

Target Organ(s)	Target Organ(s)	Target Organ(s)
EYE	EYE	EYE

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Acute Hazard Index by Source for All Pollutants Combined at PMI, MEIR, and MEIW
FRB Landfill RNG Facility - Operations - Elevated Terrain AERMOD Run

Sources	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
	receptor #	3208	receptor #	3141	receptor #	3132
	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
	434,275	3,731,022	433,275	3,729,974	434,185	3,731,019
	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)
ALL	3.38E-01	100%	1.24E-02	100%	2.97E-01	100%
ICE	3.38E-01	99.98%	1.23E-02	99.72%	2.97E-01	99.98%
TOU	7.35E-05	0.02%	3.31E-05	0.27%	5.61E-05	0.02%
FLARE	7.97E-07	0.00%	7.39E-07	0.01%	6.18E-07	0.00%

Target Organ(s)	Target Organ(s)	Target Organ(s)
EYE	EYE	EYE

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Maximum Cancer Risk by Pollutant at PMI, MEIR, and MEIW
FRB Landfill RNG Facility - Operations - Flat Terrain AERMOD Run

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3162	receptor #	3136	receptor #	6
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,276	3,731,014	433,238	3,730,039	434,246	3,731,163
		30-Year Cancer Risk	Contribution (%)	30-Year Cancer Risk	Contribution (%)	25-Year Cancer Risk	Contribution (%)
-	ALL	2.00E-07	100%	9.02E-09	100%	2.65E-09	100%
50000	Formaldehyde	7.09E-08	35.49%	2.91E-09	32.23%	7.12E-10	26.83%
106990	1,3-Butadiene	6.52E-08	32.65%	2.66E-09	29.53%	6.39E-10	24.09%
71432	Benzene	3.50E-08	17.53%	1.69E-09	18.79%	8.25E-10	31.07%
1151	PAH	1.62E-08	8.09%	1.15E-09	12.80%	1.91E-10	7.21%
75070	Acetaldehyde	4.62E-09	2.31%	1.90E-10	2.10%	4.72E-11	1.78%
75014	Vinyl Chloride	1.66E-09	0.83%	1.07E-10	1.18%	8.71E-11	3.28%
91203	Naphthalene	1.95E-09	0.98%	8.11E-11	0.90%	2.14E-11	0.81%
107062	1,2-Dichloroethane	8.94E-10	0.45%	5.85E-11	0.65%	4.89E-11	1.84%
127184	Tetrachloroethene	6.86E-10	0.34%	4.78E-11	0.53%	4.29E-11	1.62%
106934	Ethylene Dibromide	8.72E-10	0.44%	3.56E-11	0.40%	8.55E-12	0.32%
79345	1,1,2,2-Tetrachloroethane	8.30E-10	0.42%	3.39E-11	0.38%	8.13E-12	0.31%
56235	Carbon Tetrachloride	4.37E-10	0.22%	1.78E-11	0.20%	4.28E-12	0.16%
75092	Methylene Chloride	1.29E-10	0.06%	8.28E-12	0.09%	6.80E-12	0.26%

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3162	receptor #	3136	receptor #	6
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,276	3,731,014	433,238	3,730,039	434,246	3,731,163
		30-Year Cancer Risk	Contribution (%)	30-Year Cancer Risk	Contribution (%)	25-Year Cancer Risk	Contribution (%)
100414	Ethyl Benzene	1.18E-10	0.06%	8.07E-12	0.09%	5.61E-12	0.21%
79005	1,1,2-Trichloroethane	1.43E-10	0.07%	5.84E-12	0.06%	1.40E-12	0.05%
79016	Trichloroethylene	5.59E-11	0.03%	3.90E-12	0.04%	3.50E-12	0.13%
67663	Chloroform	4.81E-11	0.02%	2.12E-12	0.02%	7.53E-13	0.03%
75343	1,1-Dichloroethane	5.05E-12	0.00%	3.52E-13	0.00%	3.16E-13	0.01%
75354	1,1-Dichloroethene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
71556	1,1,1-Trichloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
107028	Acrolein	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
7664417	Ammonia	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
205992	Benzo(b)fluoranthene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108907	Chlorobenzene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
218019	Chrysene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
110543	Hexane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
67561	Methanol	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
100425	Styrene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108883	Toluene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
1330207	Xylenes	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%

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Cancer Risk by Source for All Pollutants Combined at PMI, MEIR, and MEIW
FRB Landfill RNG Facility - Operations - Flat Terrain AERMOD Run

Sources	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
	receptor #	3162	receptor #	3136	receptor #	6
	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
	434,276	3,731,014	433,238	3,730,039	434,246	3,731,163
	30-Year Cancer Risk	Contribution (%)	30-Year Cancer Risk	Contribution (%)	25-Year Cancer Risk	Contribution (%)
ALL	2.00E-07	100%	9.02E-09	100%	2.65E-09	100%
TOU	2.82E-08	14.12%	1.97E-09	21.82%	9.68E-10	36.47%
ICE	1.71E-07	85.61%	6.98E-09	77.44%	1.68E-09	63.15%
FLARE	5.16E-10	0.26%	6.74E-11	0.75%	9.96E-12	0.38%

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Maximum Chronic Hazard Index by Pollutant at PMI, MEIR, MEIW and Sensitive Receptor
FRB Landfill RNG Facility - Operations - Flat Terrain AERMOD Run

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3162	receptor #	3136	receptor #	6	receptor #	6
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,276	3,731,014	433,238	3,730,039	434,246	3,731,163	434,246	3,731,163
		Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic 8-hr Hazard Index	Contribution (%)
-	ALL	3.05E-03	100%	1.26E-04	100%	3.14E-04	100%	1.79E-04	100%
107028	Acrolein	2.31E-03	75.53%	9.46E-05	74.96%	2.24E-04	71.54%	1.12E-04	62.52%
50000	Formaldehyde	6.97E-04	22.85%	2.86E-05	22.64%	6.70E-05	21.35%	6.70E-05	37.32%
71432	Benzene	2.17E-04	7.11%	1.05E-05	8.32%	4.89E-05	15.57%	4.89E-05	27.22%
106990	1,3-Butadiene	1.01E-04	3.31%	4.13E-06	3.27%	9.47E-06	3.02%	2.10E-06	1.17%
7664417	Ammonia	3.89E-05	1.28%	2.58E-06	2.04%	2.09E-05	6.66%	0.00E+00	0.00%
106934	Ethylene Dibromide	8.11E-06	0.27%	3.31E-07	0.26%	7.60E-07	0.24%	0.00E+00	0.00%
75070	Acetaldehyde	6.13E-06	0.20%	2.52E-07	0.20%	5.99E-07	0.19%	2.80E-07	0.16%
91203	Naphthalene	3.36E-06	0.11%	1.40E-07	0.11%	3.52E-07	0.11%	0.00E+00	0.00%
108883	Toluene	2.08E-06	0.07%	1.34E-07	0.11%	1.04E-06	0.33%	5.28E-07	0.29%
127184	Tetrachloroethene	1.73E-06	0.06%	1.21E-07	0.10%	1.04E-06	0.33%	0.00E+00	0.00%
1330207	Xylenes	8.68E-07	0.03%	5.81E-08	0.05%	4.76E-07	0.15%	0.00E+00	0.00%
108907	Chlorobenzene	4.95E-07	0.02%	3.45E-08	0.03%	2.96E-07	0.09%	0.00E+00	0.00%
67561	Methanol	2.33E-07	0.01%	9.52E-09	0.01%	2.19E-08	0.01%	0.00E+00	0.00%

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Maximum Chronic Hazard Index by Pollutant at PMI, MEIR, MEIW and Sensitive Receptor
FRB Landfill RNG Facility - Operations - Flat Terrain AERMOD Run

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3162	receptor #	3136	receptor #	6	receptor #	6
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,276	3,731,014	433,238	3,730,039	434,246	3,731,163	434,246	3,731,163
		Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic 8-hr Hazard Index	Contribution (%)
75092	Methylene Chloride	1.71E-07	0.01%	1.10E-08	0.01%	8.63E-08	0.03%	0.00E+00	0.00%
56235	Carbon Tetrachloride	1.35E-07	0.00%	5.52E-09	0.00%	1.27E-08	0.00%	0.00E+00	0.00%
107062	1,2-Dichloroethane	5.77E-08	0.00%	3.78E-09	0.00%	3.02E-08	0.01%	0.00E+00	0.00%
75354	1,1-Dichloroethene	2.59E-08	0.00%	1.81E-09	0.00%	1.55E-08	0.00%	0.00E+00	0.00%
79016	Trichloroethylene	2.47E-08	0.00%	1.72E-09	0.00%	1.48E-08	0.00%	0.00E+00	0.00%
100414	Ethyl Benzene	1.26E-08	0.00%	8.62E-10	0.00%	5.73E-09	0.00%	0.00E+00	0.00%
67663	Chloroform	1.57E-08	0.00%	6.91E-10	0.00%	2.35E-09	0.00%	0.00E+00	0.00%
100425	Styrene	4.02E-09	0.00%	1.64E-10	0.00%	3.77E-10	0.00%	0.00E+00	0.00%
110543	Hexane	1.41E-09	0.00%	9.89E-11	0.00%	8.45E-10	0.00%	0.00E+00	0.00%
71556	1,1,1-Trichloroethane	1.23E-09	0.00%	8.58E-11	0.00%	7.36E-10	0.00%	0.00E+00	0.00%
75343	1,1-Dichloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
79005	1,1,2-Trichloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
79345	1,1,2,2-Tetrachloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
205992	Benzo(b)fluoranthene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
218019	Chrysene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
1151	PAH	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
75014	Vinyl Chloride	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%

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Chronic Hazard Index by Source for All Pollutants Combined at PMI, MEIR, MEIW and Sensitive Receptor
FRB Landfill RNG Facility - Operations - Flat Terrain AERMOD Run

Sources	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)		Maximally Exposed Individual Worker (MEIW)	
	receptor #	3162	receptor #	3136	receptor #	6	receptor #	6
	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
	434,276	3,731,014	433,238	3,730,039	434,246	3,731,163	434,246	3,731,163
	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic 8-hr Hazard Index	Contribution (%)
ALL	3.05E-03	100%	1.26E-04	100%	3.14E-04	100%	1.79E-04	100%
ICE	3.00E-03	98.20%	1.22E-04	96.97%	2.81E-04	89.55%	1.73E-04	96.17%
TOU	5.64E-05	1.85%	3.93E-06	3.12%	3.37E-05	10.76%	3.37E-05	18.81%
FLARE	3.30E-07	0.01%	4.31E-08	0.03%	2.14E-07	0.07%	1.93E-07	0.11%

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Maximum Acute Hazard Index by Pollutant at PMI, MEIR, and MEIW
FRB Landfill RNG Facility - Operations - Flat Terrain AERMOD Run

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3208	receptor #	3141	receptor #	3132
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,275	3,731,022	433,275	3,729,974	434,185	3,731,019
		Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)
-	ALL	4.51E-01	100%	1.65E-02	100%	3.57E-01	100%
107028	Acrolein	3.31E-01	73.46%	1.21E-02	73.39%	2.63E-01	73.46%
50000	Formaldehyde	1.17E-01	26.04%	4.28E-03	26.00%	9.31E-02	26.04%
75070	Acetaldehyde	1.87E-03	0.42%	6.84E-05	0.42%	1.49E-03	0.42%
7664417	Ammonia	3.48E-04	0.08%	2.86E-05	0.17%	2.71E-04	0.08%
108883	Toluene	3.78E-05	0.01%	2.43E-06	0.01%	2.96E-05	0.01%
1330207	Xylenes	3.26E-06	0.00%	3.05E-07	0.00%	2.52E-06	0.00%
127184	Tetrachloroethene	5.65E-08	0.00%	2.47E-08	0.00%	3.73E-08	0.00%
100425	Styrene	1.78E-07	0.00%	6.48E-09	0.00%	1.41E-07	0.00%
75014	Vinyl Chloride	1.35E-08	0.00%	8.75E-10	0.00%	1.06E-08	0.00%
106990	1,3-Butadiene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
75354	1,1-Dichloroethene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
75343	1,1-Dichloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
107062	1,2-Dichloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
71556	1,1,1-Trichloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	3208	receptor #	3141	receptor #	3132
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		434,275	3,731,022	433,275	3,729,974	434,185	3,731,019
		Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)
79005	1,1,2-Trichloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
79345	1,1,2,2-Tetrachloroethane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
71432	Benzene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
205992	Benzo(b)fluoranthene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
56235	Carbon Tetrachloride	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
108907	Chlorobenzene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
67663	Chloroform	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
218019	Chrysene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
100414	Ethyl Benzene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
106934	Ethylene Dibromide	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
110543	Hexane	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
75092	Methylene Chloride	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
67561	Methanol	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
91203	Naphthalene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
1151	PAH	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
79016	Trichloroethylene	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%

Target Organ(s)	Target Organ(s)	Target Organ(s)
EYE	EYE	EYE

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Acute Hazard Index by Source for All Pollutants Combined at PMI, MEIR, and MEIW
FRB Landfill RNG Facility - Operations - Flat Terrain AERMOD Run

Sources	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Maximally Exposed Individual Worker (MEIW)	
	receptor #	3208	receptor #	3141	receptor #	3132
	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
	434,275	3,731,022	433,275	3,729,974	434,185	3,731,019
	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)	Acute Hazard Index	Contribution (%)
ALL	4.51E-01	100%	1.65E-02	100%	3.57E-01	100%
ICE	4.51E-01	99.98%	1.64E-02	99.74%	3.57E-01	99.98%
TOU	9.48E-05	0.02%	4.15E-05	0.25%	6.27E-05	0.02%
FLARE	1.04E-06	0.00%	9.39E-07	0.01%	6.82E-07	0.00%

Target Organ(s)	Target Organ(s)	Target Organ(s)
EYE	EYE	EYE

APPENDIX C: BIOLOGICAL RESOURCES STUDIES

APPENDIX C1: BIOLOGICAL SURVEY REPORT

BIOLOGICAL SURVEY REPORT

Bowerman Renewable Natural Gas Plant
Frank R. Bowerman Landfill
Orange County, CA

August 2023

Prepared by

TETRA TECH

5383 Hollister Ave, Suite 130
Santa Barbara, CA 93111

EXECUTIVE SUMMARY

On behalf of Bowerman Power LFG, LLC (Bowerman Power) (Bowerman Power, Project Proponent), Tetra Tech has prepared this Biological Survey Report for the proposed Renewable Natural Gas (RNG) Plant planned at the Frank R. Bowerman Landfill (Bowerman Landfill) in Orange County, California (Project). This Report describes the literature review, survey methodology, and results of the biological survey conducted for the Project. This Project is being conducted under a partnership agreement between Montauk and Orange County Waste & Recycling (OCWR) to process the landfill gas (LFG) produced by the Bowerman Landfill and deliver it to Southern California Gas Company (SoCal Gas).

A literature review and biological survey to assess special-status plant and wildlife species were conducted. Vegetation mapping and habitat assessments for potential special-status species were conducted. Rare plants were surveyed for during their blooming period when they were identifiable. One rare plant species, intermediate mariposa lily (*Calochortus weedii* var. *intermedius*), was found during the biological survey conducted in 2023. The survey area also provides suitable nesting habitat for tree-nesting, shrub-nesting, and/or ground-nesting birds, including the coastal California gnatcatcher (*Polioptila californica californica*). No nests were observed during the survey. Raptor nesting habitat is also present in the form of mature trees onsite. The survey area has the potential to support other special-status species such as western spadefoot (*Spea hammondii*), orange-throated whiptail (*Aspidoscelis hyperythra*), red-diamond rattlesnake (*Crotalus ruber*), and coast patch-nosed snake (*Salvadora hexalepis virgultea*).

This report provides recommendations for special-status species, including intermediate mariposa lily and raptors and nesting birds, and as required by the Central Coastal Subregional Natural Community Conservation Plan and Habitat Conservation Plan (NCCP/HCP).

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APPENDIX A: Photographs

Acronyms and Abbreviations

BIOS	Biogeographic and Information Observation System
Bowerman Landfill	Frank R. Bowerman Landfill
Bowerman Power	Bowerman Power LFG, LLC
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO_2	carbon dioxide
CRPR	California Rare Plant Rank
ECA	Essential Connectivity Area
GIS	Geographic Information System
GPS	Global Positioning System
H_2S	sulfur hydroxide
LFG	landfill gas
LFGTE	Landfill Gas to Energy
N_2	nitrogen
NCCP/HCP	Natural Community Conservation Plan and Habitat Conservation Plan
NLB	Natural Landscape Block
O_2	oxygen
OCWR	Orange County Waste & Recycling
RNG	renewable natural gas
ROW	right-of-way
SoCal Gas	Southern California Gas Company
SSC	Species of Special Concern
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WL	Watch List

1.0 INTRODUCTION

Tetra Tech has prepared this Biological Survey Report for the proposed Renewable Natural Gas (RNG) Plant planned at the Frank R. Bowerman Landfill (Bowerman Landfill) in Orange County, California (Project). This Project is being conducted under a partnership agreement between Montauk Renewables (Montauk) and Orange County Waste & Recycling (OCWR) to process the landfill gas (LFG) produced by the Bowerman Landfill and deliver it to Southern California Gas Company (SoCal Gas).

The purpose of this Biological Survey Report is to:

- Document the methods and results of the field survey,
- Summarize the existing biological resources and conditions within the Project site and vicinity,
- Assess potential presence of special-status wildlife and rare plants, and
- Recommend preliminary measures for avoiding, minimizing, or mitigating impacts to special-status species.

Rainfall in 2023 has been higher than normal. From July 1, 2022 through June 30, 2023, rainfall for the Irvine area was estimated to be about 163 percent of normal. This high rainfall resulted in suitable conditions to conduct the biological surveys (Golden Gate Weather Services 2023).

1.1 Project Location

The proposed Project is located at Bowerman Landfill in Orange County, California and consists of a proposed RNG Plant footprint (i.e., Project site) and proposed pipeline route (Figure 1). The Project site is generally bound by Bee Canyon Access Road to the north and northeast, the existing Landfill Gas to Energy (LFGTE) plant and flare station to the west, and open space and roads to the south (Figure 2). The proposed pipeline route connecting the proposed RNG Plant to the SoCal Gas interconnection goes north and west along Bee Canyon Access Road until the intersection of Jeffrey Road and Portola Parkway (Figure 1). The site is located within the U.S. Geological Survey (USGS) *El Toro* 7.5-Minute Topographic Quadrangle Map (Figure 3). Surrounding land uses consist of other areas of the Bowerman Landfill, open space, residential uses, and highways and roads.

The survey area for the biological survey is shown in the figures, which approximates the Project Lease Boundary. The Project site consists of the proposed RNG Plant footprint. A 50-foot buffer was also surveyed adjacent to the pipeline route.

1.2 Ecoregion

California can be divided into 11 Geomorphic Provinces. The proposed Project is located within the Peninsular Ranges Geomorphic Province, which is a series of ranges separated by northwest trending valleys, almost parallel to faults branching from the San Andreas Fault. The Peninsular Ranges extend into lower California and are bound on the east by the Colorado Desert Geomorphic Province. The Los Angeles Basin and the Southern Channel Islands (Santa Catalina, Santa Barbara, San Clemente, and San Nicolas islands), together with the surrounding continental shelf, are included in this province (California Department of Conservation, California Geological Survey 2002). In addition, the Project is located within the South Coast Subregion of the Southwestern California Region (Jepson Flora Project [eds.] 2023).

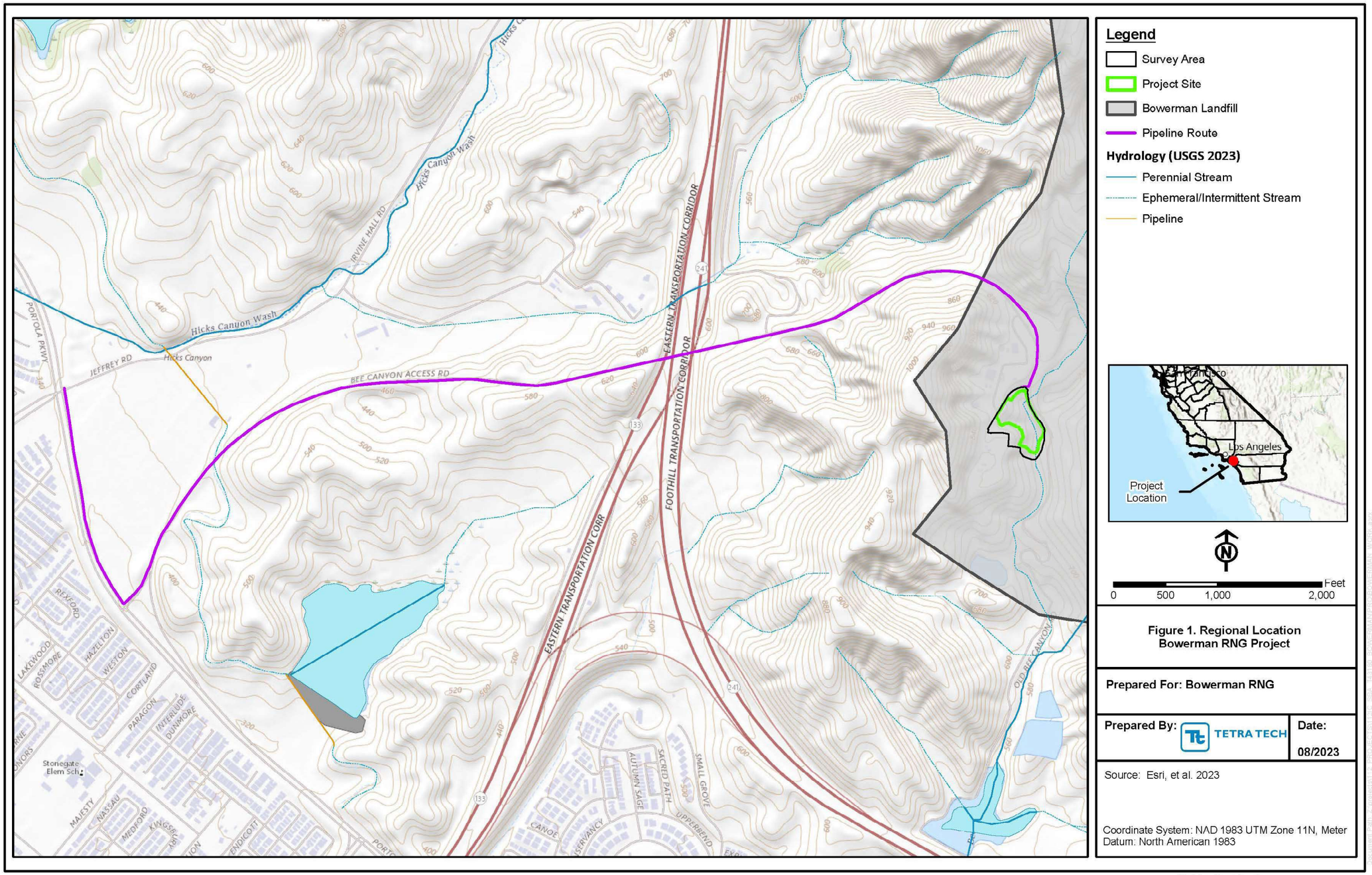


Figure 1. Regional Location
Bowerman RNG Project

Prepared For: Bowerman RNG

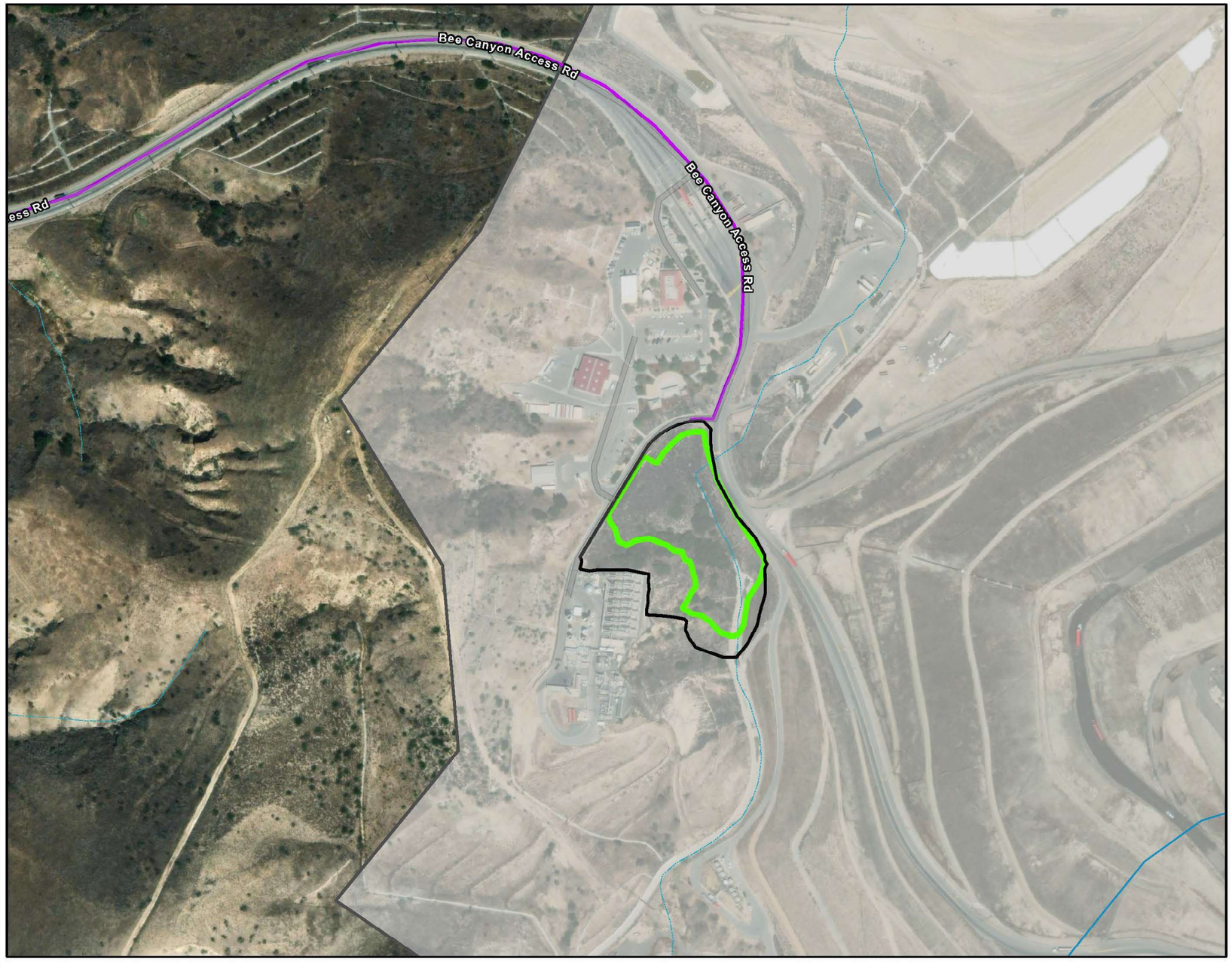
Prepared By: TETRA TECH

Date: 08/2023

Source: Esri, et al. 2023

Coordinate System: NAD 1983 UTM Zone 11N, Meter
Datum: North American 1983

Not for Construction



Legend

- Survey Area
- Project Site
- Bowerman Landfill
- Pipeline Route

Hydrology (USGS 2023)

- Perennial Stream
- Ephemeral/Intermittent Stream



N

0 150 300 600 Feet

Figure 2. Project Location
Bowerman RNG Project

Prepared For: Bowerman RNG

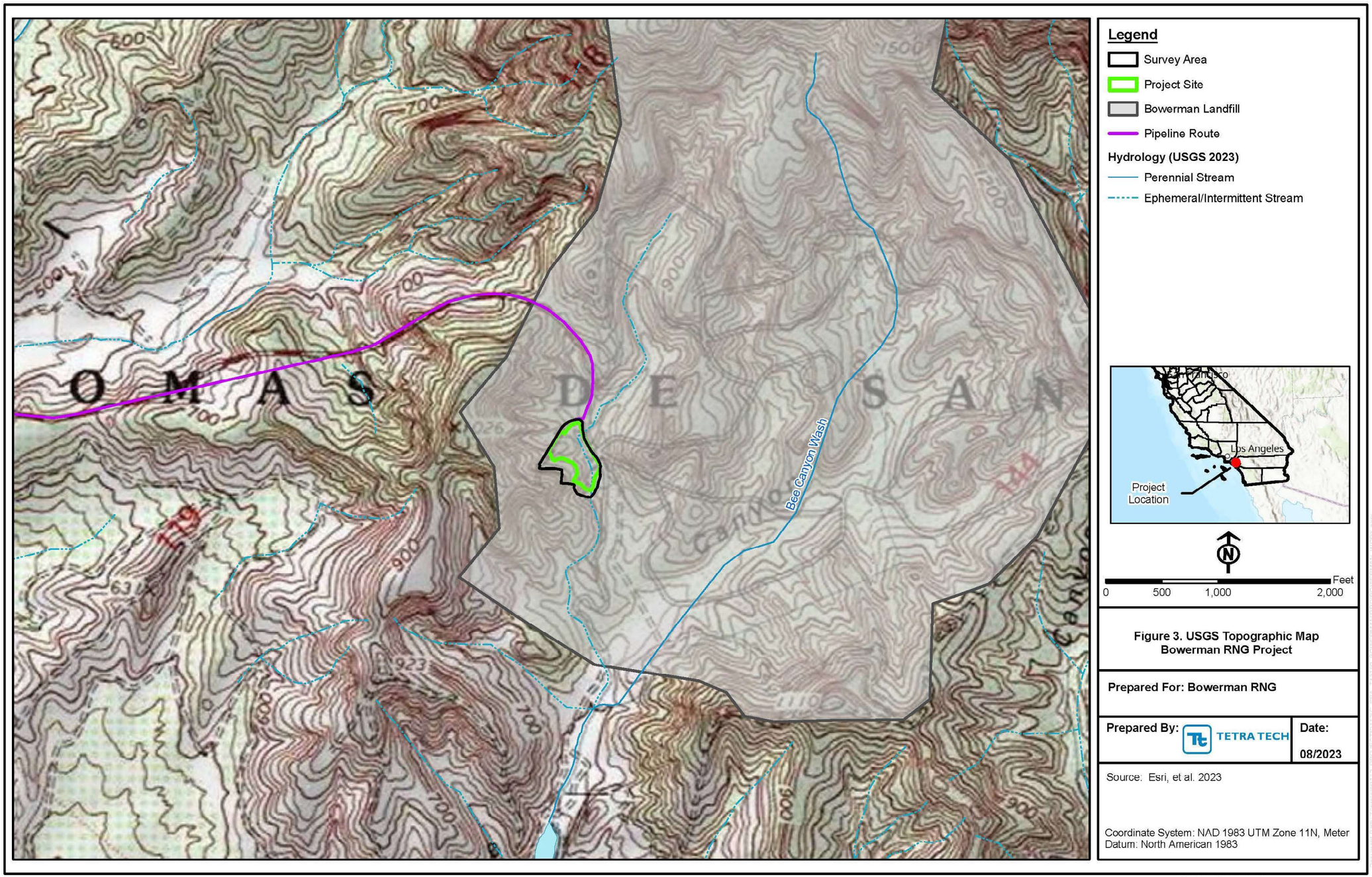
Prepared By: TETRA TECH

Date: 08/2023

Source: Esri, et al. 2023

Coordinate System: NAD 1983 UTM Zone 11N, Meter
Datum: North American 1983

Not for Construction



Not for Construction

2.0 PROJECT DESCRIPTION

The proposed Project would develop a RNG Plant and pipeline to process and transport LFG that is produced by the Bowerman Landfill to the SoCal Gas pipeline. The RNG Plant would be approximately 3.1 acres in size and the proposed pipeline would cover approximately 2.5 miles. The RNG Plant would be designed to process a maximum of 6,000 standard cubic feet per minute of raw LFG at the inlet. The process would remove nitrogen (N_2), oxygen (O_2), carbon dioxide (CO_2), sulfur hydroxide (H_2S), volatile organic compounds, and other minor impurities to meet the specifications of SoCal Gas.

3.0 LITERATURE REVIEW

This section describes the literature review performed to evaluate the biological resources that occur within the Project area.

3.1 Topography

Methods

The USGS 7.5-Minute Topographic Map *El Toro* Quadrangle as well as aerial imagery (Google Earth©) were reviewed. Topography describes the physical features of an area of land. The potential topographic features looked at include natural landforms, aquatic features, developed lands, agricultural lands, undeveloped lands, and terrain. Natural landforms are natural physical features on the surface of the land, such as mountains, hills, and canyons.

Results

Topography consists of hilly terrain throughout the survey area. A concrete channel is located at the southern end of the survey area and drains water from ephemeral drainages. Surrounding land use includes the larger Bowerman Landfill, agricultural use, open space, highways and roads, and residential built-up land. The elevational range of the survey area is approximately 690 to 800 feet above mean sea level. The elevational range of the proposed pipeline is approximately 330 to 810 feet above mean sea level.

3.2 Sensitive Natural Communities

Methods

The California Department of Fish and Wildlife (CDFW)'s California Natural Diversity Database (CNDDB) (CDFW 2023a) was used to identify sensitive natural communities that exist within the survey area.

Results

No sensitive natural communities were identified (CDFW 2023a).

3.3 Special-status Plant and Wildlife Species

Methods

Plant and wildlife species protected by Federal agencies, State agencies, and local conservation agencies and organizations, such as the California Native Plant Society (CNPS), are collectively referred to as special-status species in this report. Tetra Tech conducted a literature review by using CDFW's CNDDB RareFind 5 online database and CNPS' online *Inventory of Rare and Endangered Plants of California* to identify special-status plant and wildlife species that may exist within the Project area (CDFW 2023a, CNPS 2023). Species from the CNDDB and CNPS' online inventory that do not have habitat in the survey area, such as freshwater marsh and open water, are not carried forward in the analysis.

Results

The potential for each species to occur has been reviewed and updated based on the results of the field surveys and is provided in the special-status species results section of this report.

3.4 Critical Habitat

Methods

The U.S. Fish and Wildlife Service (USFWS) Critical Habitat Portal was reviewed to identify Federal threatened and endangered species designated final and proposed Critical Habitat within the survey area (USFWS 2023).

Results

The literature review determined that the survey area is not located within or near designated or proposed Critical Habitat for Federally listed plant or wildlife species.

3.5 Wildlife Movement

Methods

The Essential Connectivity Map located on CDFW's Biogeographic and Information Observation System (BIOS) Habitat Connectivity Viewer was reviewed to determine whether the survey area is located within or near a CDFW designated Natural Landscape Block (NLB) or Essential Connectivity Area (ECA) (CDFW 2023b).

Results

Per the BIOS Habitat Connectivity Viewer, the survey area is located within a NLB but not within an ECA (CDFW 2023b). The Bowerman Landfill is adjacent to large areas of open space, including Limestone Canyon Nature Preserve and the Irvine Ranch Natural Landmarks. However, the survey area is located near other developed areas of the Bowerman Landfill where human presence and noise may deter wildlife from using the area. Therefore, while the survey area may provide cover and forage for local wildlife and migrating birds, it is unlikely to provide a significant wildlife movement corridor. In addition, the Project site consists of a relatively small footprint that would not substantially reduce habitat connectivity in the region. The ability of wildlife to move through areas adjacent to the Project site would be unaffected.

4.0 FIELD SURVEY METHODS

A biological survey, including a rare plant survey, was conducted on June 19 and 20, 2023. The survey was conducted during daylight hours and not during abnormal or excessive cold, heat, wind, rain, or other inclement weather. An Eos Arrow 100 sub-meter Global Positioning System (GPS) unit and a paired tablet running the Geographic Information System (GIS) Field Maps application were used to collect location and attribute data during the surveys. Representative photographs that were taken during the surveys are provided in Appendix A.

The biological survey was conducted to assess special-status species wildlife species that have the potential to occur within the survey area and pipeline route. The biological survey area approximates the Project Lease Boundary and includes the Project site (i.e., RNG Plant footprint). Any special-status species or their sign (e.g., nests, burrows, pellets, scat/guano, roosts) observed or detected during the survey was recorded and mapped to sub-meter accuracy. A list of plant and wildlife species observed onsite was recorded. Vegetation communities were also mapped during the survey based on dominant plant species present. In addition, potential bird nesting habitat was identified. The biological survey included a 50-foot buffer on either side of the proposed pipeline route.

The biological survey also identified any special-status plant species that occur within the survey area. The survey was timed to occur during June when potential rare plant species were in bloom and identifiable. Pedestrian transect surveys were conducted within potential rare plant habitat to survey for rare plants. All rare plants found were mapped to sub-meter accuracy and the number of individuals observed in each population was recorded.

5.0 FIELD SURVEY RESULTS

5.1 List of Plants and Wildlife

Plant and wildlife species observed in the survey area are listed in Tables 1 and 2. One rare plant species, intermediate mariposa lily, was found in the survey area. No special-status wildlife species were observed.

Table 1. Plant Species Observed

Scientific Name	Common Name	Native/Non-Native
Acacia sp.	Acacia	Non-Native
Acmispon glaber	Deerweed	Native
Ambrosia acanthicarpa	Annual bur-sage	Native
Ambrosia psilostachya	Western ragweed	Native
Antirrhinum nuttallianum	Nuttall's snapdragon	Native
Artemisia californica	California sagebrush	Native
Avena sp.	Oat	Non-Native
Baccharis salicifolia	Mule fat	Native
Brachypodium distachyon	False brome	Non-Native
Bromus diandrus	Ripgut grass	Non-Native
Bromus madritensis	Foxtail chess	Non-Native
Calochortus weedii* var. *intermedius	**Intermediate mariposa lily**	**Native**
Calystegia macrostegia	Island morning glory	Native
Centaurea melitensis	Tocalote	Non-Native
Cuscuta californica	California dodder	Native
Cynodon dactylon	Bermuda grass	Non-Native
Daucus sp.	Wild carrot	Native
Deinandra fasciculata	Clustered tarweed	Native
Diplacus aurantiacus	Orange Bush Monkeyflower	Native
Dudleya lanceolata	Lance-leaved dudleya	Native
Dudleya pulverulenta	Chalk dudleya	Native
Encelia californica	Bush sunflower	Native
Encelia farinosa	Brittlebush	Native
Erigeron sp.	Fleabane	Native
Eriogonum fasciculatum	California buckwheat	Native
Eriophyllum confertiflorum	Golden-yarrow	Native
Eschscholzia californica	California poppy	Native
Eucalyptus sp.	Eucalyptus	Non-Native
Foeniculum vulgare	Fennel	Native
Hedypnois rhagadioloides	Crete weed	Non-Native
Helianthus annus	Common sunflower	Native
Hesperoyucca whipplei	Chaparral yucca	Native

Scientific Name	Common Name	Native/Non-Native
Heteromeles arbutifolia	Toyon	Native
Heterotheca grandiflora	Telegraph weed	Native
Hirschfeldia incana	Mediterranean hoary mustard	Non-Native
Hordeum murinum	wall barley	Non-Native
Isocoma menziesii	Menzies' goldenbush	Native
Lactuca serriola	Prickly lettuce	Non-Native
Lysimachia arvensis	Scarlet pimpernel	Non-Native
Malacothamnus fasciculatus	Chaparral mallow	Native
Malacothrix saxatilis	Cliff aster	Native
Malosma laurina	Laurel sumac	Native
Malva parviflora	Cheeseweed	Non-Native
Marah sp.	Man-root	Native
Marrubium vulgare	White horehound	Non-Native
Melilotus albus	White sweetclover	Non-Native
Melilotus indicus	Sourclover	Non-Native
Mesembryanthemum crystallinum	Crystalline iceplant	Non-Native
Nicotiana glauca	Tree tobacco	Non-Native
Oncosiphon pilulifer	Stinknet	Non-Native
Opuntia littoralis	Coast prickly pear	Native
Pennisetum setaceum	Crimson fountain grass	Non-Native
Phacelia parryi	Parry's phacelia	Native
Pinus sp.	Conifers	Native
Polypogon monspeliensis	Annual beard grass	Non-Native
Quercus agrifolia	Coast live oak	Native
Rhus integrifolia	Lemonade berry	Native
Salsola tragus	Russian thistle	Non-Native
Salvia apiana	White sage	Native
Salvia mellifera	Black sage	Native
Sequoia sp.	Redwoods	Native
Silene laciniata	Cardinal catchfly	Native
Solanum douglasii	Douglas' nightshade	Native
Sonchus oleraceus	Common sow thistle	Non-Native
Verbesina encelioides	Golden crownbeard	Non-Native
Vicia villosa	Hairy vetch	Non-Native

Species in bold text have special-status designation.

Table 2. Wildlife Species Observed

Scientific Name	Common Name	Federal/State Status
Invertebrates		
Apis sp.	Honeybee	None
Coccinellinae	Lady beetles	None
Estigmene sp.	Salt marsh moth	None
Odonata	Dragonflies	None
Papilio sp.	Swallowtails	None
Pepsis sp.	Tarantula hawk	None
Pierinae sp.	Whites (butterfly)	None
Reptiles		
Sceloporus occidentalis	Western fence lizard	None
Birds		
Buteo jamaicensis	Red-tailed hawk	None
Calypte anna	Anna's hummingbird	None
Cathartes aura	Turkey vulture	None
Chamaea fasciata	Wrentit	None
Corvus corax	Common raven	None
Haemorhous mexicanus	House finch	None
Melospiza melodia	Song sparrow	None
Mimus polyglottos	Northern mockingbird	None
Passerina amoena	Lazuli bunting	None
Pipilo maculatus	Spotted towhee	None
Psaltriparus minimus	Bushtit	None
Sayornis nigricans	Black phoebe	None
Spinus psaltria	Lesser goldfinch	None
Thryomanes bewickii	Bewick's wren	None
Mammals		
Odocoileus hemionus	Mule deer	None

5.2 Vegetation Communities

The survey area contains multiple vegetation communities, as described below. Table 3 summarizes the vegetation communities observed and their corresponding acreage within the Project site, survey area, and proposed pipeline. Vegetation communities are shown in Figure 4.

Table 3. Vegetation Communities

Vegetation Communities	Acres within Project site	Acres within Survey Area	Acres along Proposed Pipeline
Coast live oak	0.7	0.9	0.0
Developed	0.2	0.3	18.4
Sagebrush scrub	2.2	3.6	6.8
Disturbed	0.0	0.0	2.4
Disturbed sagebrush scrub	0.0	0.0	0.2

Vegetation Communities	Acres within Project site	Acres within Survey Area	Acres along Proposed Pipeline
Eucalyptus	0.0	0.0	1.2
Ornamental trees	0.0	0.0	1.0
Total	**3.1**	**4.8**	**30.0**

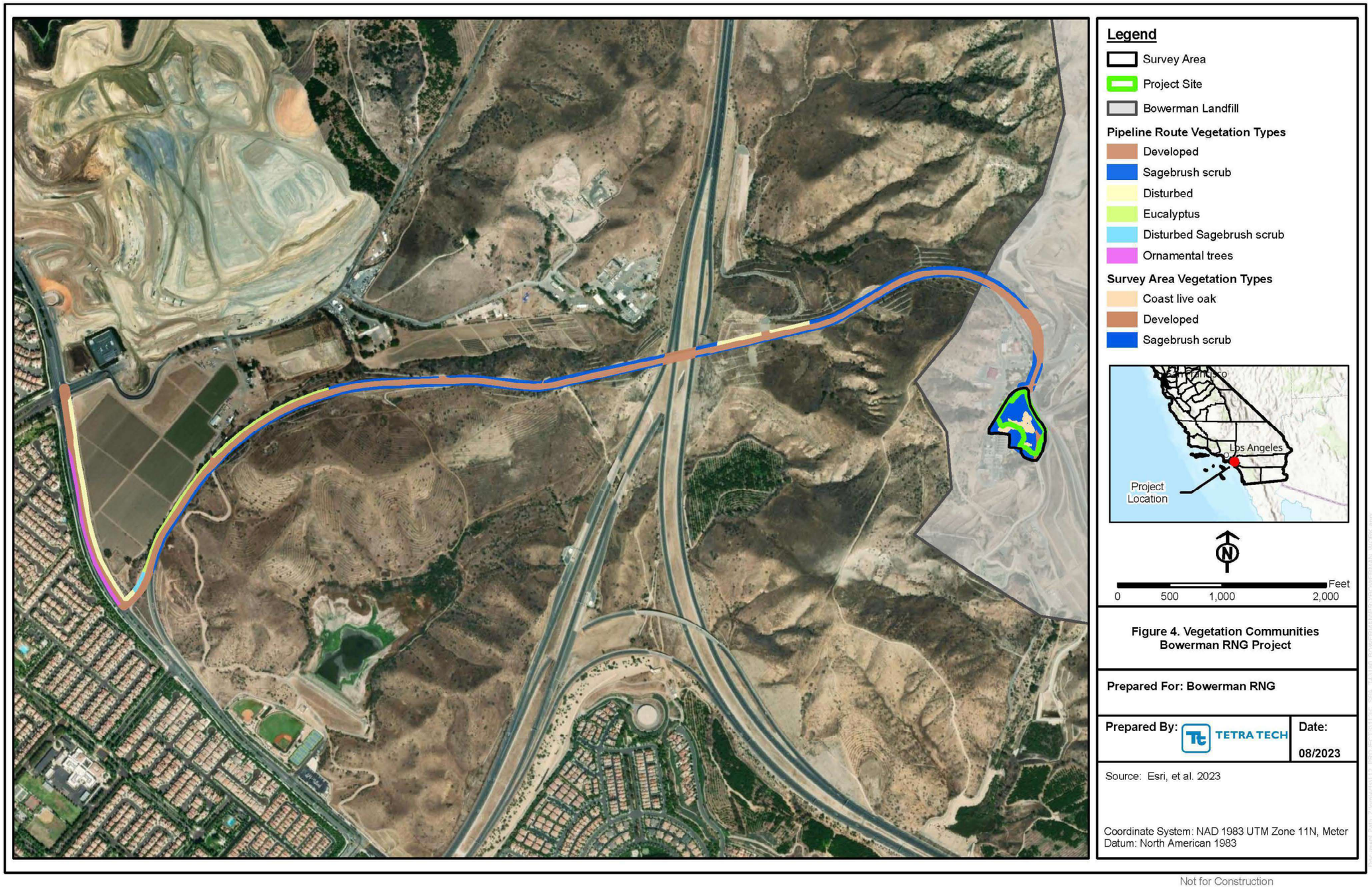
The survey area is covered primarily by sagebrush scrub, with bands of coast live oak habitat present. Within the bounds of the survey area is an approximately 35-foot wide, unvegetated concrete channel. The survey area is on a northeast-facing slope. Multiple concrete-lined channels of approximately one-foot width run downslope from the existing LFGTE plant or Bee Canyon Access Road into the wider concrete channel. Soils covered in natural vegetation were generally loose and gravelly. Burrows were not noticeable in areas of natural vegetation because vegetation coverage was dense.

The proposed pipeline impact area covers Bee Canyon Access Road, Portola Parkway, and the road right-of-way (ROW) (Figure 4). The impacts will be limited to the existing developed roads. Directly outside of these areas are some naturally occurring (sagebrush scrub) or naturalized habitats (eucalyptus grove). Also, directly outside of the ROW are artificial habitats (ornamental trees) and disturbed habitats.

Sagebrush Scrub (Survey Area): Sagebrush scrub covers about 75 percent of the survey area. This habitat group has over 100 percent vegetation coverage. The dominant shrub within the habitat is California sagebrush (*Artemisia californica*). Interspersed within the California sagebrush are native species such as California buckwheat (*Eriogonum fasciculatum*), deerweed (*Acmispon glaber*) and brittlebrush (*Encelia farinosa).* Native succulent species like coast prickly pear (*Opuntia littoralis*), chalk dudleya (*Dudleya pulverulenta*), and lance-leaved dudleya (*Dudleya lanceolata*) are also found interspersed in this habitat. Rock outcrops are present at the top of some of the steep slopes in the sagebrush scrub, mostly bordering the existing facility to the west. Along the edges of this habitat and spaced between shrubs are patches of non-native species like Mediterranean hoary mustard (*Hirschfeldia incana*) and prickly lettuce (*Lactuca serriola*). Immediately surrounding the existing facility are non-native grass species, such as oat (*Avena* sp.). There is no tree canopy within this habitat. Within the sagebrush scrub and along the margins of the coast live oak (*Quercus agrifolia*) habitat are populations of a California native rare plant, intermediate mariposa lily (*Calochortus weedii* var. *intermedius*).

Coast Live Oak (Survey Area): Along the slope, coast live oak dominants the tree canopy. The tree understory is comprised of non-native grasses, like ripgut grass (*Bromus diandrus*) and foxtail chess (*Bromus madritensis*), and sparse coverage of low-growing sagebrush scrub species, like California buckwheat.

Developed (Survey Area): A concrete channel runs from north to south at the base of the slope and along the roadside of Bee Canyon Access Road. Water run-off from the existing LFGTE facility is fed into the channel through smaller concrete channels and culverts at the north end of the channel. The channel bed is filled with soil debris. The channel feeds into an isolated evaporation/collection pool south of the existing facility.



Not for Construction

Pipeline Developed: This area encompasses Bee Canyon Access Road, Portola Parkway, and any structures in and along the road, such as fencing and gates.

Pipeline Disturbed: These areas include hardpan pads along the roadside of Bee Canyon Access Road. These pads are vegetated with primarily non-native ruderal species like Mediterranean hoary mustard. Also, colonizing shrubs of California sagebrush grow on the pads. There is also a portion of the roadside (north of Portola Parkway) which is habitat disturbed by current agricultural practices.

Pipeline Sagebrush Scrub: This habitat is on a slope and is covered by California buckwheat and California sagebrush. One-foot wide, unvegetated concrete channels run along the roadside and through this habitat.

Pipeline Disturbed Sagebrush Scrub: Along the north side of Bee Canyon Access Road, towards the end of the proposed pipeline that opens up to Portola Parkway, is a gravel pad covered in low-growing (under 1-feet) California buckwheat. Interspersed within the buckwheat are ruderal species such as Mediterranean hoary mustard and clustered tarweed (*Deinandra fasciculata*). This area appears to be disturbed by adjacent construction activities.

Pipeline Eucalyptus: A strip of eucalyptus (*Eucalyptus* sp.) grove habitat runs along the north side of Bee Canyon Access Road. Eucalyptus trees over 15-feet tall dominate the tree canopy. Eucalyptus trees under 8-feet, annual grasses, and leaf litter dominate the ground canopy.

Pipeline Ornamental Trees: Along the south side of Portola Parkway are trees planted for roadside beautification. Tree species include acacias (*Acacia* sp.), conifers (*Pinus* sp.), and redwood (*Sequoia* sp.) species. Within the ROW are paved sidewalks and utility boxes.

5.3 Raptor and Nesting Bird Habitat

All vegetated areas of the survey area provide suitable nesting habitat for tree-nesting, shrub-nesting, and/or ground-nesting birds. Raptor nesting habitat is present in the form of mature trees in the coast live oak habitat in the survey area and eucalyptus groves along the proposed pipeline. These mature trees consisted of coast live oak trees in the survey area and eucalyptus trees in the buffer area along the proposed pipeline.

One raptor species, red-tailed hawk (*Buteo jamaicensis*), was observed during the surveys, as well as other bird species that may nest onsite. However, no nests were observed during the survey.

5.4 Special-status Wildlife Species

5.4.1 Amphibians

The western spadefoot (*Spea hammondii*) is a CDFW Species of Special Concern (SSC) and an Identified Species under the Central Coastal Subregional Natural Community Conservation Plan and Habitat Conservation Plan (NCCP/HCP) that has been previously documented 0.3 miles south of the survey area (CDFW 2023a). The closest breeding habitat is 1.5 miles northwest of the survey area (CDFW 2023a). Although there are no pools within the survey area that would allow for breeding, upland habitat is present that may support transient individuals moving from breeding habitat to estivating habitat.

5.4.2 Reptiles

Orange-throated whiptail (*Aspidoscelis hyperythra*) *is* a CDFW Watch List (WL) species and is a Target Species under the NCCP/HCP. This species has been previously recorded within less than 0.1 miles of the survey area (CDFW 2023a) and is known to occur in semi-arid brushy areas with loose soil and rocks, in rocky hillside and chaparral habitats. Preferred habitat characteristics for this species, including loose soils and coastal sage scrub habitat, are present within the survey area.

Red-diamond rattlesnake (*Crotalus ruber*) is a CDFW SSC and an Identified Species under the NCCP/HCP. This species has been previously recorded 2 miles northeast of the survey area (CDFW 2023a) and is known to occur in arid scrub, coastal chaparral, oak and pine woodlands, and rocky grassland. Preferred habitat characteristics for this species are present within the survey area.

Coast horned lizard (*Phrynosoma blainvillii*) is a CDFW SSC that has been recorded 2 miles northeast of the survey area (CDFW 2023a). The species requires open habitat with loose soils and an abundant supply of ants or other insects. Given the dense vegetation present in the survey area and the lack of ants and other insects observed, coast horned lizard is unlikely to occur.

The coast patch-nosed snake (*Salvadora hexalepis virgultea*) is a CDFW SSC that has also been recorded 2 miles northwest of the survey area (CDFW 2023a). This species requires semi-arid brushy areas and chaparral in canyons, rocky hillsides, and plains. Preferred habitat characteristics for this species, including semi-arid brushy areas, are present within the survey area.

5.4.3 Birds

The coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*) is a CDFW SSC and a Target Species under the NCCP/HCP. The nearest recorded occurrence is 0.6 miles west of the survey area; however, this did not include records of nesting (CDFW 2023a). Their nesting habitat consists of prickly-pear cacti (*Opuntia* sp.), which was only observed in low numbers during the survey. Therefore, the survey area is unlikely to support coastal cactus wren nesting but may provide foraging habitat for the species.

Yellow-breasted chat (*Icteria virens*) is a CDFW SSC that has been recorded 1.5 miles southeast of the survey area (CDFW 2023a). During this occurrence, two pairs were observed but nesting was not observed. This species occurs in riparian habitats with a well-developed shrub layer and an open canopy. Suitable habitat requirements for this species are not present in the survey area.

The coastal California gnatcatcher (*Polioptila californica californica*) is a federally threatened species, a CDFW SSC, and Target Species under the NCCP/HCP. The nearest recorded occurrence is along the western boundary of the survey area and the southern boundary of the pipeline (CDFW 2023a). Additional nesting observations have been recorded at the Siphon Reservoir, which is 1.5 miles west of the survey area and 0.5 mile south of the proposed pipeline (CDFW 2023a). Foraging habitat includes habitat with California buckwheat, coastal sages, and cacti. Suitable plant species and habitat requirements are found in the survey area for this species.

The least Bell's vireo (*Vireo bellii* pusillus) is a federally and state endangered species and is a Conditionally Covered Species under the NCCP/HCP. The nearest known occurrence for this species is at the Siphon Reservoir approximately 1.5 miles west of the survey area and 0.5 mile south of the

proposed pipeline (CDFW 2023a). However, this species' habitat consists of low-elevation riparian species in proximity to water or in dry river bottoms. They typically nest in willows, coyote brush, or mesquite. Preferred nesting habitat does not exist within the survey area.

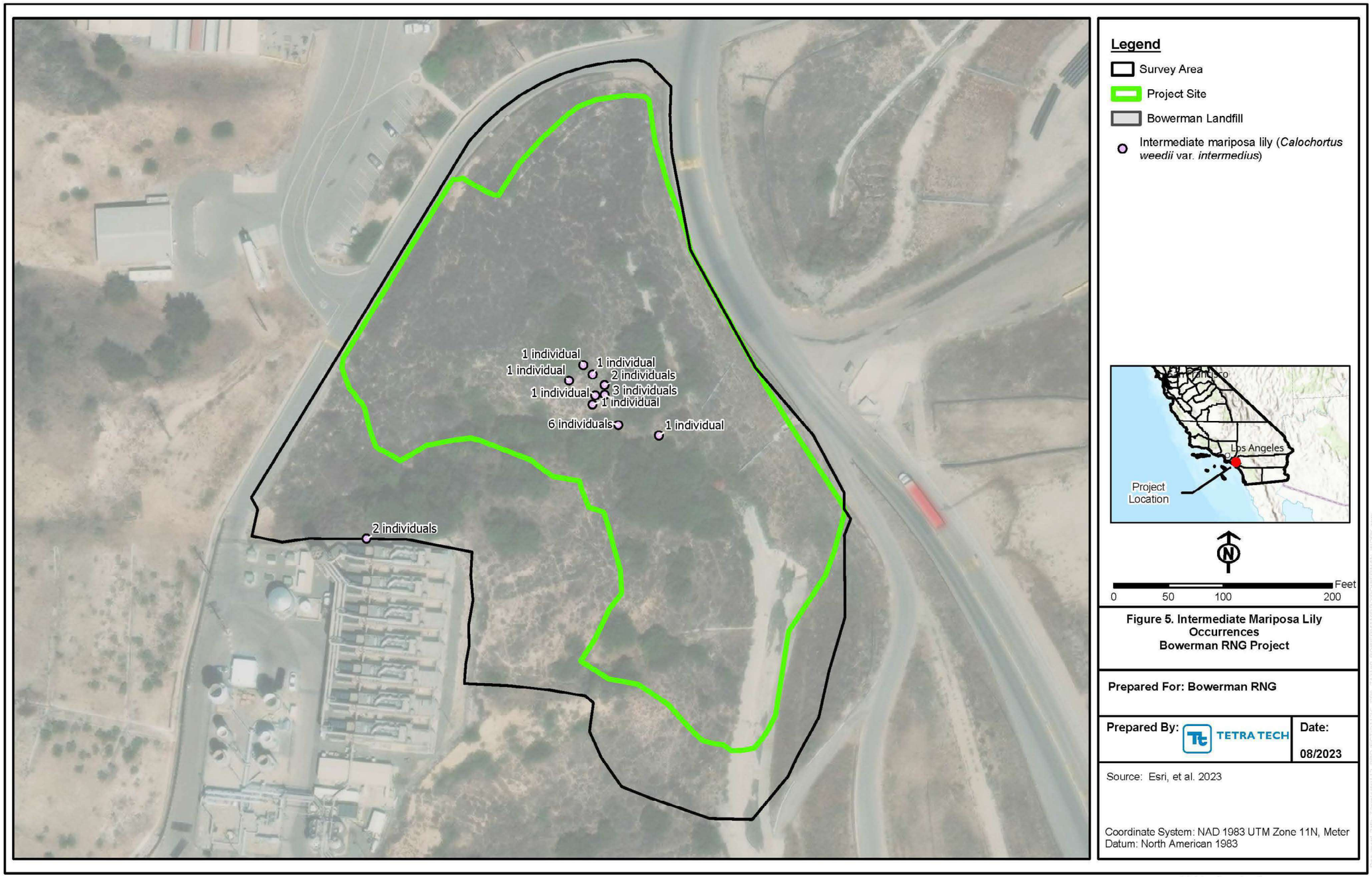
5.5 Rare Plants

Rare plants searched for in the survey area included intermediate mariposa lily and many-stemmed dudleya (*Dudleya multicaulis*). Robinson's pepper-grass (*Lepidium virginicum var. robinsonii)* and intermediate monardella (*Monardella hypoleuca* ssp. *intermedia*) also had potential to occur. Intermediate mariposa lily, a CNPS California Rare Plant Rank (CRPR) 1B.2 species and Conditionally Covered Species under the NCCP/HCP, was the only rare plant observed during the survey. Populations with a total of 17 individuals occurred within the center of the proposed RNG Plant. A population with 2 individuals was found outside the Project site within the survey area near the existing LFGTE plant and flare station (Figure 5). Table 4 provides additional details on the intermediate mariposa lily populations observed.

Table 4. Rare Plant Survey Results

Intermediate Mariposa Lily Points	Number of Individuals
1	1
2	1
3	1
4	6
5	1
6	2
7	3
8	1
9	1
10*	2
TOTAL	**19**

*This population is located outside of the Project site.



Not for Construction

5.6 Summary of Special-status Species

Based on the results of the field surveys, the potential to occur for each special-status plant and wildlife species has been reviewed and updated, as described in Table 5. Species are not included in the table that have no habitat in the survey area, such as species that only use tidal, coastal dune, or montane woodland habitats.

Table 5. Special-Status Species with Potential to Occur

Scientific Name	Common Name	Federal Status	State Status/ Other Status	Summary	Probability To Occur Within the Survey Area	Probability To Occur Within the Pipeline Buffer
Plants						
Calochortus weedii var. *intermedius*	Intermediate mariposa-lily	None	CRPR 1B.2	During the June 2023 survey, 19 individuals of this plant were observed; 17 individuals are located within the Project site and 2 individuals are outside of the Project site. There are 16 recorded observations of this species within 2 miles of the survey area, with five recorded observations being immediately outside of the survey area (CDFW 2023a). This plant is found on dry, rocky slopes at less than 680 meters elevation. Its blooming period is June to July.	Observed in sagebrush scrub habitat.	Medium in undisturbed sagebrush scrub. Unlikely to occur elsewhere.
Dudleya multicaulis	Many-stemmed dudleya	None	CRPR 1B.2	Although individuals of lanceleaf liveforever (*Dudleya lanceolata*) were found in the survey area, no many-stemmed dudleya (*Dudleya multicaulis*) individuals were observed. The closest known occurrence of many-stemmed dudleya is located approximately 2 miles from the survey area in a nature reserve within Limestone Canyon Regional Park (CDFW 2023a). This plant is found in clay soils on coastal plains and sandstone outcrops at less than 600 meters elevation. Its blooming period is from May to June.	Although there is medium potential for this species to occur in sagebrush scrub, it was not observed during the field survey.	Although there is medium potential for this species to occur in sagebrush scrub, it was not observed during the field survey. Unlikely to occur elsewhere.
Lepidium virginicum var. *robinsonii*	Robinson's pepper-grass	None	CRPR 4.3	Previously recorded observations have been documented 2 miles north of the survey area along a riverbank (CDFW 2023a). This species' habitat consists of dry, disturbed areas, cliffs, and scrub. This plant is found at elevations less than 2800 meters. Its blooming period is from March to June.	Although there is medium potential for this species to occur in sagebrush scrub and oak habitat, it was not observed	Although there is medium potential for this species to occur in sagebrush scrub, it was not observed during the field survey.

Scientific Name	Common Name	Federal Status	State Status/ Other Status	Summary	Probability To Occur Within the Survey Area	Probability To Occur Within the Pipeline Buffer
					during the field survey.	Unlikely to occur elsewhere.
Monardella hypoleuca ssp. *intermedia*	Intermediate monardella	None	CRPR 1B.3	One large population is documented in the Limestone Canyon Regional Park 2 miles northeast of the survey area (CDFW 2023a). This species' habitat consists of chaparral, oak woodland, and dry slopes. This plant is found at an elevation of 200 to 1250 meters. Its blooming period is from June to September.	Medium in area of sagebrush scrub and oak habitat. No possibility in the concrete channel.	Although there is medium potential for this species to occur in sagebrush scrub, it was not observed during the field survey. Unlikely to occur elsewhere.
Amphibians						
Spea hammondii	Western spadefoot	None	SSC	The nearest recorded observation for western spadefoot is 0.3 miles south of the survey area. In 2017, four adults were observed in evaporation/collection pool south of the existing facility (CDFW 2023a). The nearest recorded breeding habitat is 1.5 miles northwest of the survey area (CDFW 2023a). The survey area is 0.75 miles from the nearest natural pool of water. This species requires pooling water that lasts four to eleven weeks for breeding. This species' habitat consists of open areas with sandy or gravelly soils, in a variety of habitats including mixed woodlands, coastal sage scrub, chaparral, sandy washes, and foothills. There are no pools existing in the survey area which would allow for breeding. However, given that there is a wetland feature and suitable upland habitat within the survey area, this species could use the area as passage from breeding habitat to estivating habitat.	No breeding habitat onsite. Upland habitat present within the survey area, including the concrete channel.	Unlikely to occur in all habitats within the proposed pipeline area.

Scientific Name	Common Name	Federal Status	State Status/ Other Status	Summary	Probability To Occur Within the Survey Area	Probability To Occur Within the Pipeline Buffer
Reptiles						
Aspidoscelis hyperythra	Orange-throated whiptail	None	WL	There is one recorded observation of several adults within less than 0.1 miles of the survey area from 2005 (CDFW 2023a). Additional observations have been recorded at Siphon reservoir, approximately 0.5 miles south of the pipeline from 1990 (CDFW 2023a). This species' habitat consists of semi-arid brushy areas with loose soil and rocks, in rocky hillside and coastal chaparral and scrub habitat. There are records of this species near the survey area and suitable habitats for this species exist.	High in area of sagebrush scrub and oak habitat. Low in concrete channel.	High in undisturbed sagebrush scrub. Unlikely to occur elsewhere.
Crotalus ruber	Red-diamond rattlesnake	None	SSC	The nearest recorded observation for red-diamond rattlesnake is 2 miles northeast of the survey area. One individual was captured during a pitfall trap study done in the Limestone Canyon Regional Park in 1999. The extension of the landfill since its initial construction in 1990 has further fragmented available and natural habitat surrounding the survey area. Reptiles are relatively fossorial species which spend periods of the year underground until suitable temperatures rebound and prey are accessible. These conditions can lead to low population counts and recorded observations. This species' habitat consists of arid scrub, coastal chaparral, oak and pine woodlands, and rocky grassland. These habitats are found in the survey area.	Medium in area of sagebrush scrub and oak habitat. Low in concrete channel.	Medium in undisturbed sagebrush scrub. Unlikely to occur elsewhere.

Scientific Name	Common Name	Federal Status	State Status/ Other Status	Summary	Probability To Occur Within the Survey Area	Probability To Occur Within the Pipeline Buffer
Phrynosoma blainvillii	Coast horned lizard	None	SSC	The nearest recorded observation of coast horned lizard is 2 miles northeast of the survey area. A total of 43 individuals were captured during a pitfall trap study done in the Limestone Canyon Regional Park in 1999 (CDFW 2023a). This species requires open habitat with loose soils for burial and an abundant supply of ants or other insects. The conditions onsite consist of dense vegetation coverage with no visible burrows or burrowing species observed. No ants were observed during the survey despite the presence of natural habitats. These conditions are incompatible with the habitat needs of coast horned lizard.	Low in all habitats.	Low in all habitats.
Salvadora hexalepis virgultea	Coast patch-nosed snake	None	SSC	The nearest recorded observation for coast patch-nosed snake is 2 miles northeast of the survey area. Two individuals were captured during a pitfall trap study done in the Limestone Canyon Regional Park in 1999. The extension of the landfill since its initial construction in 1990 has further fragmented available and natural habitat surrounding the survey area. Reptiles are relatively fossorial species which spend periods of the year underground until suitable temperatures rebound and prey are accessible. These conditions can lead to low population counts and recorded observations. Scrub and oak habitats for this species are found in the survey area.	Medium in area of sagebrush scrub and oak habitat. Low in concrete channel.	Medium in undisturbed sagebrush scrub. Unlikely to occur elsewhere.

Scientific Name	Common Name	Federal Status	State Status/ Other Status	Summary	Probability To Occur Within the Survey Area	Probability To Occur Within the Pipeline Buffer
Birds						
Campylorhynchus brunneicapillus sandiegensis	Coastal cactus wren	None	SSC	The nearest recorded observation for this species is 0.6 miles west of the survey area; this locality did not include records of nesting (CDFW 2023a). Their nesting habitat consists of thickets of prickly-pear cacti (*Opuntia* sp.) tall enough to support and protect the birds' nests. General foraging habitat consists of coastal sage scrub at elevations below 460 meters where cacti are prominent. Suitable plant species and habitat requirements are found in the survey area for this species. Prickly-pear cacti were observed within the survey area but in low numbers. Therefore, the it is unlikely to support coastal cactus wren nesting but may provide foraging habitat.	No nesting habitat within the survey area. May forage in sagebrush scrub.	Nesting habitat in undisturbed sagebrush scrub.
Icteria virens	Yellow-breasted chat	None	SSC	The nearest recorded observation for this species is 1.5 miles southeast from the survey area; two pairs were observed in a nearby park, but no nests observed (CDFW 2023a). This species' habitat consists of riparian habitats with a well-developed shrub layer and an open canopy. Nesting habitat is typically limited to the margin of streams, creeks, sloughs, and rivers. Suitable habitat requirements for this species are not present in the survey area.	Low in all habitats.	Low in all habitats.

Scientific Name	Common Name	Federal Status	State Status/ Other Status	Summary	Probability To Occur Within the Survey Area	Probability To Occur Within the Pipeline Buffer
Polioptila californica californica	Coastal California gnatcatcher	Threatened	SSC	The nearest recorded observation for this species is along the western boundary of the survey area and southern boundary of the pipeline (CDFW 2023a). Additional observations of nesting have been recorded at the Siphon Reservoir, which is 1.5 miles west of the survey area and 0.5 miles south of the pipeline (CDFW 2023a). This area provides nesting habitat and successful nesting has been documented up to 2015 (CDFW 2023a). Foraging habitat for this species consists of California buckwheat, coastal sages, and cacti. General habitat preferences consist of coastal scrub habitat in arid washes, on mesas, and on slopes of coastal hills. Suitable plant species and habitat requirements are found in the survey area for this species.	Medium in area of sagebrush scrub and oak habitat.	Medium in undisturbed sagebrush scrub. Unlikely to occur elsewhere.
Vireo bellii pusillus	Least Bell's vireo	Endangered	Endangered	The Siphon Reservoir provides habitat for least Bell's vireo individuals found within the vicinity of the survey area; one successful nest was documented at this location in 2001 (CDFW 2023a). This species' habitat consists of low-elevation riparian habitat in proximity to water or in dry river bottoms. They nest along the margins of bushes or on twigs, usually in willows (*Salix* sp.), coyote brush (*Baccharis* sp.), or mesquite (*Prosopis* sp.). Preferred nesting habitat of this species is not found in the survey area. The only habitat requirement met for this species in the survey area is an artificial water source and a feature which resembles a dry river bottom.	No nesting habitat onsite. May visit the concrete channel when there is standing water.	Low in all habitats.

Federally listed endangered: an animal or plant in danger of extinction within the foreseeable future throughout all or a significant portion of its range.
Federally listed threatened: an animal or plant in danger of becoming endangered within the foreseeable future throughout all or a significant portion of its range.

State listed threatened: "threatened species" means a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts (Fish and Game Code § 2067).
SSC = CDFW Species of Special Concern: “Species of Special Concern” means a species, subspecies, or distinct population of an animal native to California that currently satisfies one or more of the following criteria:

- Is extirpated from California or, in the case of birds, is extirpated in its primary season or breeding role;
- Is Federally listed, but not State listed, as threatened or endangered; meets the State definition of threatened or endangered but has not formally been listed;
- Is experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for State threatened or endangered status; and/or
- Has naturally small populations exhibiting high susceptibility to risk from any factor(s), that if realized, could lead to declines that would qualify it for State threatened or endangered status.

WL = CDFW Watch List: animal taxa that were previously designated as SSC but no longer merit that status, or which do not yet meet SSC criteria, but for which there is concern and a need for additional information to clarify status.
Tracked by CDFW: species tracked by CDFW but that do not have a designated Federal or State status.
CRPR = California Rare Plant Rank:

1B = Plants rare, threatened, or endangered in California and elsewhere.
2B = Plants rare, threatened, or endangered in California but more common elsewhere.
0.1 = Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat).
0.2 = Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat).

6.0 CONCLUSION AND RECOMMENDATIONS

The recommendations within this report are preliminary and will be refined during the California Environmental Quality Act (CEQA) process as more details about the Project design and schedule are determined. The Project site falls under the Central Coastal Subregional NCCP/HCP as the Bowerman Landfill is in the Central Subregion area of the NCCP Reserve. Projects within the NCCP must comply with the NCCP requirements, including Construction Minimization Measures, pre-construction surveys, and associated mitigation plans if such species are detected. The NCCP/HCP provides Incidental Take coverage related to permitted uses within the Reserve system.

One rare plant species, intermediate mariposa lily (CRPR 1B.2), was found on the Project site during the survey. CRPR 1B.2 applies to species that are rare, threatened, or endangered in California and elsewhere, and are fairly threatened in California. It is recommended that Project impacts avoid the populations of this species to the maximum extent feasible. While intermediate mariposa lily is not Federally or State listed, impacts to this species must be evaluated in the CEQA document. Likewise, it is a Conditionally Covered Species under the NCCP/HCP. Per requirements in the NCCP/HCP, if less than 20 individuals of intermediate mariposa lily are observed in the impact area, no mitigation would be required. If more than 20 individuals are observed, mitigation will be required. During the 2023 survey, 19 individuals were observed in the survey area (17 individuals within the proposed Project site and 2 individuals outside of the proposed Project site). The following preliminary mitigation measures are recommended for this species:

- Prior to initiating construction activities, a qualified biologist shall conduct a focused survey for special-status plant species in the Project impact areas. The survey will be done during the peak blooming period in accordance with the most current protocols approved by CDFW and CNPS.
- If 20 or more individuals of intermediate mariposa lily are found in the Project impact areas during the pre-construction survey, mitigation will be required. A Mitigation Plan shall be prepared in accordance with the NCCP/HCP. The Mitigation Plan shall explain how bulbs will be collected from the Project impact area and translocated to a mitigation site with appropriate habitat for intermediate mariposa lily. Collection of bulbs shall occur during an appropriate time of year to maximize success during translocation. The Mitigation Plan shall be implemented as approved and meet the required performance criteria. The Mitigation Plan shall be developed in coordination with USFWS, CDFW, and the NCCP non-profit corporation and approved by USFWS.

Native oak trees within the Project site that primarily occur in coast live oak areas (Figure 4) with a minimum diameter at breast height of 8 inches, or 12 inches for multi-trunked trees, are protected by the County of Orange Tree Preservation Ordinance (Article 2, Sec. 7-9-69). The ordinance requires avoidance or tree replacement on-site, off-site, or through payment of a fee if impacts would occur. However, this ordinance has not been published in the County's current Comprehensive Zoning Code and may not officially adopted. Therefore, coordination with the County is recommended to determine if the permit is required or to obtain it.

The Project as currently designed will impact 2.2 acres of sagebrush scrub in the Project site, which is a type of coastal sage scrub habitat. Direct impacts to scrub habitat may impact coastal California gnatcatcher, coastal cactus wren, and orange-throated whiptail that live in this habitat. Impacts shall be mitigated through the participation and contribution in the Central Coastal NCCP/HCP. Coastal California gnatcatcher, coastal cactus wren, and orange-throated whiptail are Target Species under the NCCP/HCP. The NCCP/HCP has allocated 138.34 acres of authorized coastal sage scrub take to occur within the Bowerman Landfill boundary (County of Orange Integrated Waste Management Department 2006). It is recommended that the client have discussions with OCWR to determine if additional coastal sage scrub take credit would be required to implement this Project and impact 2.2 acres of sagebrush scrub. If additional take credit is required, an amendment (major or minor) to the NCCP/HCP may be required to ensure coastal sage scrub take is authorized under the NCCP/HCP.

In addition, the following Construction Minimization Measures required by the NCCP/HCP shall be followed:

- Impacts to coastal sage scrub habitat shall occur outside the breeding and nesting season of the coastal California gnatcatcher (February 15 through July 15) to the extent practicable.
- A pre-construction survey shall be conducted within the Project site to determine the presence/absence of coastal California gnatcatcher and coastal cactus wren prior to clearing or grading activities. The survey shall include a 100-foot buffer around the grading limits. Any coastal California gnatcatcher or coastal cactus wren observations shall be recorded and marked on the construction/grading plans.
- All coastal sage scrub habitat outside of the Project impact area shall be fenced or marked with materials prior to the commencement of grading. No construction access, parking, or storage of equipment or materials will be allowed within these areas.
- A qualified biologist shall conduct and document a pre-construction meeting to educate construction staff (including supervisors, equipment operators, and other site employees) on the conservation measures required for the Project.
- A qualified biologist shall monitor the clearing of coastal sage scrub and oak woodland. USFWS/CDFW shall be notified at least 7 calendar days (preferably 14 calendar days) prior to clearing habitat occupied by Target/Identified Species, if observed. The qualified biologist will ensure that clearing activities and earth-moving equipment do not harm coastal California gnatcatchers or coastal cactus wren. The biologist will also ensure that these activities do not harm other species that may occur, including western spadefoot, orange-throated whiptail, red-diamond rattlesnake, and coast patch-nosed snake.
- The access road shall be sprayed with water on occasion to reduce dust accumulation on the leaves of coastal sage scrub species, as overseen by the biological monitor.

Development activities that are addressed by the NCCP/HCP are considered fully mitigated under the NCCP Act and state and federal Endangered Species Acts for impacts to habitat occupied by listed species, Target Species, and other “Identified Species” and to “covered habitats” that these species are dependent upon or associated with. Species that have potential to occur at the Project site that

qualify as Target Species or Identified Species include coastal California gnatcatcher, coastal cactus wren, orange-throated whiptail, red-diamond rattlesnake, western spadefoot, and other nesting birds and common wildlife species. Adhering to the requirements of the NCCP policies and procedures ensures no further mitigation is necessary.

Raptors and other birds have the potential to nest in the Project site and surrounding areas. Mature trees that could support nesting raptors were found in the areas mapped as coast live oak in the Project site and eucalyptus along the proposed pipeline (Figure 4). All vegetated areas of the Project site have the potential to support other nesting birds. To protect raptors and other nesting birds, the following measures are recommended:

- Avoid ground-disturbing and vegetation removal activities during the nesting bird season (February 15 to September 15). If these activities must occur during the nesting season, a pre-construction nesting bird survey would be conducted by a qualified biologist on and within 300 feet of the Project construction area. The survey would be conducted no more than 10 days prior to initiation of ground-disturbance, vegetation clearing, or construction activities and repeated between delays of greater than 10 days during the nesting season.
- If an active nest is found, an appropriate no-disturbance buffer for the species would be developed by a qualified biologist. No ground-disturbing or vegetation removal activities would occur within the buffer until the nesting season has ended or the nest is vacated, and juveniles have fledged, as determined by the qualified biologist. At the discretion of a qualified biologist, encroachment into the buffer may occur for non-listed bird species.

Recommendations regarding jurisdictional areas are described in the jurisdictional delineation report (Tetra Tech 2023).

7.0 REFERENCES

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WETLANDS DELINEATION REPORT

Bowerman Renewable Natural Gas Plant
Frank R. Bowerman Landfill
Orange County, CA

August 2023

Prepared by

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EXECUTIVE SUMMARY

On behalf of Bowerman Power LFG, LLC ("Bowerman Power") (Bowerman Power, Project Proponent), Tetra Tech has prepared this Wetlands Delineation Report for the proposed Renewable Natural Gas (RNG) Plant planned at the Frank R. Bowerman Landfill (Bowerman Landfill) in Orange County, California (Project). This Report describes the literature review, survey methodology, and results of the wetlands delineation conducted for the Project. This Project is being conducted under a partnership agreement between Bowerman Power and Orange County Waste & Recycling (OCWR) to process the landfill gas produced by the Bowerman Landfill and deliver it to Southern California Gas Company (SoCal Gas).

A wetlands delineation was performed to assess potential jurisdictional waters and wetland features within the Project survey area. Three features under U.S. Army Corps of Engineers (USACE) and Regional Water Quality Control Board (RWQCB) jurisdiction were identified in the survey area. Four areas under California Department of Fish and Wildlife (CDFW) jurisdiction were also identified in the survey area. Portions of each feature overlap with the proposed Project site (i.e., RNG Plant footprint). Avoidance or minimization of impacts to areas under the jurisdiction of the USACE, RWQCB, and CDFW is recommended. Coordination with these agencies is recommended to determine if the previously obtained permits still apply or if a modification or new permits are required, including a Section 404 permit from the USACE, a Water Quality Certification from the RWQCB, and a Lake and Streambed Alteration Agreement from the CDFW (County of Orange Integrated Waste Management Department 2006). The previously permitted or new jurisdictional features that occur in the survey area are as follows:

- Feature 1 – previously permitted from USACE and RWQCB, CDFW area is new.
- Feature 2 – not permitted.
- Feature 3 – not permitted.
- Feature 4 – previously permitted from USACE and RWQCB, CDFW area is new.

This Report is subject to verification by the USACE, RWQCB, and CDFW.

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Acronyms and Abbreviations

Bowerman Landfill	Frank R. Bowerman Landfill
Bowerman Power	Bowerman Power LFG, LLC
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
LFGTE	Landfill Gas to Energy
LSAA	Lake and Streambed Alteration Agreement
NWI	National Wetlands Inventory
OBL	Obligate Wetland
OCWR	Orange County Waste & Recycling
OHWM	ordinary high water mark
Porter-Cologne Act	Porter-Cologne Water Quality Control Act of 1969
Procedures	State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State
RNG	Renewable Natural Gas
RWQCB	Regional Water Quality Control Board
SoCal Gas	Southern California Gas Company
SWRCB	State Water Resources Control Board
UPL	Upland
USACE	U.S. Army Corps of Engineers
USDA NRCS	U.S. Department of Agriculture National Resources Conservation Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WDRs	waste discharge requirements

1.0 INTRODUCTION

Tetra Tech has prepared this Wetlands Delineation Report (Report) for the proposed Renewable Natural Gas (RNG) Plant planned at the Frank R. Bowerman Landfill (Bowerman Landfill) in Orange County, California (Project). This Project is being conducted under a partnership agreement between Bowerman Power LFG, LLC (Bowerman Power) and Orange County Waste & Recycling (OCWR) to process the landfill gas produced by the Bowerman Landfill and deliver it to Southern California Gas Company (SoCal Gas).

The purpose of this Wetlands Delineation Report is to:

- Summarize the major applicable federal and state laws that apply to protecting jurisdictional wetlands, waters, and water quality.
- Document the methods and results of the wetlands delineation conducted for the Project.
- Identify jurisdictional areas under the U.S. Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and California Department of Fish and Wildlife (CDFW) criteria.

1.1 Project Location

The proposed Project is located at Bowerman Landfill in Orange County, California and consists of a proposed RNG Plant footprint (i.e., Project site) and proposed pipeline route (Figure 1). The Project site is generally bound by Bee Canyon Access Road to the north and northeast, the existing Landfill Gas to Energy (LFGTE) plant and flare station to the west, and open space and roads to the south (Figure 2). The proposed pipeline route connecting the proposed RNG Plant to the SoCal Gas interconnection goes north and west along Bee Canyon Access Road until the intersection of Jeffrey Road and Portola Parkway (Figure 1). The site is located within the U.S. Geological Survey (USGS) *El Toro* 7.5-Minute Topographic Quadrangle Map (Figure 3). Surrounding land uses consist of other areas of the Bowerman Landfill, open space, agricultural use, residential uses, and highways and roads.

The survey area for the wetlands delineation is shown in the figures, which approximates the Project Lease Boundary. The Project site consists of the proposed RNG footprint. The pipeline route was not surveyed for wetlands since construction would only occur within the existing roadway.

1.2 Environmental Setting

One unnamed ephemeral/intermittent stream runs through the survey area and ultimately leads off-site into Bee Canyon Wash, San Diego Creek, and then the Pacific Ocean (Figures 1 to 3). The data shown in Figures 1 to 3 is based on USGS blue-line streams, which are defined as perennial or ephemeral flowing waters. As described in the results section below, the waters that occur within the survey area were investigated during Tetra Tech surveys. A majority of the survey area is very steep hillside terrain and elevation ranges from approximately 690 to 800 feet above sea level. The survey area is undeveloped and vegetation throughout the survey area is a mixture of sagebrush scrub and coast live oak. Rainfall in 2023 has been higher than normal. From July 1, 2022 through June 30, 2023, rainfall for the Irvine area was estimated to be about 163 percent of normal (Golden Gate Weather Services 2023).

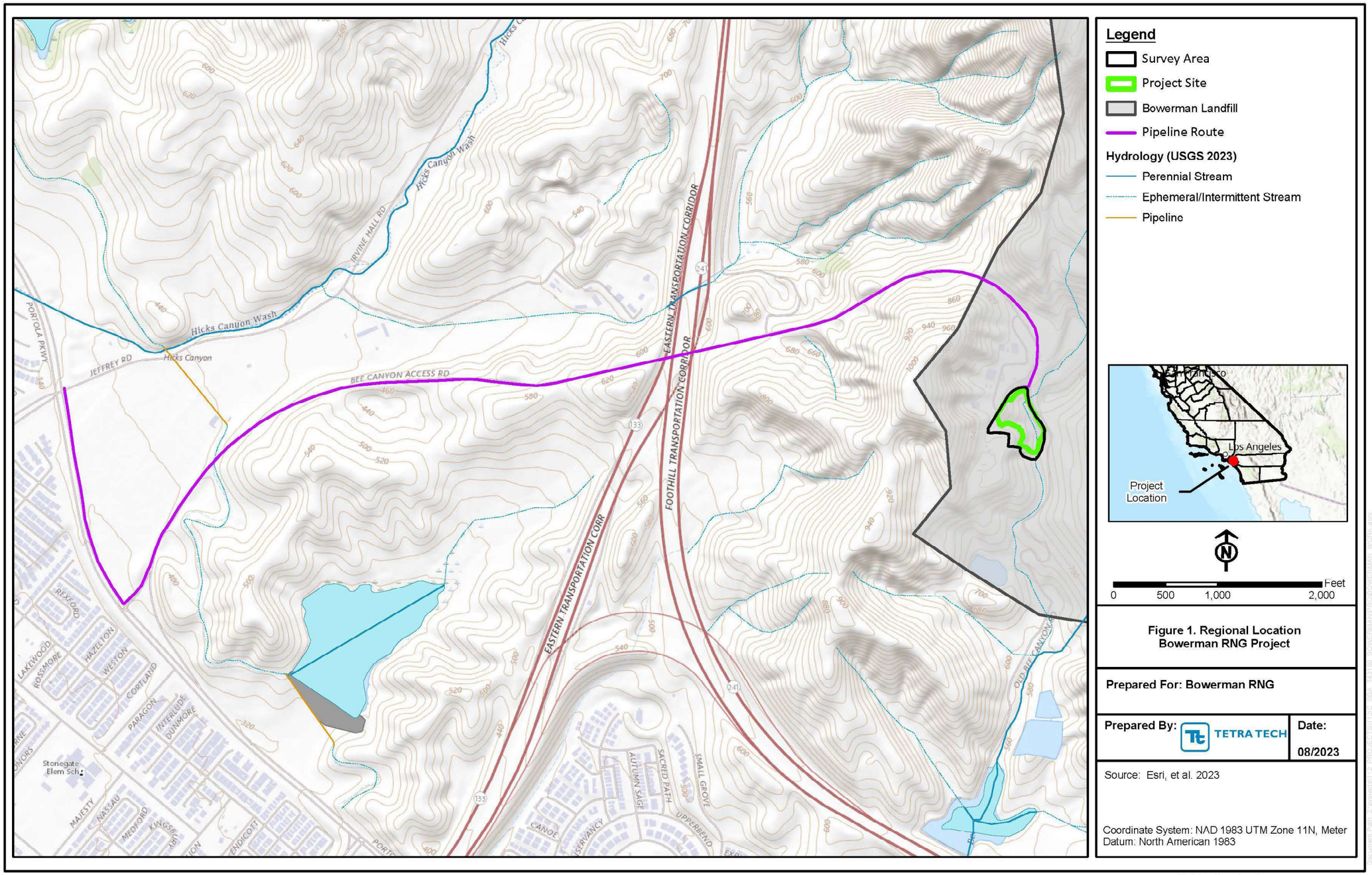


Figure 1. Regional Location
Bowerman RNG Project

Prepared For: Bowerman RNG

Prepared By: TETRA TECH **Date:** 08/2023

Source: Esri, et al. 2023

Coordinate System: NAD 1983 UTM Zone 11N, Meter
Datum: North American 1983

Not for Construction



Legend

- Survey Area
- Project Site
- Bowerman Landfill
- Pipeline Route

Hydrology (USGS 2023)

- Perennial Stream
- Ephemeral/Intermittent Stream



N

0 150 300 600 Feet

Figure 2. Project Location
Bowerman RNG Project

Prepared For: Bowerman RNG

Prepared By: TETRA TECH **Date:** 08/2023

Source: Esri, et al. 2023

Coordinate System: NAD 1983 UTM Zone 11N, Meter
Datum: North American 1983

Not for Construction

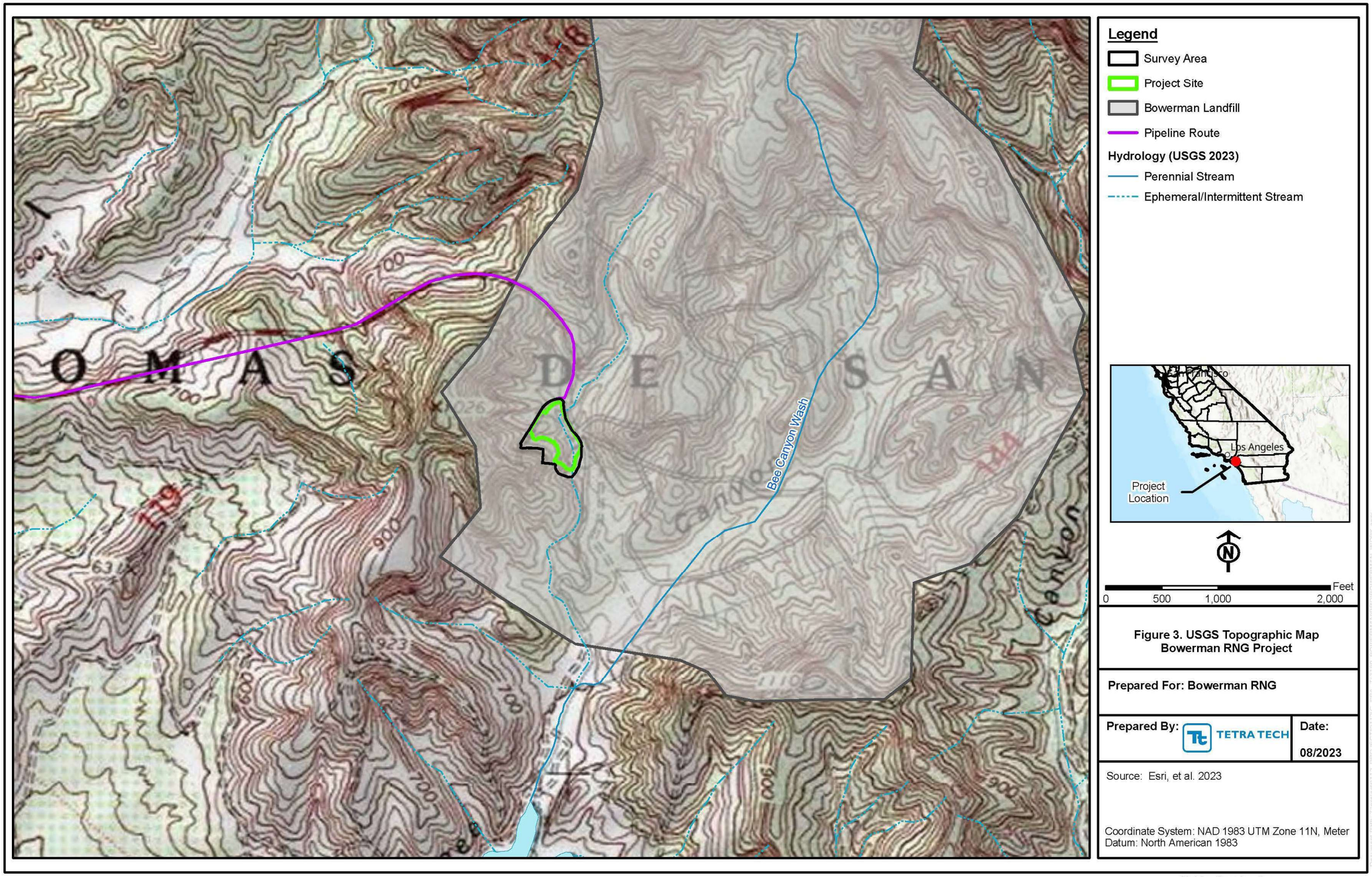


Figure 3. USGS Topographic Map
Bowerman RNG Project

Prepared For: Bowerman RNG

Prepared By: TETRA TECH **Date:** 08/2023

Source: Esri, et al. 2023

Coordinate System: NAD 1983 UTM Zone 11N, Meter
Datum: North American 1983

Not for Construction

2.0 REGULATORY OVERVIEW AND DEFINITIONS

2.1 U.S. Army Corps of Engineers

Section 404 of the Clean Water Act provides the U.S. Environmental Protection Agency (EPA) and the USACE regulatory and permitting authority over activities that result in the discharge of dredged or fill material into "navigable Waters of the U.S." Section 502(7) of the Clean Water Act defines navigable waters as "Waters of the U.S., including territorial seas." Section 328 of Chapter 33 in the Code of Federal Regulations (CFR) defines the term Waters of the U.S. as it applies to the jurisdictional limits of the authority of the USACE under the Clean Water Act. A summary of this definition of Waters of the U.S. in 33 CFR Section 328.3 includes (1) waters which are: (i) currently used, or were used in the past, or may be susceptible to use in commerce, including all waters which are subject to tides; (ii) the territorial seas; or (iii) interstate waters, including interstate wetlands; (2) impoundments of waters; (3) tributaries of waters; (4) wetlands adjacent to waters; (5) intrastate lakes and ponds, streams, or wetlands (USACE and EPA 2023). Therefore, for the purpose of determining USACE jurisdiction under the Clean Water Act, "navigable waters" as defined in the Clean Water Act are the same as Waters of the U.S. defined in the CFR above.

The limits of USACE jurisdiction under Section 404 as defined in 33 CFR Section 328.4 are as follows: (a) Territorial seas: three nautical miles in a seaward direction from the baseline; (b) Tidal waters of the U.S.: high tide line or to the limit of adjacent non-tidal waters; (c) Non-tidal waters of the U.S.: ordinary high water mark (OHWM) or to the limit of adjacent wetlands, or when the water of the U.S. consists only of wetlands to the limit of the wetland.

2.1.1 Section 404 Jurisdictional Wetlands

The USACE has defined the term "wetlands" as follows (33 CFR 328.3):

> *Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.*

The three parameters that are used to determine the presence of wetlands are: (1) hydrophytic vegetation, (2) wetland hydrology, and (3) hydric soils. Evidence of a minimum of one positive wetland indicator from each of the three parameters must be found in order to make a positive wetland delineation (USACE 2008).

Wetland areas which do not have a surface or groundwater connection to, and are not adjacent to, navigable Waters of the U.S. may be considered isolated and not subject to USACE jurisdiction.

Vegetation

Hydrophytic vegetation is defined as areas where the frequency and duration of inundation or soil saturation exerts a controlling influence on the plant species present. Plant species are assigned wetland indicator status according to the probability of their occurrence in a wetland. More than fifty percent of the dominant plant species must have a wetland indicator status to meet the hydrophytic vegetation criterion. The USACE has published the *Arid West 2020 Regional Wetland Plant List*

(USACE 2020) which separates vascular plants into the following categories based on plant species frequency of occurrence in wetlands:

- Obligate Wetland (OBL). Occur almost always (estimated probability greater than 99 percent) under natural conditions in wetlands.
- Facultative Wetland (FACW). Usually occur in wetlands (estimated probability 67-99 percent), but occasionally found in non-wetlands.
- Facultative (FAC). Equally likely to occur in wetlands or non-wetlands (estimated probability 34–66 percent).
- Facultative Upland (FACU). Usually occur in non-wetlands (estimated probability 67–99 percent), but occasionally found in wetlands (estimated probability 1–33 percent).
- Obligate Upland (UPL). Occur almost always (estimated probability greater than 99 percent) under natural conditions in non-wetlands.

The USACE considers OBL, FACW, and FAC species to be indicators of a wetland. An area is considered to have hydrophytic vegetation when greater than 50 percent of the dominant species in each vegetative stratum (tree, shrub, and herb) fall within these categories. Any species not listed in the USACE wetland plant list is assumed to be an upland species, almost never occurring in wetlands.

A secondary hydrophytic vegetation identifier is a prevalence index of 3.0 or less. The prevalence index is a weighted-average wetland indicator status of all plant species at the sample point, where each indicator status category is given a numeric code (OBL=1, FACW=2, FAC=3, FACU=4, and UPL=5) and weighting is by abundance (percent cover). This method is a more comprehensive analysis of the hydrophytic status of the community than one based on just a few dominant species. The prevalence index is used as a supplement to determine whether hydrophytic vegetation is present on sites where indicators of hydric soil and wetland hydrology are present, but the vegetation initially fails the dominance test.

Hydrology

Wetland hydrology is inundation or soil saturation with a frequency and duration long enough to cause the development of hydric soils and vegetation communities dominated by hydrophytic vegetation. If direct observation of wetland hydrology is not possible (as in seasonal wetlands), or records of wetland hydrology are not available (such as stream gauges), assessment of wetland hydrology is frequently supported by indicators, such as watermarks, surface soil cracks, sediment deposits, or a high water table.

OHWM is a line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area.

Soils

Hydric soils are saturated or inundated for a sufficient duration during the growing season to develop anaerobic or reducing conditions that favor the growth and regeneration of hydrophytic vegetation.

Field indicators of wetland soils include sulfidic odor, observations of ponding, inundation or saturation, dark (low chroma) soil colors, bright mottles (concentrations of oxidized minerals such as iron), or gleying (reduced conditions indicated by a blue- or green-grey color). Additional supporting information includes documentation of soil as hydric or reference to wet conditions in the local soil survey, both of which must be verified in the field.

Field indicators for hydric soils are particularly difficult to observe in sandy soils, which are often recently deposited soils of floodplains. These soils usually lack sufficient fines (clay and silt) and organic material to allow use of color as a reliable indicator of hydric soil. Hydric soil indicators in sandy soils include accumulations of organic matter and organic pan (soil layer in which organic matter and aluminum accumulate where the top of the water table most often occurs).

2.1.2 Section 404 Jurisdictional Waters of the U.S.

In April 2020, the USACE and EPA published the Navigable Waters Protection Rule in the Federal Register, which became effective on June 22, 2020. Following a federal district court decision on August 30, 2021, the USACE and EPA halted implementation of the Navigable Waters Protection Rule and began interpreting Waters of the U.S. consistent with the "pre-2015" regulatory regime (USACE and EPA 2021). On December 7, 2021, the USACE and EPA announced a Proposed Rule, published in the Federal Register, to revise the definition of Waters of the U.S. to formalize the Supreme Court's decisions and put back into place the "pre-2015" definition of Waters of the U.S. (USACE and EPA 2021). The final Revised Definition of Waters of the United States rule was published in the Federal Register on January 18, 2023, and took effect on March 20, 2023 (USACE and EPA 2023). Although the Supreme Court reached a decision on May 25, 2023 (Sacket vs EPA), which found that only wetlands that are "indistinguishable" from adjacent jurisdictional waterbodies can be covered by the law, the implications of this decision on enforcement of the final rule are currently not determined. Therefore, the analysis in this Report is based on the final rule from March 2023. Under the final rule (33 CFR 328.3):

(a) **Waters of the United States** means:

(1) Waters which are:

(i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(ii) The territorial seas; or

(iii) Interstate waters, including interstate wetlands;

(2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;

(3) Tributaries of waters identified in paragraph (a)(1) or (2) of this section:

(i) That are relatively permanent, standing or continuously flowing bodies of water; or

(ii) That either alone or in combination with similarly situated waters in the region, significantly affect the chemical, physical, or biological integrity of waters identified in paragraph (a)(1) of this section;

(4) Wetlands adjacent to the following waters:

(i) (i) Waters identified in paragraph (a)(1) of this section; or

(ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3)(i) of this section and with a continuous surface connection to those waters; or

(iii) Waters identified in paragraph (a)(2) or (3) of this section when the wetlands either alone or in combination with similarly situated waters in the region, significantly affect the chemical, physical, or biological integrity of waters identified in paragraph (a)(1) of this section;

(5) Intrastate lakes and ponds, streams, or wetlands not identified in paragraphs (a)(1) through (4) of this section:

(i) That are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3)(i) of this section; or

(ii) That either alone or in combination with similarly situated waters in the region, significantly affect the chemical, physical, or biological integrity of waters identified in paragraph (a)(1) of this section.

(c)(6) **Significantly affect** means a material influence on the chemical, physical, or biological integrity of waters identified in paragraph (a)(1) of this section. To determine whether waters, either alone or in combination with similarly situated waters in the region, have a material influence on the chemical, physical, or biological integrity of waters identified in paragraph (a)(1) of this section, the functions identified in paragraph (c)(6)(i) of this section will be assessed and the factors identified in paragraph (c)(6)(ii) of this section will be considered:

(i) Functions to be assessed:

(A) Contribution of flow;

(B) Trapping, transformation, filtering, and transport of materials (including nutrients, sediment, and other pollutants);

(C) Retention and attenuation of floodwaters and runoff;

(D) Modulation of temperature in waters identified in paragraph (a)(1) of this section; or

(E) Provision of habitat and food resources for aquatic species located in waters identified in paragraph (a)(1) of this section;

(ii) Factors to be considered:

(A) The distance from a water identified in paragraph (a)(1) of this section;

(B) Hydrologic factors, such as the frequency, duration, magnitude, timing, and rate of hydrologic connections, including shallow subsurface flow;

(C) The size, density, or number of waters that have been determined to be similarly situated;

(D) Landscape position and geomorphology; and

(E) Climatological variables such as temperature, rainfall, and snowpack.

2.1.3 Areas Exempt from Section 404 Jurisdiction

Under the final Revised Definition of Waters of the United States rule (33 CFR 328.3):

(b) The following are not "waters of the United States" even where they otherwise meet the terms of paragraphs (a)(2) through (5) of this section:

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act;

(2) Prior converted cropland designated by the Secretary of Agriculture. The exclusion would cease upon a change of use, which means that the area is no longer available for the production of agricultural commodities. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA;

(3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water;

(4) Artificially irrigated areas that would revert to dry land if the irrigation ceased;

(5) Artificial lakes or ponds created by excavating or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;

(6) Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;

(7) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States; and

(8) Swales and erosional features (e.g., gullies, small washes) characterized by low volume, infrequent, or short duration flow.

2.2 Regional Water Quality Control Board

The Dickey Water Pollution Act of 1949 and the Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act) established the State Water Resources Control Board (SWRCB) and nine RWQCBs in California. The SWRCB and each RWQCB regulate activities in Waters of the State which include Waters of the U.S. "Waters of the State" are defined by the Porter-Cologne Act as "any surface water or groundwater, including saline waters, within the boundaries of the state." These may include intermittent or ephemeral waters as well as isolated waters. SWRCB/RWQCB jurisdiction extends to the OHWM for non-wetland Waters of the State, or for wetlands, to the limit of the wetland.

The SWRCB/RWQCB regulates the "discharge of waste," including discharges of fill and dredged material, into Waters of the State. All parties proposing to discharge waste that could affect Waters of the State must file a report of waste discharge with the appropriate RWQCB. The RWQCB will then respond to the report of waste discharge by issuing waste discharge requirements (WDRs) in a public hearing, or by waiving WDRs (with or without conditions) for that proposed discharge.

Pursuant to Section 401 of the Clean Water Act, the SWRCB/RWQCB established the State Water Quality Certification Program. This program issues certifications for projects which propose to discharge fill or dredged material into Waters of the State. Water Quality Certification is necessary for all projects that require a USACE Section 404 permit, or fall under other federal jurisdiction, and have the potential to impact Waters of the State. A Water Quality Certification issued by the SWRCB/RWQCB certifies that project activities will not violate water quality standards individually or cumulatively over the term of the action. A Water Quality Certification must be consistent with the requirements of the Federal Clean Water Act, the California Environmental Quality Act (CEQA), the California Endangered Species Act, and the Porter-Cologne Act.

If a proposed project, or portion of a proposed project, does not require a federal permit but does involve dredge or fill activities that may result in a discharge to Waters of the State, the RWQCB has the option to regulate the dredge and fill activity under its state authority in the form of WDRs or Certification of WDRs. In these cases, a Water Quality Certification is not necessary under Section 401 of the Clean Water Act because federal jurisdiction does not apply.

The SWRCB has adopted the *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* (Procedures), which became effective on May 28, 2020 (SWRCB 2019). The Procedures consist of the following four components: (1) a statewide wetland definition; (2) a framework for determining if a feature that meets the wetland definition is a Water of the State; (3) wetland delineation procedures; and (4) supplemental procedures for application submittal, and the review and approval of Water Quality Certifications, WDRs, and waivers of WDRs for dredge or fill activities, including the *State Supplemental Dredge or Fill Guidelines* (Appendix A of the Procedures).

The Procedures define an area as a wetland as follows: an area is a wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation. This definition does not affect the meaning of Waters of the State as it pertains to SWRCB/RWQCB jurisdiction pursuant to the Porter-Cologne Act, nor does it modify the current authorities of the SWRCB/RWQCB to protect water quality. In accordance with the Procedures, the wetland delineation method outlined by the USACE has been utilized to map wetlands and Waters of the State, which extend to the limit of the wetland or to the OHWM for non-wetland waters. Jurisdiction has been evaluated in the regulatory context of the RWQCB, who may regulate intermittent or ephemeral waters as well as isolated waters.

2.2.1 Waters of the State

The SWRCB Procedures consider natural wetlands, wetlands created by modification of surface Waters of the State, and areas that meet the current or historic definitions of Waters of the U.S., to be

Waters of the State (SWRCB 2019). In addition, the Procedures considers artificial wetlands (i.e., wetlands that result from human activity) that meet specific criteria to be Waters of the State (SWRCB 2019). The Procedures incorporate the established wetland delineation procedures set forth by the USACE (USACE 2008), which were used to map wetlands and Waters of the State. However, contrary to the USACE wetland definition, the State's wetland definition also protects non-vegetated wetlands. In addition, Waters of the State may also include intermittent or ephemeral waters as well as isolated waters that are not under federal jurisdiction.

2.2.2 Areas Exempt from State Jurisdiction

Areas exempt from SWRCB/RWQCB jurisdiction include all artificial wetlands that are less than 1 acre in size and do not satisfy the following criteria: (1) created by modification of a surface Water of the State; (2) approved by an agency as compensatory mitigation for impacts to other Waters of the State, except where the approving agency explicitly identifies the mitigation as being of limited duration; (3) specifically identified in a water quality control plan as a wetland or other Water of the State; or (4) resulted from historic human activity, is not subject to ongoing operation and maintenance, and has become a relatively permanent part of the natural landscape.

In addition, artificial wetlands greater than or equal to one acre in size are exempt from SWRCB/RWQCB jurisdiction if the artificial wetland was constructed, and is currently used and maintained, primarily for one or more of the following purposes: (1) industrial or municipal wastewater treatment or disposal; (2) settling of sediment; (3) detention, retention, infiltration, or treatment of stormwater runoff and other pollutants or runoff subject to regulation under a municipal, construction, or industrial stormwater permitting program; (4) treatment of surface waters; (5) agricultural crop irrigation or stock watering; (6) fire suppression; (7) industrial processing or cooling; (8) active surface mining – even if the site is managed for interim wetlands functions and values; (9) log storage; (10) treatment, storage, or distribution of recycled water; (11) maximizing groundwater recharge (this does not include wetlands that have incidental groundwater recharge benefits); or (12) fields flooded for rice growing.

2.3 California Department of Fish and Wildlife

The CDFW is responsible for conserving, protecting, and managing California's fish, wildlife, and native plant resources. Streams and lakes, as habitat for fish, wildlife, and native plant species, are subject to jurisdiction by CDFW under Sections 1600-1616 of the California Fish and Game Code. Section 1602 requires any person, state or local governmental agency, or public utility to notify CDFW before beginning any activity that will do one or more of the following: (1) substantially obstruct or divert the natural flow of a river, stream, or lake; (2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake. These regulated activities require a Section 1602 Lake and Streambed Alteration Agreement (LSAA) from CDFW. Removal of riparian vegetation also requires a LSAA.

The Fish and Game Code, Sections 1600-1616, regulates activities that would alter the flow, bed, banks, channel, or associated riparian areas of a river, stream, or lake. CDFW jurisdiction over lakes

and streams is to the top of bank, or edge of riparian vegetation as determined by edge of dripline, whichever is further (CDFW 1994).

2.4 Summary of Regulations and Jurisdiction Definitions

The jurisdiction of each agency (i.e., USACE, RWQCB, and CDFW) is summarized in Table 1 based on the information provided in the sections above. Key differences are highlighted in the table.

Table 1. USACE, RWQCB, and CDFW Jurisdiction

Agency (Regulation)	Jurisdiction Type	Jurisdiction Extent	Notes
USACE (Section 404 of Clean Water Act)	Wetlands, non-wetland Waters of the U.S.	Boundary of wetland, or OHWM for non-wetland Waters of the U.S.	The feature must be either relatively permanent or significantly affect specific Waters of the U.S. to be considered jurisdictional.
RWQCB (Section 401 of Clean Water Act)	Wetlands, non-wetland Waters of the State	Boundary of wetland, or OHWM for non-wetland Waters of the State	Jurisdiction includes ephemeral waters as well as isolated waters that may not be under USACE jurisdiction, significant affect is not required.
CDFW (Section 1600-1616 of Fish and Game Code)	River, stream, or lake	Top of bank or edge of riparian vegetation (whichever is further)	Requires bed, banks, and channel or riparian vegetation.

Notes:
CDFW: California Department of Fish and Wildlife
OHWM: Ordinary high water mark
RWQCB: Regional Water Quality Control Board
USACE: U.S. Army Corps of Engineers

3.0 METHODS

3.1 Literature Review

Prior to the field survey, a literature review was conducted to evaluate potential jurisdictional areas within the survey area. The USGS 7.5-Minute Topographic Map *El Toro* Quadrangle, aerial and historical imagery (Google Earth©), the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) database (USFWS 2023), the U.S. Department of Agriculture National Resources Conservation Service (USDA NRCS) Web Soil Survey (USDA NRCS 2023), and previous site-specific studies were reviewed.

3.2 Jurisdictional Waters and Wetlands Delineation

A jurisdictional waters and wetlands delineation was performed within the survey area on June 19-20, 2023. The delineation was conducted at any potential jurisdictional wetlands, Waters of the U.S. and State, and areas potentially under CDFW jurisdiction. The procedures described in the *Interim Regional Supplement to the Corps of Engineering Wetland Delineation Manual: Arid West Region* (USACE 2008) were used to identify wetlands and Waters of the U.S. in the survey area that are potentially subject to regulation under Section 404 of the Clean Water Act. The potential jurisdictional features were also examined for an OHWM. The USACE delineation methodology was also used to map potential Waters of the State that were evaluated for RWQCB jurisdiction. Areas of CDFW jurisdiction were determined by the presence of defined bed, banks, and channel, or presence of a lake or pool, and were measured to the top of bank or the edge of riparian vegetation.

Sample points were taken to determine areas of potential jurisdiction and were mapped in the field using a Global Positioning System receiver with sub-meter accuracy. Field indicators were examined, and wetland data reporting forms were used to record three parameters: hydrophytic vegetation, wetland hydrology, and hydric soils. Completed wetland determination data forms are provided in Appendix A. Photographs taken during the field survey are provided in Appendix B.

Plant species present and the presence or absence of hydrophytic vegetation was recorded. Hydrophytic vegetation was determined to be present if greater than 50 percent of the dominant species at the sample point were OBL, FACW, or FAC (USACE 2020). If the hydrophytic vegetation dominance test was not greater than 50 percent, then the prevalence index was conducted if both hydric soils and hydrology were met unless disturbed or problematic. If the prevalence index was less than or equal to 3.0 then the vegetation was considered hydrophytic. Soil pits were excavated to a depth of at least 14 inches when feasible to examine soils for evidence of hydric indicators or saturation at the sample points. Soil pit locations are synonymous with sample points. Hydric soils and wetland hydrology were determined based on the presence of one or more of the applicable indicators.

Sample points were collected in each potential jurisdictional feature and as needed at upland points to determine the extent of the feature. A sample point is considered to be within a USACE wetland if the area met all three wetland parameters. If one or more of these parameters was not met in a typical situation, the point was considered to not be within a USACE wetland. In atypical or problematic situations (i.e., when vegetation, soil, or hydrology indicators are absent due to recent human disturbance or natural causes), all three parameters are not required to be a USACE wetland.

4.0 RESULTS

4.1 Literature Review

The survey area contains one ephemeral/intermittent blue-line stream as shown in the USGS topographic map (Figure 3). Blue-line streams are shown as either broken or solid blue lines and are defined as flowing waters that are ephemeral (broken lines) or perennial (solid lines). Two NWI riverine features also occur in the survey area (USFWS 2023). Previous site-specific studies also found jurisdictional features within the survey area (LSA 2022; County of Orange Integrated Waste Management Department 2006). All potential features were assessed during the jurisdictional delineation.

Soils mapped by the U.S. Department of Agriculture National Resources Conservation Service at the sample locations are Calleguas clay loam (USDA NRCS 2023). This soil type has 50 to 75 percent slopes, is non-saline to very slightly saline, and is not considered hydric soil (USDA NRCS 2023). The presence of hydric soils was assessed during the jurisdictional delineation.

4.2 Jurisdictional Delineation

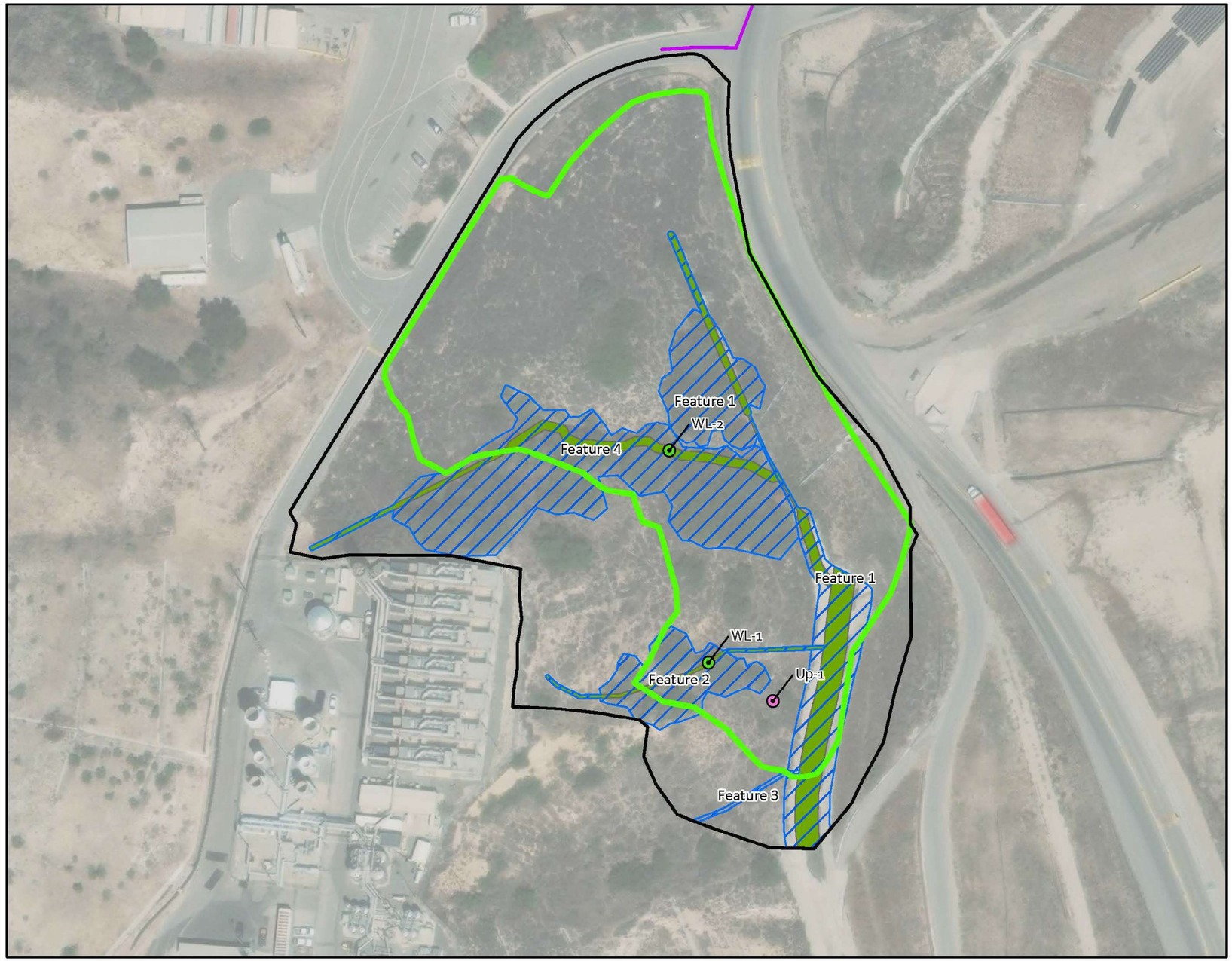
A total of four jurisdictional features were identified and mapped (Figure 4). These features were ephemeral soft- or hard-bottom (i.e., concrete) drainages. Areas of coast live oak (*Quercus agrifolia*) riparian vegetation was found around some of the features. A description of each feature is provided below. Saturated conditions and surface water were absent from the survey area besides one small portion of Feature 1, as described below. All features exhibited wetland hydrology but lacked hydric soils and hydrophytic vegetation. Results of the jurisdictional delineation conducted at these features are provided in Table 2.

Feature 1. This feature is a concrete channel that ranged in width from 2 to 40 feet. Banks were gradual to steep. In the southern portion, the wide banks of the concrete channel extended beyond the channel OHWM as shown in Figure 4. In addition, coast live oak riparian vegetation associated with this feature occurred adjacent to the channel in the northern portion. This feature was unvegetated but had portions with dense overhang of plant species that occur in sagebrush scrub and coast live oak habitats, such as coast live oak, mule fat (*Baccharis salicifolia*), California encelia (*Encelia californica*), California sagebrush (*Artemisia californica*), laurel sumac (*Malosma laurina*), and lemonade berry (*Rhus integrifolia*). Small areas of standing water were observed within this feature at a maximum of about 1 foot deep.

Feature 2. This feature is a concrete channel that transitions to soft-bottom in the central and western portions of the feature and was 3 feet wide. This feature drains water from the existing LFGTE plant to the concrete channel in the southern portion of the survey area. Banks were steep in the concrete channel and gradual in the soft-bottom area. Coast live oak riparian vegetation associated with this feature occurred adjacent to the soft-bottom channel in the central portion (Figure 4). The concrete channel was unvegetated and the soft-bottom area supported plant species that occur in sagebrush scrub and coast live oak habitats, such as coast live oak, California sagebrush, lemonade berry, and toyon (*Heteromeles arbutifolia*) as well as non-natives short podded mustard (*Hirschfeldia incana*), false brome (*Brachypodium distachyon*), and foxtail chess (*Bromus madritensis*). All areas of this feature were dry during the survey.

Feature 3. This feature is a concrete channel that was 3 feet wide. This feature continues outside the survey area to the west and likely drains water from the existing LFGTE plant to the concrete channel in the southern portion of the survey area. Banks were steep throughout. This feature was unvegetated but had overhang of sagebrush scrub plants, such as California sagebrush and non-native short podded mustard. All areas of this feature were dry during the survey.

Feature 4. This feature is a soft-bottom drainage that was 8 feet wide and transitions into a concrete channel that was 4 feet wide in the western portion of the feature (Figure 4). This feature drains water from the existing LFGTE plant to the concrete channel in the southern portion of the survey area. Banks were gradual in the soft-bottom area and steep in the concrete channel. Coast live oak riparian vegetation associated with this feature occurred throughout a majority of the feature and was dominated by coast live oak trees. All areas of this feature were dry during the survey.



Legend

- Survey Area
- Project Site
- Bowerman Landfill
- Pipeline Route

Jurisdiction

- CDFW Jurisdiction
- USACE Waters of the U.S. and RWQCB Waters of the State

Survey Point

- Upland Sample Point
- Wetland Sample Point



N

0 50 100 200 Feet

Figure 4. Wetland Delineation Results Bowerman RNG Project

Prepared For: Bowerman RNG

Prepared By: TETRA TECH

Date: 08/2023

Source: Esri, et al. 2023

Coordinate System: NAD 1983 UTM Zone 11N, Meter
Datum: North American 1983

Not for Construction

Table 2. Jurisdictional Delineation Results

Feature Number	Sample Point	Hydrophytic Vegetation	Hydric Soil	Wetland Hydrology	USACE Wetlands / Waters of the U.S.	RWQCB Waters of the State	CDFW Jurisdiction	Notes
1*	UP1	-	-	-	Yes	Yes	Yes	Concrete channel that ranged in width from 2-40 feet. In some portions the concrete banks extended beyond the channel OHWM. Coast live oak riparian vegetation occurred in the northern portion.
2	UP-1	-	-	-	Yes	Yes	Yes	Concrete channel and soft-bottom drainage that was 3 feet wide. Coast live oak riparian vegetation occurred in the central portion.
	WL-1	-	-	X				
3*	UP-1	-	-	-	No	No	Yes	Concrete channel that was 3 feet wide.
4	UP-1	-	-	-	Yes	Yes	Yes	Soft-bottom drainage (8 feet wide) and concrete channel (4 feet wide). Coast live oak riparian vegetation occurred throughout.
	WL-2	-	-	X				

Note: *Concrete-lined channels were mapped but sample points were not collected since soil pits cannot be dug.

"X" = indicator met; "-" = indicator not met.

No features met all three USACE wetland parameters required to be a wetland. However, three features within the survey area (Features 1, 2, and 4) are jurisdictional to the USACE since these features ultimately converge and connect into Bee Canyon Wash, which connects into San Diego Creek and then the Pacific Ocean. These features were determined to be USACE Waters of the U.S. since they significantly affect traditional navigable waters. One feature (Feature 3) was determined to be exempt from USACE jurisdiction since it is a ditch that drains only dry land. All areas determined to be Waters of the U.S. are also RWQCB Waters of the State. In addition, areas of CDFW jurisdiction were found, which includes all four features and the surrounding riparian vegetation in some areas.

Table 3 provides total acres of jurisdictional areas within the Project site, which includes the proposed RNG Plant footprint. Results of the delineation in the context of the USACE, RWQCB, and CDFW are discussed in Sections 4.2.1 to 4.2.3.

Table 3. Jurisdictional Areas

Feature Number	USACE Wetlands / Waters of the U.S. (acres) within Project Site	RWQCB Waters of the State (acres) within Project Site	CDFW Jurisdiction (acres) within Project Site
1	0.12	0.12	0.36
2	0.01	0.01	0.11
3	0	0	0.001
4	0.05	0.05	0.37
Total	**0.18**	**0.18**	**0.84**

4.2.1 U.S. Army Corps of Engineers

Section 404 Jurisdictional Wetlands

As shown in Table 2, no features met hydrophytic vegetation or hydric soil. Features 2 and 4 met wetland hydrology, which was in the form of water-stained leaves, drift deposits, and drainage patterns. Features 1 and 3 were concrete-lined and were unvegetated. Therefore, no features met all three wetland parameters required to be a USACE Wetland. In addition, no atypical or problematic situations were encountered. However, as discussed in the section below, three features (Features 1, 2, and 4) are jurisdictional to the USACE since they ultimately connect into and significantly affect traditional navigable waters, and Feature 3 is exempt.

Data on vegetation, hydrology, and soils collected at sample points for each feature during the jurisdictional delineation are provided on the USACE wetland determination data forms in Appendix A. All sample points are shown in Figure 4.

Section 404 Jurisdictional Waters of the U.S.

Features 1, 2, and 4 are jurisdictional channels that ultimately lead into the Pacific Ocean. Features 2 and 4 connect into Feature 1 on-site, which leads off-site to the south into Bee Canyon Wash. Bee Canyon Wash then connects into San Diego Creek and the Pacific Ocean. Therefore, these three features are considered tributaries to traditional navigable waters. These features are ephemeral and likely receive water only in response to rainfall and are not considered relatively permanent waters.

Relatively permanent waters either flow year-round or have continuous flow at least seasonally, which is typically quantified as three months. However, in combination with similarly situated waters in the region, these waters may significantly affect the chemical, physical, or biological integrity of traditional navigable waters since there is a hydrologic connection. These features may contribute flow; trap, transform, filter, or transport materials (e.g., nutrients, sediments, and other pollutants); and provide retention and attenuation of floodwaters and runoff into traditional navigable waters. These features may also provide habitat and food resources for aquatic species. Therefore, Features 1, 2, and 4 are Section 404 Waters of the U.S.

Areas Exempt from Section 404 Jurisdiction

Feature 3 was determined to be exempt from USACE Section 404 jurisdiction because it is considered a ditch excavated wholly in and draining only dry land, and does not carry a relatively permanent flow of water. Although Feature 2 is a similar concrete feature in the eastern portion, it connects through and drains a riparian area and is connected to other Waters of the U.S. as described above, and therefore is not exempt.

4.2.2 Regional Water Quality Control Board

Waters of the State

RWQCB Waters of the State include USACE Section 404 jurisdictional wetlands and Waters of the U.S. Therefore, Waters of the State were identified within the survey area at Features 1, 2, and 4 since these three features are considered Waters of the U.S. (Figure 4). Feature 3 is not a Waters of the U.S. or wetland and is therefore also not a Waters of the State.

Areas Exempt from State Jurisdiction

No features in the survey area were determined to be exempt from RWQCB jurisdiction.

4.2.3 California Department of Fish and Wildlife

Features 1 through 4 have defined bed, banks, and channel or are connected directly upstream or downstream to an area that does. In addition, coast live oak riparian vegetation was found surrounding potions of Features 1, 2, and 4 (Figure 4). The features as well as the adjacent riparian vegetation are under CDFW jurisdiction.

5.0 CONCLUSION

Three features under USACE and RWQCB jurisdiction were identified in the survey area, which includes Features 1, 2, and 4. These features and Feature 3 are under CDFW jurisdiction. Portions of each feature overlap with the proposed Project site. It is recommended that impacts are avoided to areas under the jurisdiction of the USACE, RWQCB, and CDFW. Coordination with these agencies is recommended to determine if the previously obtained permits still apply or if a modification or new permits are required, including a Section 404 permit from the USACE, a Water Quality Certification from the RWQCB, and a Lake and Streambed Alteration Agreement from the CDFW (County of Orange Integrated Waste Management Department 2006). The previously permitted or new jurisdictional features that occur in the survey area are as follows:

- Feature 1 – previously permitted from USACE and RWQCB, CDFW area is new.
- Feature 2 – not permitted.
- Feature 3 – not permitted.
- Feature 4 – previously permitted from USACE and RWQCB, CDFW area is new.

This Report is subject to verification by the USACE, RWQCB, and CDFW.

6.0 REFERENCES

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APPENDIX A: WETLAND DETERMINATION DATA FORMS

APPENDIX B: PHOTOGRAPHS

Photograph 1	
Location: Feature 1	
Notes: Overview of Feature 1.	

Photograph 2	
Location: Feature 1	
Notes: Overview of Feature 1.	

Photograph 3	
Location: Feature 2	
Notes: Overview of Feature 2 and Sample Point WL-1.	

Photograph 4	
Location: Feature 3	
Notes: Overview of Feature 3.	

Photograph 5	
Location: Feature 4	
Notes: Overview of Feature 4 and sample point WL-2.	

Photograph 6	
Location: Upland	
Notes: Sample Point UP-1.	

APPENDIX C3: CROTCH'S BUMBLE BEE SURVEYS

August 22, 2025

Ms. Paula Fell
Tetra Tech, Inc.
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614-6213

RE: Results of 2025 Crotch's Bumble Bee Focused Surveys for the Frank R. Bowerman Landfill Renewable Gas Plant Project

Dear Ms. Fell

ECORP Consulting, Inc. (ECORP) conducted three focused surveys to evaluate the presence or absence of Crotch's bumble bee (CBB; *Bombus crotchii*) and to search for active nests within the Frank R. Bowerman (FRB) Landfill Renewable Natural Gas Plant Project (Project) located in Orange County, California. This letter report summarizes the results of the CBB focused surveys conducted in March, April, and May during 2025 CBB flight season.

INTRODUCTION

Project Description and Location

The Project proposes construction of a new renewable natural gas plant (RNG Plant) to process and transport landfill gas (LFG) that is produced by the FRB Landfill to a new Southern California Gas (SoCalGas) pipeline. The RNG Plant site will be approximately 3.52 acres in size and the new pipeline will extend approximately 2.4 miles, primarily within an existing roadway. The RNG Plant has been designed to process a maximum of 6,000 standard cubic feet per minute of raw LFG at the inlet. The process will remove nitrogen, oxygen, carbon dioxide, sulfur hydroxide, hydrogen sulfide, volatile organic compounds, and other minor impurities to meet the specifications of SoCalGas.

The Project encompasses two primary areas of disturbance: the new RNG Plant and the new SoCalGas pipeline (Appendix A, Figure 1). The RNG Plant will occupy 3.52 acres of undeveloped land on the eastern side of the Project site, adjacent to the existing Bowerman Power Plant and the FRB Landfill flare station. The new SoCalGas pipeline will span 2.4 miles, beginning at the RNG Plant and extending along Bee Canyon Access Road and Portola Parkway to connect with the existing pipeline infrastructure.

The Project is situated at the FRB Landfill in Orange County, California and the RNG Plant is bordered by Bee Canyon Access Road to the north and northwest, the existing Bowerman Power Landfill Gas to Energy plant and flare station to the west, and open space and roads to

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the south. The Project is surrounded by Orange County Central-Coastal Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP) Reserve open space. The Project lies within the U.S. Geological Survey El Toro 7.5-Minute Topographic Quadrangle Map. Surrounding land uses include other areas of Bowerman Landfill, open space, agricultural fields, residential areas, roads, and highways.

Crotch's Bumble Bee Natural History

Bumble bees live in social colonies and have different divisions of labor (or castes) that include a queen (reproductive female), workers (non-reproductive females), drones (males), and gyne (females destined to become queens). The California Department of Fish and Wildlife's (CDFW's) survey considerations define the queen flight season as February through March, the gyne flight season as September through October, and the colony active period (highest probability of detection) as April through August (CDFW 2023).

CBB is typically distinguished from other bumble bee species based on hair coloration. Queens and workers have identical color patterns with black hair on the face and yellow on top of the head (vertex). The hair on the front portion of the thorax (scutum) is yellow and the hairs between and below the wings, as well as on the back portion of the thorax (scutellum) are typically black. The coloration on the bodies of the queens and workers varies between the segments on the abdomen. The first tergal (T-dorsal plate, T1) segment on the abdomen is black medially, T2 is yellow, with occasional black medially and anteriorly, and T3 is black anteriorly and occasionally red posteriorly. T4 and T5 are either entirely black or red (Hatfield et al. 2018). Males typically have an enlarged or bulbous body shape, with yellow hair on the head and face. Both the scutum and scutellum are yellow, and there is a black band between the wings. T1 and T2 are occasionally yellow, with T3 being yellow laterally and posteriorly. T4 to T7 are either entirely black or entirely red (Hatfield et al. 2018). Body size also varies between queens, workers, and males, with queens ranging between 22 and 25 millimeters (mm) in length, workers ranging between 12 and 20 mm in length, and males ranging between 14 and 19 mm in length. CBB is found throughout California in many different habitats including open grasslands, shrublands, chaparral, desert scrub, and urban settings. It is nearly endemic to California with the exception of a few records in bordering states (CDFW 2022).

Similar to other bumble bee species, CBB is a generalist forager and visits a variety of flowering plants. It is a short-tongued bumble bee and is therefore best suited to forage on open flowers with short corollas (Hatfield et al. 2018). Plant families most commonly associated with CBB records in California include Fabaceae, Apocynaceae, Asteraceae, Lamiaceae, Hydrophyllacae, Asclepiadaceae, and Boraginaceae (Hatfield et al. 2018). Other reports commonly associate CBB with plants in the genera *Antirrhinum, Phacelia, Clarkia, Cordylanthus, Dendromecon, Eschscholzia, Eriogonum, Hypericum, Lantana, Lupinus, Salvia, Asclepias, Cirsium, Monardella,*

Keckiella, Acmispon, Euthamia, Ehrendorferia, Vicia, Trichostema, Chaenactis, and/or *Medicago* as nectaring sources.

CBB primarily nests underground, though colony sizes have not been well documented, and this species may utilize similar nesting habitats as other *Bombus* species (Williams et al. 2014). In general, *Bombus* queens do not dig or make their own nests, but rather have been observed to occupy cavities in a variety of substrates including thatched grasses, abandoned rodent burrows or bird nests, brush piles, rock piles, and fallen logs (Alford 1975; Free and Gasking Butler 1959; Fussell and Corbet 1992; Lye et al. 2012; Sladen 1912; Williams et al. 2014) and have also been found nesting in human-made structures such as walls, rubble or abandoned furniture (Fussell and Corbet 1992; Williams et al. 2014). Bumble bee nests are annual and conclude with deaths of the queen, workers, and drones at the end of the season with only the mated gyne surviving the winter (overwintering) to emerge the following spring to start the next year's colony.

Very little is known about the overwintering habitat typically utilized by CBB. However, based on overwintering sites of other bumble bee species, it is possible that CBB overwinters in soft, disturbed soils or under leaf litter and other debris (Hatfield et al. 2018), and on grassy north-facing slopes (Liczner et al, 2019). Factors that have been identified as a substantial threat to the survival and reproduction of CBB include loss of habitat due to human landscape modifications (i.e., agricultural intensification, livestock grazing, urban development), increased use of herbicides and pesticides, competition, climate change, genetic factors, and disease and pathogen spillover (Hatfield et al. 2018).

Crotch's Bumble Bee Status

CBB was petitioned for listing under the California Endangered Species Act (CESA) in October 2018 (Hatfield et al. 2018). In June of 2019, CBB was designated as a Candidate for listing and the designation was challenged in the courts. The candidacy was temporarily stayed beginning in February of 2021, and candidacy was subsequently reinstated in September of 2022 (CDFW 2025a). As a state candidate species, CBB is afforded the same protection as a species listed as threatened or endangered until a decision is made to officially list it under CESA. CBB is not a Covered Species under the Orange County Central-Coastal NCCP/HCP.

METHODOLOGY

Literature Review

Prior to conducting focused CBB surveys, a database query of CDFW's California Natural Diversity Database (CNDDB; CDFW 2025b), and Xerces Society's Bumble Bee Watch (Xerces Society 2025) for historic and recent CBB occurrences within 5 miles of the Project was conducted. The literature review results and surveys were reviewed by a CBB qualified biologist.

CBB Habitat Evaluation

The vegetation communities map and existing conditions were reviewed to determine potential focused survey areas (Tetra Tech 2024). Developed areas were excluded from surveys as these are comprised of paved areas that do not provide potential CBB habitat. A microhabitat assessment was conducted during each focused survey to determine quality, diversity, and abundance of flowering resources and quality of foraging, nesting, and overwintering habitat.

CBB Focused Surveys

The Proposed Survey Plan and lead CBB Biologist's qualifications were submitted to CDFW Regional biologists on May 5, 2025 and approved by CDFW on May 7, 2025. Three surveys were conducted by the lead CBB Biologist and one assistant in accordance with the CDFW-approved Survey Plan for non-lethal, non-capture techniques during appropriate weather conditions (ECORP 2025). Surveys were conducted throughout non-excluded habitat within the CBB survey area during the flight season (March 1 through September 1), spaced no closer than two to three weeks apart, with at least two of the surveys completed during the colony active period for the highest nest detection probability. Surveys were conducted on clear or mostly sunny days when temperatures were between 65°F (degrees Fahrenheit) and 90°F (18.3°C[degrees Celsius] -32.2°C) and were not conducted during inclement weather conditions (e.g., foggy, raining, or drizzling, sustained winds greater than 8 mph, or during mostly cloudy conditions when surveyors are unable to see their shadow). Surveys were conducted at least two hours after sunrise and three hours before sunset. Each bumble bee and Crotch's bumble bee location was recorded using GPS enabled smart devices equipped with ESRI's ArcGIS Field Maps and noted on standardized data sheets. Micro-habitat assessments were completed and representative photographs were taken during each of the focused surveys to document flowering resources available at the time of each survey. Weather conditions (e.g., air temperature, wind speed, and cloud cover) were recorded at the start and end of each survey.

RESULTS

Literature Review

The literature review determined two CNDDB, 23 iNaturalist, and six Bumble Bee Watch records have been recorded within 5 miles of the site. No occurrences were recorded within the Project limits.

Survey Initiation and Timing

A total of three focused CBB surveys were conducted by CDFW authorized lead biologist, Christine Tischer, and one assistant biologist during each survey. All surveys were conducted

during weather conditions conducive to detection of CBB. Although the Project Specific Survey Plan stated surveys would be spaced no closer than three weeks apart, adjustments were made to avoid unsuitable survey conditions yet also capture the peak blooming period of preferred nectar sources at the site as determined by the micro-habitat assessments. Survey timing and weather conditions are summarized in Table 1.

Table 1. Crotch's Bumble Bee Focused Survey Data

Survey No.	Date	Surveyor[1]	Time		Temperature (°F)		Cloud Cover (%)		Wind Speed (mph)	
			Start	End	Start	End	Start	End	Start	End
1	03/19/25	CLT, DJ	0942	1509	61	78	0	0	0-2	0-3
2	04/22/25	CLT, DJ	1105	1620	62	69	0	0	0-3	1-4
3	05/07/25	CLT, SH	1015	1435	66	75	90	0	2-4	2-4

Notes: °F = degrees Fahrenheit; mph = miles per hour
[1]CLT = Christine Tischer; DJ = Daniel Jaques, SH = Sam Harrison

Crotch's Bumble Bee Micro Habitat Assessments

The Project contains multiple vegetation communities including sagebrush scrub (13.3 acres), disturbed sagebrush scrub (0.2 acre), coast live oak (1.8 acres), eucalyptus (1.2 acres), ornamental trees (1.0 acre), but the 2.4-mile linear pipeline portion of the Project is largely disturbed (2.4 acres) and developed (18.9 acres) (Appendix A, Figure 2, Orange County Waste & Recycling 2024). Developed areas including the 35-foot-wide unvegetated concrete channel within the RNG Plant portion of the Project as well as Bee Canyon Access Road and Portola Parkway, did not provide CBB habitat and were excluded from surveys. Representative photographs are included in Appendix B.

Preferred nectaring resources including California buckwheat (*Eriogonum fasciculatum*), deerweed (*Acmispon glaber*), white sage (*Salvia apiana*), black sage (*Salvia mellifera*), Parry's phacelia (*Phacelia parryi*), and hairy vetch (*Vicia villosa*) were interspersed throughout the sagebrush scrub and small rodent burrows were detected in the open areas. Therefore, the sagebrush scrub areas were assessed as providing high quality nesting and foraging habitat. A significant amount of landfill trash was present in the northeastern portion of the RNG Plant Project area on the southwest facing slope below Bee Canyon Access Road. Although the habitat quality was greatly diminished at the time of the surveys, flowering resources (primarily brittlebush [*Encelia farinosa*]) were still present and the trash may provide atypical nesting and overwintering habitat. This area was still included as high-quality habitat since the trash appeared to have only recently blown onto the site since the time of vegetation mapping (Google Earth 2024; Tetra Tech 2024).

Minimal flowering resources were present in the understory of the areas with trees and were limited to areas with breaks in the canopy and sunlit edges. Non-native Indian hawthorn

(*Rhaphiolepis indica*) shrubs were present in the understory of the ornamental trees along Portola Highway and do not serve as a known CBB preferred nectar resource. Steep slopes within the RNG Plant portion of the Project limited the accumulation of leaf litter and small mammal activity, but leaf litter, downed wood, and woodrat (*Neotoma* sp.) middens in the understory, where present, may serve as overwintering habitat. Therefore, the coast live oak, eucalyptus, and ornamental trees were assessed as providing low quality foraging, nesting, and overwintering habitat.

Crotch's Bumble Bee and Other Bumble Bee Detections

ECORP observed a total of two CBB individual sightings over the course of the three focused surveys. Both Crotch's bumble bee observations were determined to be queens based on size and behavior in relation to the seasonal progression (delayed blooming resulting in delayed CBB emergence). No collected pollen was observed within the corbicula (i.e., pollen baskets) and queens were observed actively foraging and some pollen dust could be detected on their leg and body hairs indicating that the queens were not likely collecting pollen to support a nest in the area. CBB nest searching behavior was not noted during any of the surveys. Some offsite survey areas were not accessible, so surveys were limited to the use of binoculars to scan past the fences along the inbound and outbound sides of Bee Canyon Access Rd., as well as several steep slope areas in the RNG Plant portion of the Project Site.

The first CBB individual (CBB-1) was observed foraging in the maintained landscaping on a western redbud (*Cercis occidentalis*) between the landfill entry road and the offices within the 50-foot buffer of the proposed SoCalGas pipeline during the first focused CBB survey conducted on March 19, 2025 (Figure 3a). The second CBB individual (CBB-2) was seen foraging on a black sage, at the edge of the 50-foot buffer also along the proposed SoCalGas pipeline (Appendix A, Figure 3). Both CBB individuals appeared to be freshly emerged queens not collecting or carrying pollen which would indicate they were not likely tending a colony at that time. No CBB workers, males, or nests were detected during 2025 focused surveys.

Two other bumble bee species including California bumble bee (*Bombus californicus*) and yellow-faced bumble bee (*Bombus vosnesenskii*) were observed. Both were observed foraging on freshly flowering deerweed. The total number of bumble bees detected during each focused survey are summarized in Table 2 and flowering resources noted during each survey can be found on the field data sheets in Appendix C.

Table 2. Bumble Bee Observations during Focused Surveys			
Bumble Bees Observed	**Survey 1**	**Survey 2**	**Survey 3**
Crotch's bumble bee (*Bombus crotchii*)	**1**	**0**	**1**
California bumble bee (*Bombus californicus*)	0	1	0
Yellow-faced bumble bee (*Bombus vosnesenskii*)	0	1	0

Notes: Survey 1: March 19, 2025; Survey 2: April 22, 2025; Survey 3: May 07, 2025.

Other Pollinators and Incidental Detections

Other pollinators observed during the focused surveys included Sara orangetip (*Anthocharis sara*), Behr's metalmark (*Apodemia virgulti virgulti*), metallic green sweat bee (*Agapostemon* sp.), unidentified sweat bee (*Halictidae* sp.), bee fly (*Bombylius* sp.), hoverfly (family Syrphidae), dragonfly (*Anisoptera* sp.), California bumble bee, yellow-faced bumble bee, Crotch's bumble bee, ladybug larvae (*Coccinella* sp.), tarantula hawk (*Pepsis thisbe*), mountain carpenter bee (Xylocopa *tabaniformis*), valley carpenter bee (*X. varipuncta*), Costa's hummingbird (*Calypte costae*), and Anna's hummingbird (*C. anna*).

Several species that are considered adequately conserved by the NCCP/HCP were incidentally detected during focused CBB surveys including: coyote (*Canis latrans*), least Bell's vireo (*Vireo bellii pusillus*), and Catalina mariposa lily (*Calochortus catalinae*). Least Bell's vireo is a federal and state listed (endangered) bird species, but coyote and Catalina mariposa lily do not have a federal or state special status. Woodrat middens were also detected and may or may not belong to San Diego desert woodrat (*Neotoma lepida intermedia*), a CDFW Species of Special Concern (SSC) and an NCCP/HCP covered species. CDFW California Natural Diversity Data Base (CNDDB) report forms were submitted for all CBB and incidental listed and SSC observations and their locations are included in Appendix A, Figure 3.

IMPACT ANALYSIS

The Project as currently designed will permanently impact 2.9 acres of sagebrush scrub in the Project site and Fuel Modification Area. Because the surrounding NCCP/HCP Reserve supports similar high-quality foraging, nesting, and overwintering habitat, the permanent loss of 2.9 acres of sagebrush scrub would not be significant as long as nests and overwintering queens are not directly affected. CBB choose nest and overwintering sites on an annual basis and locations cannot be determined beforehand based on presence of potential habitat. Should a nest or overwintering queen be present within the Project impact area at the time of construction, ground-disturbing activities may cause death or injury of adults, eggs, and larva; burrow collapse; nest abandonment; and/or reduced nest success.

The proposed pipeline impact area will be limited to the existing developed roads that have been previously stabilized and will only require trenching during placement. Directly outside of the proposed pipeline area are some naturally occurring (i.e., sagebrush scrub) or naturalized habitats (i.e., eucalyptus trees), as well as artificial (i.e., ornamental trees) and disturbed habitats. Trenching activities, including stockpiling of dirt along road shoulders, parking, increased foot traffic, and traffic control associated with pipeline construction may result in temporary impacts, but would not result in significant impacts to CBB unless a CBB nest was present along the disturbed roadsides at the time of construction.

CONCLUSIONS AND RECOMMENDATIONS

A total of two individual observations of CBB were detected during the three focused surveys. Bumble bees, in general, were not abundant at the time of the surveys despite the presence of potential CBB habitat of various quality. Implementation of the Project will result in the loss of potential foraging, nesting, and overwintering habitat for CBB. Nest colony locations are chosen annually, and none were found during the focused surveys. If a nesting colony were to be present or a CBB individual were to be underground during ground disturbing activities, then the Project could result in death or injury of adults, eggs, and larvae through burrow collapse.

Even though CBB nests were not found during the focused CBB surveys, focused Crotch's bumble bee preconstruction detection and nest surveys are recommended immediately prior to initial vegetation clearing or ground disturbing activities. Due to the difficulty in detecting underground nests and overwintering individuals, biological monitoring is recommended during initial vegetation removal and ground disturbing activities, no matter the time of year. Therefore, preparation and implementation of a Project specific CBB Avoidance Plan developed by a qualified CBB biologist with input from CDFW is recommended. The CBB Avoidance Plan should include effective, specific, enforceable, and feasible measures including a Worker Environmental Awareness Program for all Project personnel, pre-construction focused CBB surveys, biological monitoring during initial vegetation removal and ground disturbing activities, establishment of no-work buffers or defining areas that require staggered clearing, planting and pesticide use restrictions, and CDFW reporting requirements.

If you have any questions about the information presented in this letter, please contact me at ctischer@ecorpconsulting.com or (714) 648-0630.

Sincerely,

Christine Tischer

Christine Tischer
Senior Biologist/Project Manager

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LIST OF APPENDICES

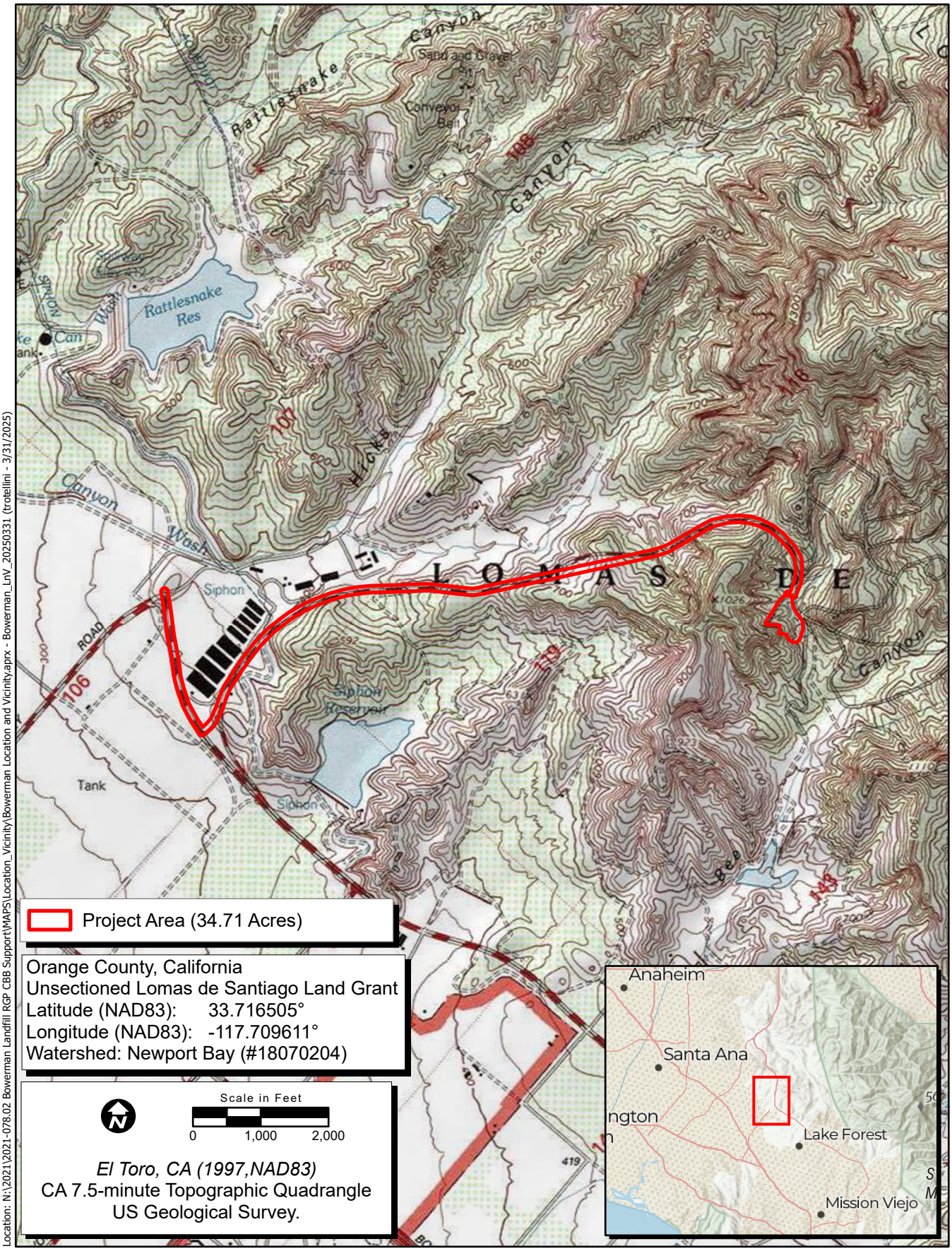
Appendix A – Figures

Appendix B – Representative Photographs

Appendix C – Field Data Sheets

APPENDIX A

Figures



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Map Date: 3/31/2025
Sources: ESRI, USGS

Figure 1. Project Location and Vicinity



Map Contents

- SoCalGas Pipeline Alignment

Vegetation Communities

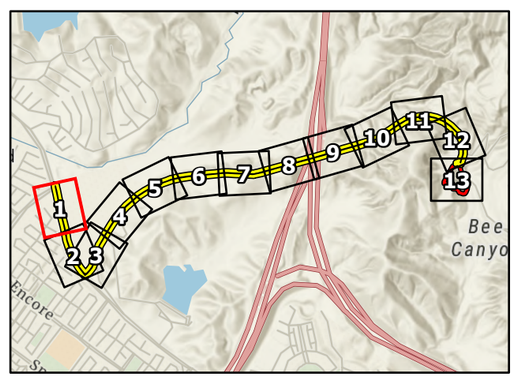
- Ornamental trees

Land Cover Types

- Developed
- Disturbed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

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Scale in Feet
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Figure 2. Vegetation Communities and Land Cover Types
Sheet 1 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- SoCalGas Pipeline Alignment

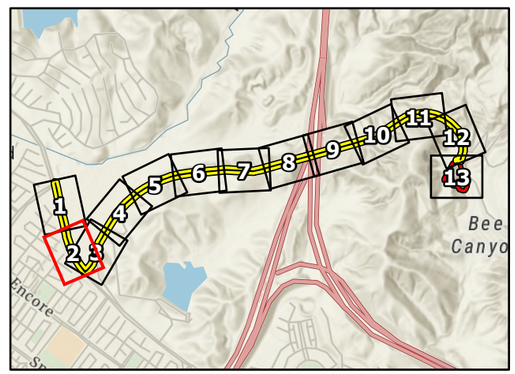
Vegetation Communities

- Eucalyptus
- Ornamental trees
- Sagebrush Scrub
- Disturbed Sagebrush Scrub

Land Cover Types

- Developed
- Disturbed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



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Map Date: 8/13/2025

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Scale in Feet
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Figure 2. Vegetation Communities and Land Cover Types
Sheet 2 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- SoCalGas Pipeline Alignment

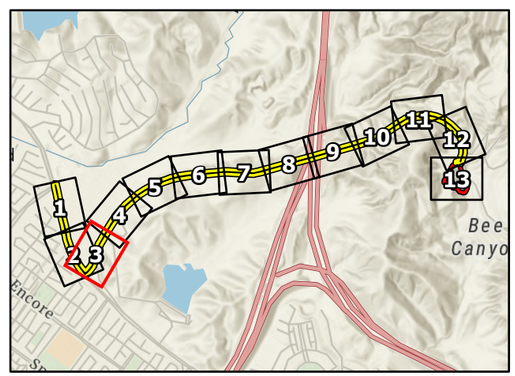
Vegetation Communities

- Eucalyptus
- Ornamental trees
- Sagebrush Scrub
- Disturbed Sagebrush Scrub

Land Cover Types

- Developed
- Disturbed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



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Map Date: 8/13/2025

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Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 3 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

Eucalyptus

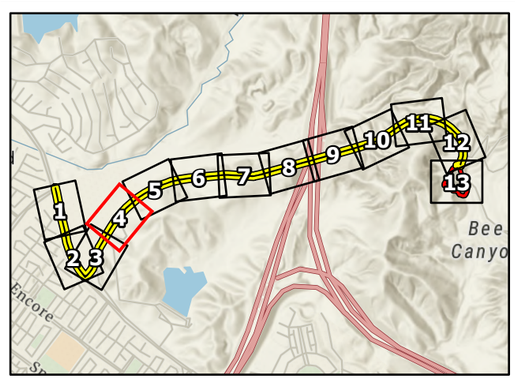
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



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Map Date: 8/13/2025

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Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 4 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

Eucalyptus

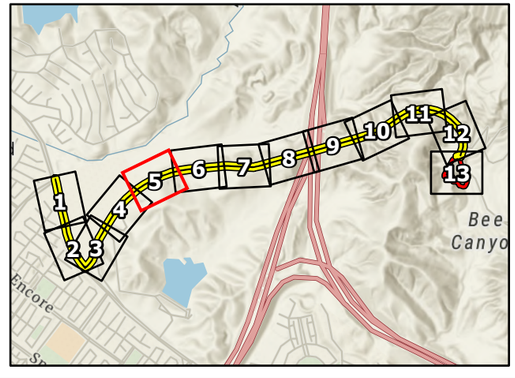
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



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Map Date: 8/13/2025

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Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 5 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

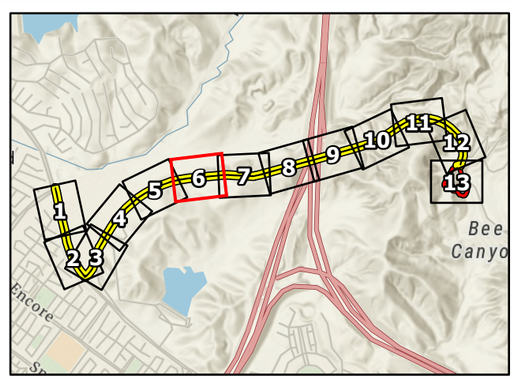
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



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Map Date: 8/13/2025

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Scale in Feet
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Figure 2. Vegetation Communities and Land Cover Types
Sheet 6 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

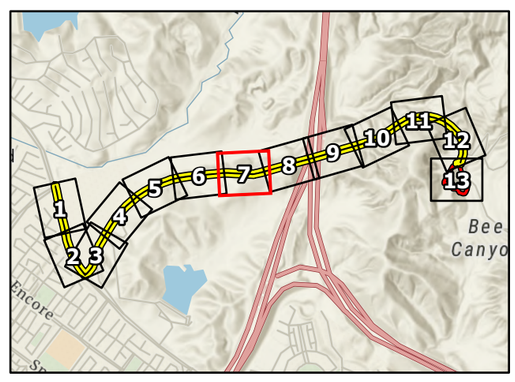
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



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Map Date: 8/13/2025

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Scale in Feet
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Figure 2. Vegetation Communities and Land Cover Types
Sheet 7 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

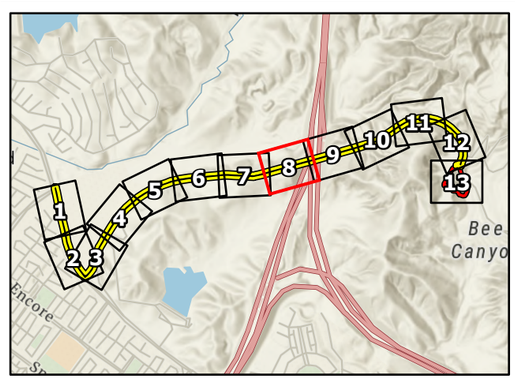
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



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Map Date: 8/13/2025

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Scale in Feet
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Figure 2. Vegetation Communities and Land Cover Types
Sheet 8 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- SoCalGas Pipeline Alignment

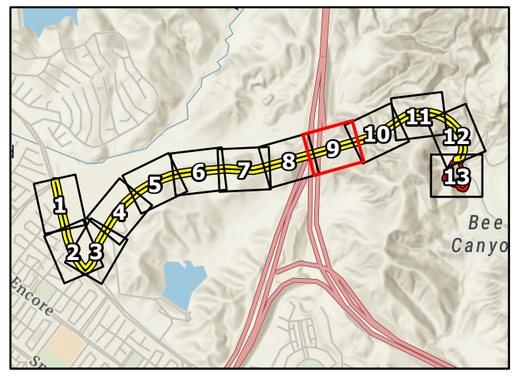
Vegetation Communities

- Sagebrush Scrub

Land Cover Types

- Developed
- Disturbed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation.aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

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Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 9 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- SoCalGas Pipeline Alignment

Vegetation Communities

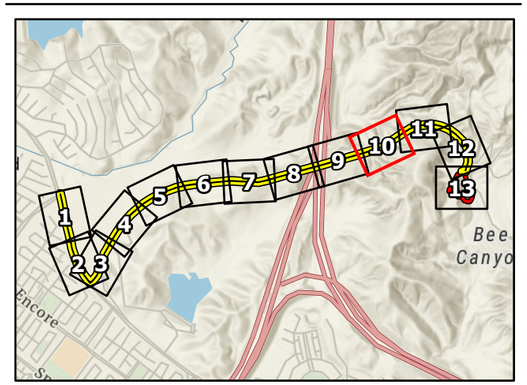
- Sagebrush Scrub

Land Cover Types

- Developed
- Disturbed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

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Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 10 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

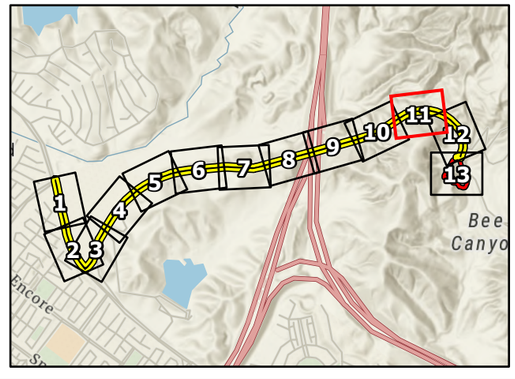
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

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Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 11 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- Proposed RNG Plant Boundary
- SoCalGas Pipeline Alignment

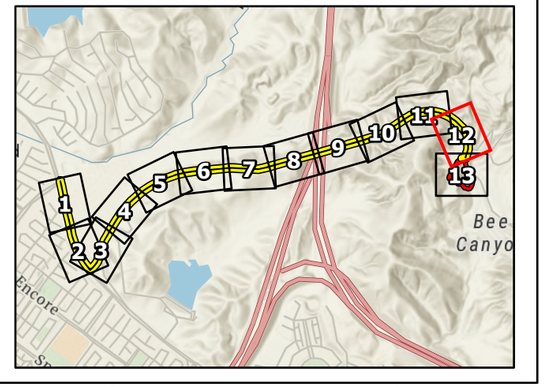
Vegetation Communities

- Sagebrush Scrub

Land Cover Types

- Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 12 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- Proposed RNG Plant Boundary
- SoCalGas Pipeline Alignment

Vegetation Communities

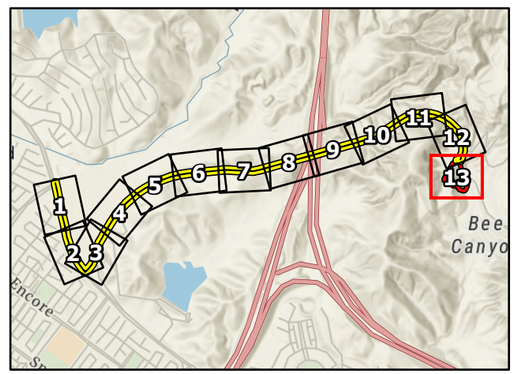
- Coast Live Oak
- Sagebrush Scrub
- Disturbed Sagebrush Scrub

Land Cover Types

- Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation.aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 13 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

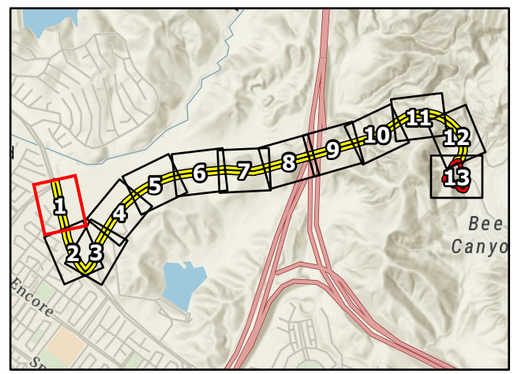
- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- Low Quality Habitat - Potential for Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources aprx - Bowerman_CBB_HA_20250331 (trotellini - 8/21/2025)

Map Date: 8/21/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Focused Survey Results
Sheet 1 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



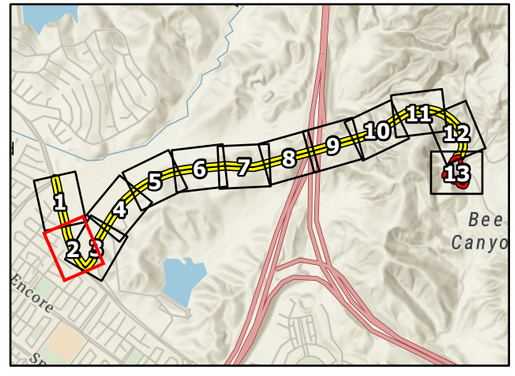
Map Contents

- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Moderate Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting, Foraging, and Overwintering
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 8/21/2025)

Map Date: 8/21/2025

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ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Focused Survey Results
Sheet 2 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

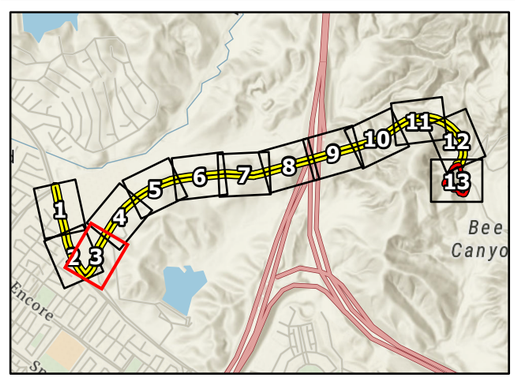
Special-Status Species Detections

- Least Bell's Vireo
- Yellow warbler

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Moderate Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting, Foraging, and Overwintering
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 8/21/2025)

Map Date: 8/21/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Focused Survey Results
Sheet 3 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Special-Status Species Detections

Least Bell's Vireo

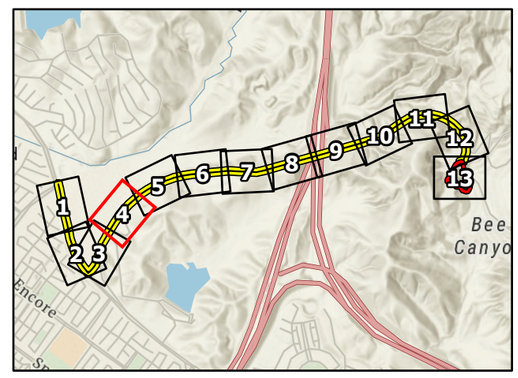
Crotch's Bumble Bee Habitat Suitability

High Quality Habitat - Potential for Nesting and Foraging

Low Quality Habitat - Potential for Nesting, Foraging, and Overwintering

No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttotellini - 8/21/2025)

Map Date: 8/21/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Focused Survey Results
Sheet 4 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Bumble Bee Observations

Yellow-faced Bumble Bee

Crotch's Bumble Bee Habitat Suitability

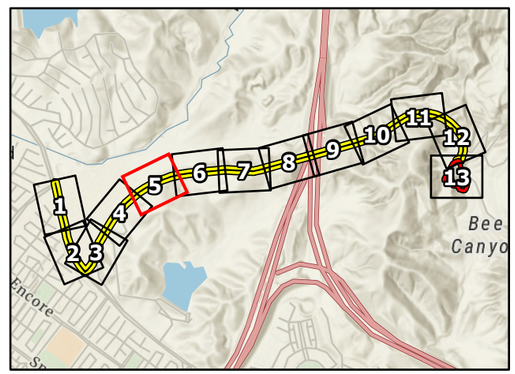
High Quality Habitat - Potential for Nesting and Foraging

Low Quality Habitat - Potential for Nesting, Foraging, and Overwintering

No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources aprx - Bowerman_CBB_HA_20250331 (trotellini - 8/21/2025)

Map Date: 8/21/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Focused Survey Results
Sheet 5 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

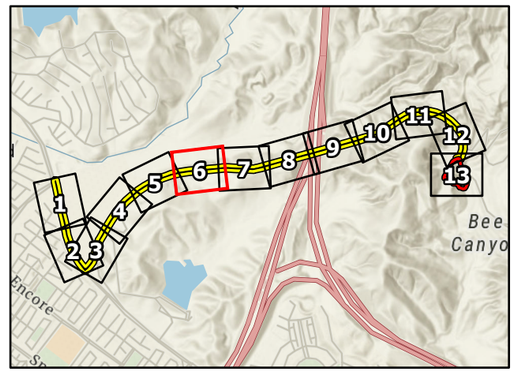
Crotch's Bumble Bee Habitat Suitability

High Quality Habitat - Potential for Nesting and Foraging

No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (trotellini - 8/21/2025)

Map Date: 8/21/2025

ECORP Consulting, Inc.
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Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Focused Survey Results
Sheet 6 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Bumble Bee Observations

- Crotch's Bumble Bee Observation (5/7/2025)
- California Bumble Bee

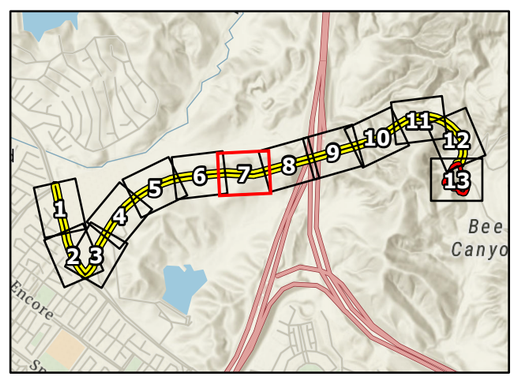
Special-Status Species Detections

- Least Bell's Vireo

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 8/21/2025)

Map Date: 8/21/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Focused Survey Results
Sheet 7 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

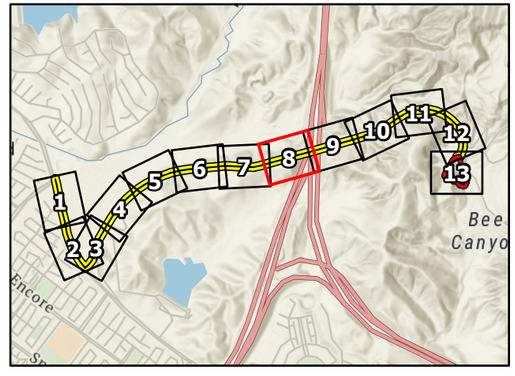
Crotch's Bumble Bee Habitat Suitability

High Quality Habitat - Potential for Nesting and Foraging

No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttotellini - 8/21/2025)

Map Date: 8/21/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Focused Survey Results
Sheet 8 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



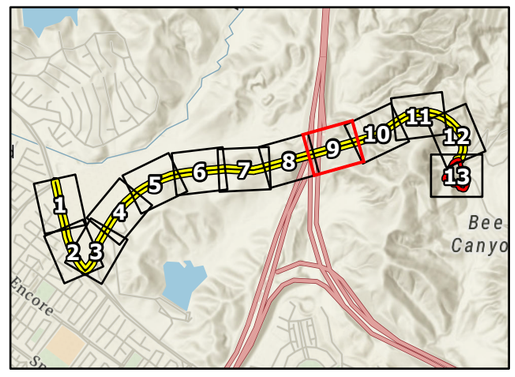
Map Contents

- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttotellini - 8/21/2025)

Map Date: 8/21/2025

ECORP Consulting, Inc.
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Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Focused Survey Results
Sheet 9 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



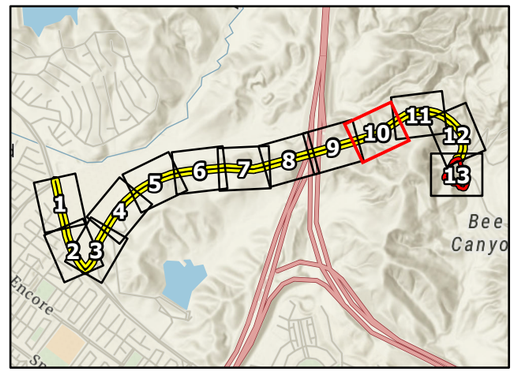
Map Contents

- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



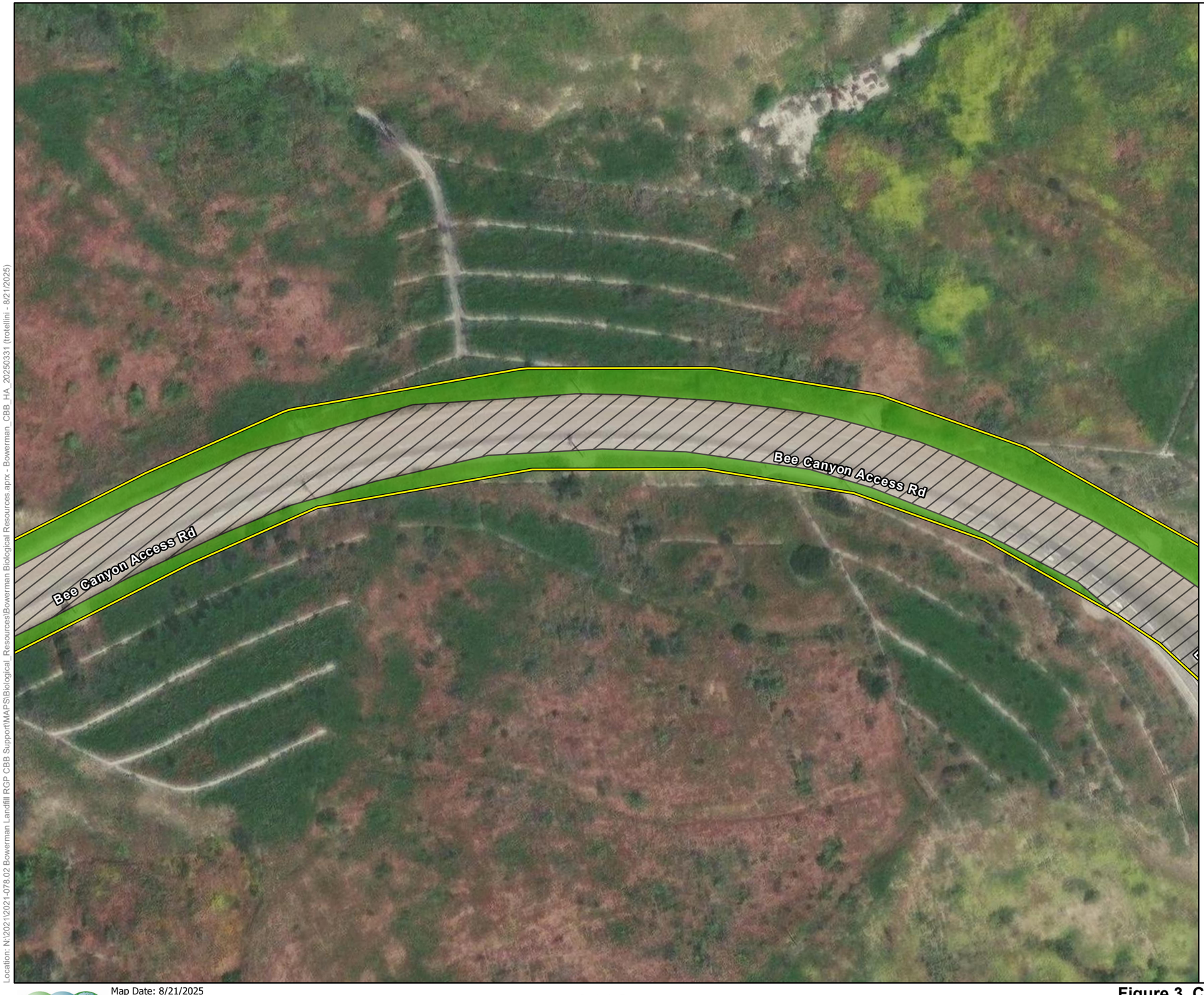
Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 8/21/2025)

Map Date: 8/21/2025

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ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Focused Survey Results
Sheet 10 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

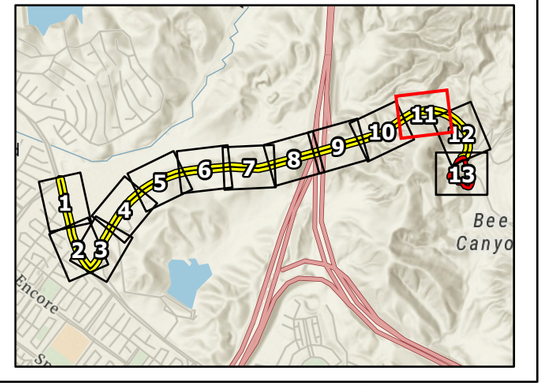
Crotch's Bumble Bee Habitat Suitability

High Quality Habitat - Potential for Nesting and Foraging

No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



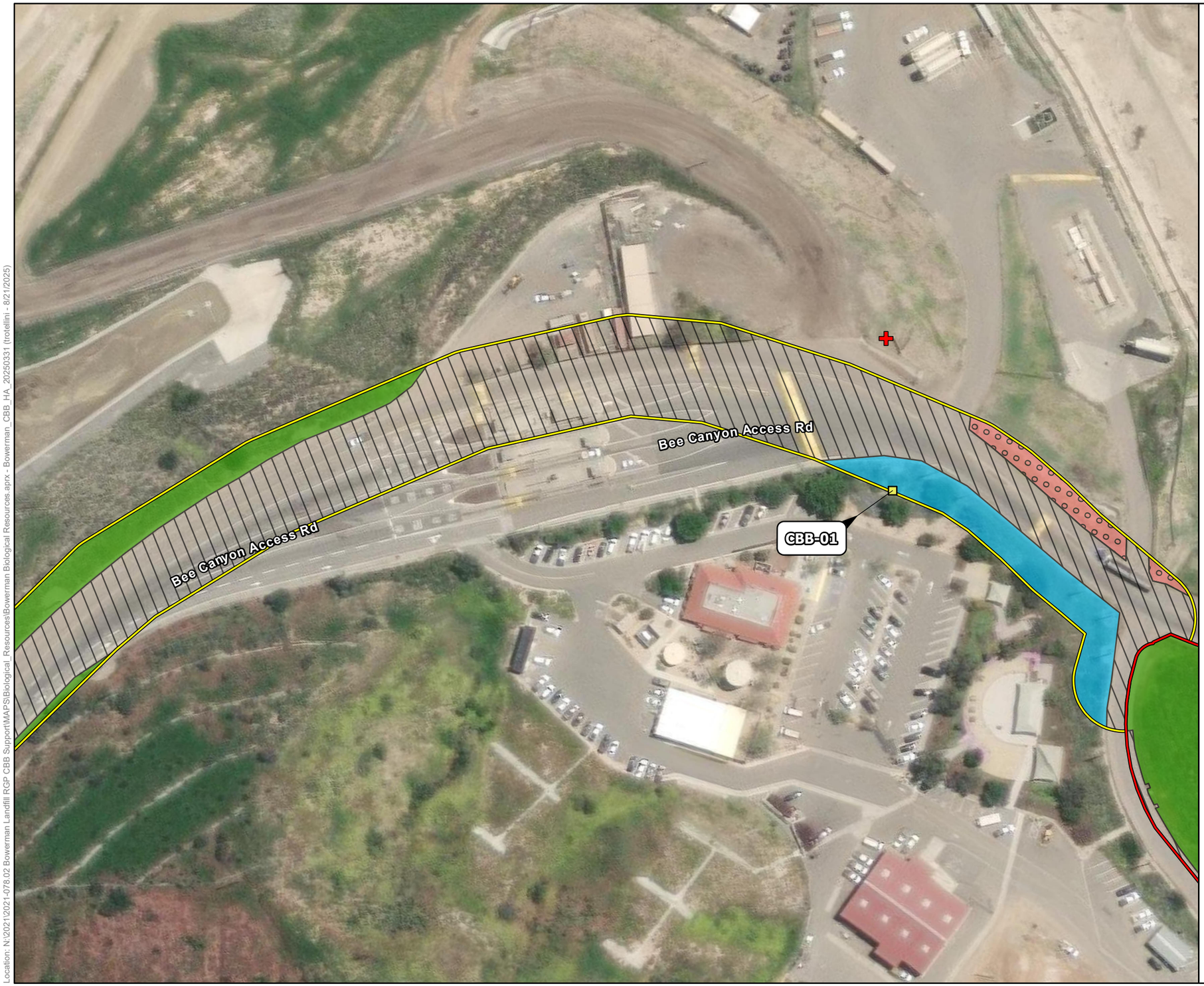
Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources aprx - Bowerman_CBB_HA_20250331 (ttotellini - 8/21/2025)

Map Date: 8/21/2025

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ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Focused Survey Results
Sheet 11 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- Proposed RNG Plant Boundary
- SoCalGas Pipeline Alignment

Bumble Bee Observations

- Crotch's Bumble Bee Observation (3/19/2025)

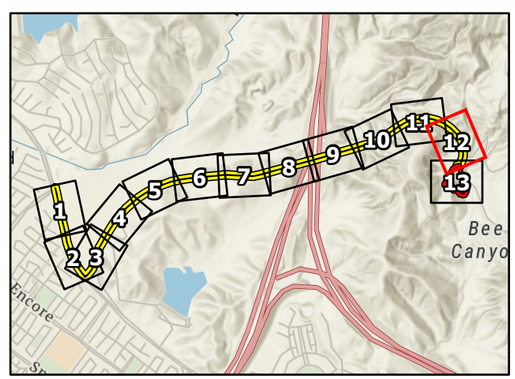
Other

- Active Honybee Hive

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Moderate Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 8/21/2025)

Map Date: 8/21/2025

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ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Focused Survey Results
Sheet 12 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- Proposed RNG Plant Boundary
- SoCalGas Pipeline Alignment

Special-Status Species Detections

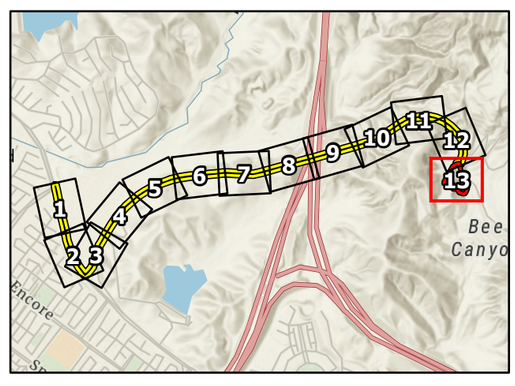
- Least Bell's Vireo
- Woodrat Midden

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Moderate Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting, Foraging, and Overwintering
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources aprx - Bowerman_CBB_HA_20250331 (ttotellini - 8/21/2025)

Map Date: 8/21/2025

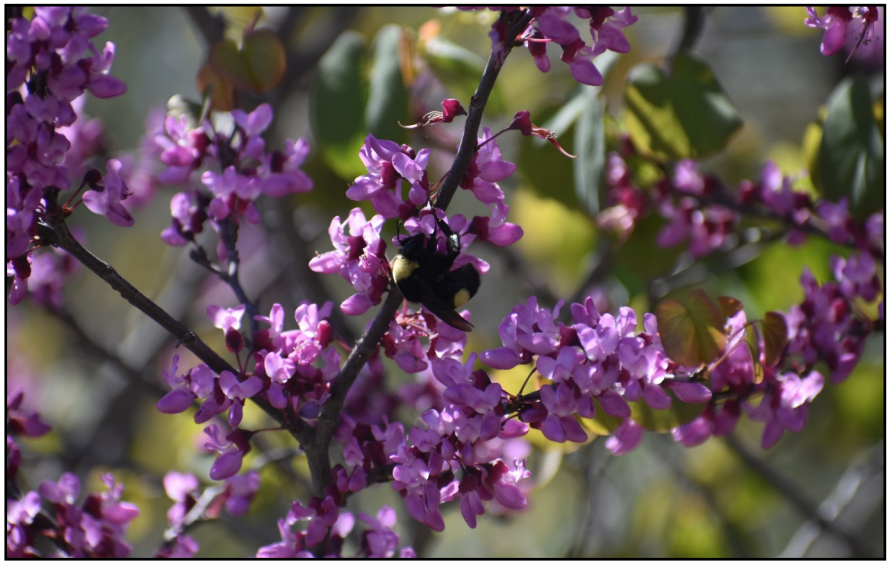
ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Focused Survey Results
Sheet 13 of 13
2021-078.02 Bowerman Landfill RGP CBB Support

APPENDIX B

Representative Photographs



Queen Crotch's Bumble Bee (*Bombus crotchii*) Observed Nectaring on Western Redbud in Native Landscaping during Survey 1 on March 19, 2025.



Crotch's Bumble Bee (*Bombus crotchii*) Observed Nectaring on Black Sage Along Native Slope along Bee Canyon Access Road during Survey 3 on May 7, 2025.



California Bumble Bee (*Bombus californicus*) Observed Nectaring on Deerweed along Bee Canyon Access Road during Survey 2 on April 22, 2025.



Yellow-faced Bumble Bee (*Bombus vosnesenskii*) Observed Nectaring on Deerweed along Bee Canyon Access Road during Survey 2 on April 22, 2025.



Woodrat Midden and Leaf Litter under Coast Live Oak Woodland within Proposed Renewable Natural Gas Plant Limits.



Looking at Flowering Annuals on Slope West of Concrete-lined Channel in Eastern Portion of Proposed Renewable Natural Gas Plant.



Looking Downslope at Sagebrush Scrub from Southwestern Corner of Proposed Renewable Natural Gas Plant Limits.



Looking toward Coast Live Oak Woodland at Flowering Resources and Loose Trash Within Sagebrush Scrub below Bee Canyon Access Road in Northeastern Portion of Renewable Natural Gas Plant.



Mowed and Maintained Area above Sagebrush Slope along Bee Canyon Access Road.



Sagebrush Scrub with Deerweed in Bloom along Bee Canyon Access Road next to the Project Boundary.



Eucalyptus Trees along Bee Canyon Access Road with Thatch and Leaf Litter Suitable for Overwintering Bumble Bees.



Disturbed Vegetation along North Side of Portola Parkway and south of Former Agricultural Field in the Process of Being Developed.

APPENDIX C

Field Data Sheets

Bumble Bee Survey Field Data Sheet	Project Number: 2021-078.02
Page 1 of 3	Permit Number: S-190160005-20247-001

Permittee/Surveyor Name(s)	Email Address	Project Name	Site Name
Christine Tischer	ctischer@ecorpconsulting.com	Bowerman Landfill RGP CBB Support	Frank R. Bowerman Landfill

Date	Survey Start Time	Can you see Shadow (Yes/No)	Temperature (F)	Est. Wind Speed (mph)	Est. Cloud Cover (%)
03/19/2025	0942	Yes	61°F	0-2	0

Date	Survey End Time	Can you see Shadow (Yes/No)	Temperature (F)	Est. Wind Speed (mph)	Est. Cloud Cover (%)
03/19/2025	1509	Yes	78°F	0-3	0

Centroid of Survey Area (Decimal Degrees)		Survey Area Boundaries (Decimal Degrees)			
LAT	LONG	LAT North of Boundary	LAT South of Boundary	LONG West of Boundary	LONG East of Boundary
33.717611	-117.723320	33.720564	33.711307	-117.740679	-117.708671

Habitat Type (Circle all that apply) From National Land Cover Database, each classification is further defined here https://www.mrlc.gov/nlcd11_leg.php		% Est. Vegetative cover (circle one)	Number of native plant spp. in flower (circle one)	Description of dominant management practices on the survey area	Description of observed or likely stressors in survey area (e.g., use of pesticides, tilling, etc.)
Open water Developed/ Park Developed-Low/Med/High Barren Land Decid. Forest	Mixed Forest Ever.Forest Shrubland Grassland Pasture/Hay Cultivated Crop Woody wetland Herb. wetland Other	<10% 10-24% 25-49% 50-75% >75%	0 species 1-4 species 5-9 species 10- 14 spp 15+ spp	Active county landfill and entry road, former agricultural field northwest of Portola/Bee Canyon Road being developed, native plant nursery northwest of Bee Canyon Road	Landscape maintenance around offices and Portola, vehicular traffic, use of herbicide in landscape (Roundup and Garland), former agricultural practices – now grading for development

File/folder names of representative survey area photograph(s)	Supporting map file/folder name(s)
K:\Projects\2021\2021-078.02 - Sub to Tetra Tech Bowerman RNG Plant CBB Support\Biology\Focused Surveys\CBB Survey #1_03192025	2021-078.02 Bowerman Landfill RGP (CBB/BIO)

Bumble Bee Survey Field Data Sheet **Page 2 of 3**	**Unique Survey ID:** FRB CBB #1 **Date:** 3/19/2025	**Project Number: 2021-078.02**
Were *Bombus* present? Y or N	Are Honey Bees (*Apis*) present? Y or N	*Bombus to Apis Ratio (circle closest estimate 20:1, 10:1, 1:1, 1:10, or 1:20+)*

Species	**No. of Females**	**No. of Males**	**No. of Queens**	**Flowers or species** of plant being used	**Actual (A) or Estimated (E) counts?**	**% ID Conf***	**Distance (m)** Distance sampling only

*Self-evaluation of your confidence in your identification of each species (95-100% confident, 75-94%, 50-74%, 5-49%, <5%).

Individual Bee Data for *B. crotchii* (Enter each *B. crotchii* capture point as separate row)					***B. crotchii* Observation Point** (Decimal degrees)		**Photos taken (Yes/No)**
Species	**No. of Females**	**No. of Males**	**No. of Queens**	**Flowers or species of plant being used**	**LAT**	**LONG**	**Photo Numbers**
B. crotchii			1	*Cercis occidentalis*	33.718273	-117.709256	CLT 5280-5289, DRJ 4414-4437
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							

Bumble Bee Survey Field Data Sheet Page 3 of 3	Unique Survey ID: FRB CBB #1 Date: 3/19/2025	Project Number: 2021-078.02

Pollinator and Wildlife Species Observed:

CORA - Nest in rocks within 300', LEGO, HOFI, TUVU, BUSH, *Uta stansburiana*, YRWA, WCSP, woodrat (midden), SAPH, SOSP, WREN, chorus frog, CALT, desert cottontail, CA ground squirrel (carcass), coyote (scat), NOMO, CAKI

metallic sweatbee*, bee fly*, honeybee*, Halictidae*, Sara orangetip*, 1 CBB** between entry and facility

Plant Species in Bloom:

2 stalks of deerweed, Marah in understory of oak, *Encelia farinosa*, *Encelia californica*, *Rhamnus ilicifolia, Ribes speciosum, Aloe barbadensis, Cerces occidentalis, Eschscholzia californica* (adjacent), Groundsel (*Senecio* sp., adjacent), *Heterotheca grandiflora, Malocothamnus fasciculatus, Nicotiana glauca, Dipterostemon capitatus, Hazardia* sp., *Artemisia californica*, *Eriogonum fasciculatum*, *Rhus integrifolia, Calystegia macrostegia, Hirschfeldia incana, Hesperoyucca whipplei, Baccharis salicifolia, Lepidium* sp., *Quercus agrifolia, Solanum nigrum, Stephanomeria* sp., *Sisymbrium irio, Lantana camara, Myoporum* sp., *Salvia gregii, Salvia microphylla, Westringia fruticosa, Salix* sp., *Ceanothus sp., Lysimachia arvensis, Pseudognaphalium californicum, Rhaphiolepis indica, Sisymbrium irio, Lantana camara, Salvia micophylla* 'Hot lips'

For the most part, it is a little too early in the season as most plants are not in bloom and due to late rains.

Not in bloom:
Brassica sp., *Jacaranda mimosifolia, Schinus molle,* Clover sp., *Malosma laurina, Erodium cicutarium, Salvia apiana, Salsola tragus, Salvia mellifera, Washingtonia robusta, Heteromeles arbutifolia, Quercus* sp. Soap lily, *Opuntia* sp., *Aster* sp., *Dudleya* sp. *Brassica nigra, Leymus condensatus, Dudleya* sp. (chalky), *Pellaea andromedifolia, Polypodium* sp., *Mirabilis laevis, Solanum* sp, *Hazardia sp., Parkinsonia* sp., *Tecoma stans, Platanus racemosa*, Foxtail aloe, *Hesperaloe* sp., *Carex* sp., *Chilopsis* sp., *Urtica urens, Malva parviflora*, Ironbark Eucalyptus, *Citrus* sp., *Phacelia* sp.

2nd survey recommended in 3 weeks when more plants are in bloom

Bumble Bee Survey Field Data Sheet	Project Number: 2021-078.02
Page 1 of 3	Permit Number: S-190160005-20247-001

Permittee/Surveyor Name(s)	Email Address	Project Name	Site Name
Christine Tischer	ctischer@ecorpconsulting.com	Bowerman Landfill RGP CBB Support	Frank R. Bowerman Landfill

Date	Survey Start Time	Can you see Shadow (Yes/No)	Temperature (F)	Est. Wind Speed (mph)	Est. Cloud Cover (%)
04/22/2025	1105	Yes	62°F	0-3	0

Date	Survey End Time	Can you see Shadow (Yes/No)	Temperature (F)	Est. Wind Speed (mph)	Est. Cloud Cover (%)
04/22/2025	1620	Yes	69°F	1-4	0

Centroid of Survey Area (Decimal Degrees)		Survey Area Boundaries (Decimal Degrees)			
LAT	LONG	LAT North of Boundary	LAT South of Boundary	LONG West of Boundary	LONG East of Boundary
33.717611	-117.723320	33.720564	33.711307	-117.740679	-117.708671

Habitat Type (Circle all that apply) From National Land Cover Database, each classification is further defined here https://www.mrlc.gov/nlcd11_leg.php		% Est. Vegetative cover (circle one)	Number of native plant spp. in flower (circle one)	Description of dominant management practices on the survey area	Description of observed or likely stressors in survey area (e.g., use of pesticides, tilling, etc.)
Open water Developed/ Park Developed-Low/Med/High Barren Land Decid. Forest	Mixed Forest Ever.Forest Shrubland Grassland Pasture/Hay Cultivated Crop Woody wetland Herb. wetland Other	<10% 10-24% 25-49% 50-75% >75%	0 species 1-4 species 5-9 species 10- 14 spp 15+ spp	Active county landfill and entry road, former agricultural field northwest of Portola/Bee Canyon Road being developed, native plant nursery northwest of Bee Canyon Road	Landscape maintenance around offices and Portola, vehicular traffic, use of herbicide in landscape (Roundup and Garland), former agricultural practices – now grading for development

File/folder names of representative survey area photograph(s)	Supporting map file/folder name(s)
K:\Projects\2021\2021-078.02 - Sub to Tetra Tech Bowerman RNG Plant CBB Support\Biology\Focused Surveys\CBB Survey #2_04222025	2021-078.02 Bowerman Landfill RGP (CBB/BIO)

Bumble Bee Survey Field Data Sheet **Page 2 of 3**	**Unique Survey ID:** FRB CBB #2 **Date:** 4/22/2025	**Project Number: 2021-078.02**
Were *Bombus* present? Y or N	Are Honey Bees (*Apis*) present? Y or N	*Bombus to Apis Ratio (circle closest estimate 20:1, 10:1, 1:1, 1:10, or 1:20+)*

Species	**No. of Females**	**No. of Males**	**No. of Queens**	**Flowers or species** of plant being used	**Actual (A) or Estimated (E) counts?**	**% ID Conf***	**Distance (m)** Distance sampling only
B.vosnesenskii	1			*Acmispon glaber*	Actual	100	
B.californicus	1			*Acmispon glaber*	Actual	95	

*Self-evaluation of your confidence in your identification of each species (95-100% confident, 75-94%, 50-74%, 5-49%, <5%).

Individual Bee Data for *B. crotchii* (Enter each *B. crotchii* capture point as separate row)					***B. crotchii* Observation Point** (Decimal degrees)		**Photos taken (Yes/No)**
Species	**No. of Females**	**No. of Males**	**No. of Queens**	**Flowers or species of plant being used**	**LAT**	**LONG**	**Photo Numbers**
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							

Bumble Bee Survey Field Data Sheet Page 3 of 3	Unique Survey ID: FRB CBB #2 Date: 4/22/2025	Project Number: 2021-078.02

Pollinator and Wildlife Species Observed:

CORA - Nest in rocks within 300' (saw 1 flew to nest hopped in and hopped back out), LEGO, HOFI, TUVU, BUSH, *Uta stansburiana*, SOSP, WREN, CALT, NOMO, Lady bug larvae, BGGN, CASJ, SPTO, RTHA, HOWR, BEWR, MODO, LABU, BLGR, 2 least Bell's vireo (1 at edge of pipeline 50' buffer at Gate 2 and 1 south of Bee Canyon Road well away from project, both in upland sumac/ lemonadeberry not near riparian), YEWA***

metallic sweatbee*, bee fly*, honeybee*, Dragonfly sp., mountain carpenter bee*, female valley carpenter bee*, ANHU*, Behr's metalmark*, COHU*, honeybee swarm on chain link fence along Portola, 1 BCal, 1 BVos

Plant Species in Bloom:

Acmispon glaber, *Encelia farinosa*, *Encelia californica*, *Aloe barbadensis, Cerces occidentalis, Eschscholzia californica, Heterotheca grandiflora, Malocothamnus fasciculatus, Nicotiana glauca, Dipterostemon capitatus, Hazardia squarrosa*, *Eriogonum fasciculatum*, *Calystegia macrostegia, Hirschfeldia incana, Hesperoyucca whipplei, Baccharis salicifolia, Myoporum parvifolium*, *Pseudognaphalium californicum, Rhaphiolepis indica, Sisymbrium irio, Lantana camara, Oncosiphon pilulifer, Melilotus* sp., *Lupinus succulentus, Lupinus bicolor, Hedypnois rhagadioloides, Ambrosia psilostachya, Sonchus oleraceous, Plagiobothrys* sp., *Verbesina encelioides, Sisyrinchium bellum, Lotus americanum, Rhaphanus sativus, Lobularia maritima, Calochortus catalinae, Amsinckia menziesii, Vicia villosa, Ailanthus altissima, Sambucus mexicana, Marrubium vulgare, Eucrypta chrysanthemifolia, Gallium* sp.*, Gallium angustifolium, Uropappus lindleyi, Amsinckia intermedia, Datura wrightii, Phacelia distans, Melilotus albus, Salvia chamaedryoides, Anigozanthos flavidus, Phacelia parryi, Lupinus hirsutissimus, Gazania linearis, Linum usitatissimum, Lotus corniculatus, Pulicaria palludosa, Lepidospartum* sp.*, Salvia leucantha, Trifolium hirtum, Brassica tournefortii*, *Brassica* sp., *Erodium cicutarium, Salvia apiana, Salvia mellifera, Brassica nigra, Mirabilis laevis, Solanum* sp, *Parkinsonia* hybrid 'desert museum', and *Tecoma stans* 'Orange Jubilee'.

Bumble Bee Survey Field Data Sheet	Project Number: 2021-078.02
Page 1 of 3	Permit Number: S-190160005-20247-001

Permittee/Surveyor Name(s)	Email Address	Project Name	Site Name
Christine Tischer	ctischer@ecorpconsulting.com	Bowerman Landfill RGP CBB Support	Frank R. Bowerman Landfill

Date	Survey Start Time	Can you see Shadow (Yes/No)	Temperature (F)	Est. Wind Speed (mph)	Est. Cloud Cover (%)
05/07/2025	1015	Yes	66°F	2-4	90

Date	Survey End Time	Can you see Shadow (Yes/No)	Temperature (F)	Est. Wind Speed (mph)	Est. Cloud Cover (%)
05/07/2025	1435	Yes	75°F	2-4	0

Centroid of Survey Area (Decimal Degrees)		Survey Area Boundaries (Decimal Degrees)			
LAT	LONG	LAT North of Boundary	LAT South of Boundary	LONG West of Boundary	LONG East of Boundary
33.717611	-117.723320	33.720564	33.711307	-117.740679	-117.708671

Habitat Type (Circle all that apply) From National Land Cover Database, each classification is further defined here https://www.mrlc.gov/nlcd11_leg.php		% Est. Vegetative cover (circle one)	Number of native plant spp. in flower (circle one)	Description of dominant management practices on the survey area	Description of observed or likely stressors in survey area (e.g., use of pesticides, tilling, etc.)
Open water Developed/ Park Developed- Low/Med/High Barren Land Decid. Forest	Mixed Forest Ever.Forest Shrubland Grassland Pasture/Hay Cultivated Crop Woody wetland Herb. wetland Other	<10% 10-24% 25-49% 50-75% >75%	0 species 1-4 species 5-9 species 10- 14 spp 15+ spp	Active county landfill and entry road, former agricultural field northwest of Portola/Bee Canyon Road being developed, native plant nursery northwest of Bee Canyon Road	Landscape maintenance around offices and Portola, vehicular traffic, use of herbicide in landscape (Roundup and Garland), former agricultural practices – now grading for development

File/folder names of representative survey area photograph(s)	Supporting map file/folder name(s)
K:\Projects\2021\2021-078.02 - Sub to Tetra Tech Bowerman RNG Plant CBB Support\Biology\Focused Surveys\CBB Survey #3_05072025	2021-078.02 Bowerman Landfill RGP (CBB/BIO)

Bumble Bee Survey Field Data Sheet **Page 2 of 3**	**Unique Survey ID:** FRB CBB #3 **Date:** 5/07/2025	**Project Number: 2021-078.02**
Were *Bombus* present? Y or N	Are Honey Bees (*Apis*) present? Y or N	*Bombus to Apis Ratio (circle closest estimate 20:1, 10:1, 1:1, 1:10, or 1:20+)*

Species	**No. of Females**	**No. of Males**	**No. of Queens**	**Flowers or species** of plant being used	**Actual (A) or Estimated (E) counts?**	**% ID Conf***	**Distance (m)** Distance sampling only

*Self-evaluation of your confidence in your identification of each species (95-100% confident, 75-94%, 50-74%, 5-49%, <5%).

Individual Bee Data for *B. crotchii* (Enter each *B. crotchii* capture point as separate row)					***B. crotchii* Observation Point** (Decimal degrees)		**Photos taken (Yes/No)**
Species	**No. of Females**	**No. of Males**	**No. of Queens**	**Flowers or species of plant being used**	**LAT**	**LONG**	**Photo Numbers**
B. crotchii	1			*Salvia mellifera*	33.717510	-117.726767	SH Canon 4731-4740
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							
B. crotchii							

Bumble Bee Survey Field Data Sheet Page 3 of 3	Unique Survey ID: FRB CBB #3 Date: 5/07/2025	Project Number: 2021-078.02

Pollinator and Wildlife Species Observed:

CORA, LEGO, HOFI, TUVU, BUSH, *Uta stansburiana*, WREN, CALT, NOMO,
CAQU, LBVI** (1st heard high on hill south of oak woodland within RNG Plant limits and 2nd or same individual heard in mule fat scrub at north end of concrete channel - not heard or seen at same time; one more heard north of Bee Canyon Road along pipeline route), SAPH, CATH,
CAKI, COYE, NRWS, OCWA, WEBL, BGGN, SPTO, RTHA, HOWR, MODO, LABU, BLGR, and coyote

bee fly*, honeybee*, mountain carpenter bee*, female valley carpenter bee*, ANHU*, COHU*, ALHU*, blue sp.*, mourning cloak*, and striped fly, 1 CBB** along pipeline portion

Plant Species in Bloom:

Acmispon glaber, *Encelia farinosa*, *Encelia californica*, *Aloe barbadensis, Eschscholzia californica, Heterotheca grandiflora, Malocothamnus fasciculatus, Nicotiana glauca, Dipterostemon capitatus, Eriogonum fasciculatum*, *Calystegia macrostegia, Hirschfeldia incana, Hesperoyucca whipplei, Baccharis salicifolia, Myoporum parvifolium*, *Pseudognaphalium californicum, Lantana camara, Oncosiphon pilulifer, Melilotus* indicus, *Lupinus bicolor, Hedypnois rhagadioloides, Sonchus* sp., *Sisyrinchium bellum, Rhaphanus sativus, Lobularia maritima, Amsinckia menziesii, Vicia villosa, Sambucus mexicana, Marrubium vulgare, Gallium* sp.*, Eriophyllum confertiflorum, Uropappus lindleyi, Amsinckia* sp., *Phacelia* sp., *Diplacus aurantiacus, Bloomeria crocea, Melilotus albus, Cirsium occidentale, Malva parviflora, Lotus corniculatus, Pulicaria palludosa, Centaurea melitensis, Trifolium hirtum, Medicago polymopha, Erodium cicutarium, Salvia apiana, Lupinus truncatus, Salvia mellifera, Brassica nigra, Chilopsis linearis, Chrysanthemum coronarium, Solanum* sp, *Parkinsonia* hybrid 'desert museum', and *Tecoma* capensis.

APPENDIX C4: CROTCH'S BUMBLE BEE AVOIDANCE PLAN

Crotch's Bumble Bee Avoidance Plan

Frank R. Bowerman Landfill Renewable Natural Gas Plant Project



Prepared for:

OC Waste & Recycling
11002 Bee Canyon Access Road
Irvine, CA 92602
Contact: Leila Barker, (714) 834-4013

Prepared by:

ECORP Consulting, Inc.
111 Academy Way, Suite 210
Irvine, CA 92617

August 2025

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Appendix B – Orange County Fire Authority Plant Lists

Appendix C – Detailed Identification Photos for Training

LIST OF ACRONYMS AND ABBREVIATIONS

Term	Definition
Bowerman Power	Bowerman Power LFG, LLC
CBB	Crotch's bumble bee
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CNDDB	California Natural Diversity Database
ECORP	ECORP Consulting, Inc.
ESA	Environmentally Sensitive Area
LFG	Landfill Gas
LFGTE	Landfill Gas to Energy
NCCP/HCP	Natural Communities Conservation Plan/Habitat Conservation Plan
OCFA	Orange County Fire Authority
OCWR	OC Waste & Recycling
RNG	Renewable Natural Gas
SoCalGas	Southern California Gas
Study Area	Project Site and 50-foot buffer

1.0 INTRODUCTION

ECORP Consulting, Inc. (ECORP) prepared this Crotch's bumble bee (CBB) Avoidance Plan for OC Waste & Recycling's (OCWR's) and Bowerman Power LFG, LLC's (Bowerman Power's) Frank R. Bowerman Landfill future Renewable Natural Gas (RNG) Plant (Project) in Orange County, California. The Project is anticipated to commence, starting with ground disturbances and vegetation removal in late 2025.

1.1 Project Location

The Project encompasses two primary areas of disturbance: the new RNG Plant and the new Southern California Gas (SoCalGas) pipeline (Appendix A, Figure 1). The RNG Plant will occupy 3.52 acres of undeveloped land on the eastern side of the Project site, adjacent to the existing Bowerman Power Plant and the FRB Landfill flare station. The proposed SoCalGas pipeline will span 2.4 miles, beginning at the RNG Plant and extending along Bee Canyon Access Road and Portola Parkway to connect with the existing pipeline infrastructure.

The Project is situated at the Frank R. Bowerman Landfill in Orange County, California and the site is bordered by Bee Canyon Access Road to the north and northeast, the existing Bowerman Power Landfill Gas to Energy (LFGTE) plant and flare station to the west, and open space and roads to the south. The Project site is surrounded by Orange County Central-Coastal Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP), Reserve open space. The site lies within the U.S. Geological Survey (USGS) El Toro 7.5-Minute Topographic Quadrangle Map. Surrounding land uses include other areas of Bowerman Landfill, open space, agricultural fields, residential areas, roads, and highways.

1.2 Project Description

The proposed Project would develop a RNG Plant and pipeline to process and transport landfill gas (LFG) that is produced by the Bowerman Landfill to the SoCalGas pipeline. The RNG Plant site would be approximately 3.52 acres in size and the proposed pipeline would extend approximately 2.4 miles. The RNG Plant would be designed to process a maximum of 6,000 standard cubic feet per minute of raw LFG at the inlet. The process would remove nitrogen, oxygen, carbon dioxide, sulfur hydroxide, hydrogen sulfide, volatile organic compounds, and other minor impurities to meet the specifications of SoCalGas.

1.3 Crotch's Bumble Bee Natural History

The CBB is found between San Diego and Redding in a variety of habitats including open grasslands, shrublands, chaparral, desert margins including Joshua tree and creosote scrub, and semi-urban settings. It is near endemic to California, with only a few records from Nevada and Mexico (CDFW 2022).

Similar to other bumble bee species, CBB is a generalist forager and visits a variety of flowering plants. It is a short-tongued bumble bee and is therefore best suited to forage on open flowers with short corollas (Hatfield et al. 2018). Plant families most commonly associated with CBB records in California include Fabaceae, Apocynaceae, Asteraceae, Lamiaceae, Hydrophyllacae, Asclepiadaceae, and Boraginaceae (Hatfield et al. 2018). Other reports commonly associate CBB with plants in the genera *Antirrhinum*, *Phacelia*, *Clarkia*, *Cordylanthus*, *Dendromecon*, *Eschscholzia*, *Eriogonum*, *Hypericum*, *Lantana*, *Lupinus*,

Salvia, *Asclepias*, *Cirsium*, *Monardella*, *Keckiella*, *Acmispon*, *Euthamia*, *Ehrendorferia*, *Vicia*, *Trichostema, Chaenactis,* and/or *Medicago* as nectaring sources.

Bumble bees live in social colonies and have different division of labor (or castes) that include a queen (reproductive female), workers (nonreproductive females), drones (males), and gyne (females destined to become queens). The California Department of Fish and Wildlife's (CDFW's) survey considerations define the queen flight season as February through March, the gyne flight season as September through October, and the colony active period (highest detection probability) as April through August (CDFW 2023). For purposes of this CBB Avoidance Plan, the CBB nesting season is defined as March 15 to September 15 and the CBB overwintering season is defined as September 16 to March 14 of any given year.

CBB primarily nest underground, though colony sizes have not been well documented and may utilize similar nesting habitats as other *Bombus* species (Williams et al. 2014). In general, *Bombus* queens do not dig or make their own nests, but rather have been observed to occupy cavities in a variety of substrates including thatched grasses, abandoned rodent burrows or bird nests, brush piles, rock piles, and fallen logs (Alford 1975; Free and Gasking Butler 1959; Fussell and Corbet 1992; Lye et al. 2012; Sladen 1912; Williams et al. 2014) and have also been found nesting in human-made structures such as walls, rubble or abandoned furniture (Fussell and Corbet 1992; Williams et al. 2014). Bumble bee nests are annual and conclude with deaths of the queen, workers, and drones at the end of the season with only the mated gyne surviving the winter (overwintering) in order to emerge the following spring to start the next year's colony.

Very little is known about the overwintering habitat typically utilized by CBB. However, based on overwintering sites of other bumble bee species, it is possible that CBB overwinters in soft, disturbed soils or under leaf litter and other debris (Hatfield et al. 2018), and on grassy north-facing slopes (Liczner et al, 2019). Factors that have been identified as a substantial threat to the survival and reproduction of CBB include loss of habitat due to human landscape modifications (i.e., agricultural intensification, livestock grazing, urban development), increased use of herbicides and pesticides, competition, climate change, genetic factors, and disease and pathogen spillover (Hatfield et al. 2018).

1.4 Purpose and Need

The Crotch's bumble bee (*Bombus crotchii*; CBB) was petitioned for listing under the California Endangered Species Act (CESA) in October 2018 (Hatfield et al. 2018); it advanced to candidacy in June 2019 and was challenged in courts. The candidacy was temporarily stayed beginning in February 2021, and candidacy was reinstated in September 2022 (CDFW 2025a). As a state candidate species, CBB is afforded the same protections as a listed species under CESA. Although the Project is located within the Orange County Central-Coastal NCCP/HCP, CBB is not a Covered Species under the NCCP/HCP, therefore the OCWR does not have take coverage. Therefore, this CBB Avoidance Plan has been prepared to fully avoid direct impacts to CBB.

2.0 CBB DISTRIBUTION WITHIN THE PROJECT

ECORP conducted a literature review and ground truthing of mapped vegetation communities and land cover types (Appendix A, Figure 2), site photographs, and the plant list contained within the Biological Survey Report (Tetra Tech 2024) for their potential to provide suitable habitat for CBB. Suitable moderate- and high-quality foraging and nesting habitat is present within the disturbed and undisturbed sagebrush scrub communities, respectively (Appendix A; Figures 2 and 3). Low quality foraging and/or nesting habitat is also present within landscaped and disturbed habitat on either side of the paved roads within the 2.4-mile linear pipeline portion of the Project. The coast live oak and eucalyptus woodlands have low potential to provide foraging and nesting habitat due to the presence of a limited number of flowering annuals in the understory. Leaf litter in the understory, where present, may provide overwintering habitat.

Three focused CBB surveys were conducted in accordance with the CDFW approved CBB Survey Plan (ECORP 2025) on March 19, April 22, and May 7, 2025. The CBB technical report of findings is in the process of being prepared at the time of this Avoidance Plan. Prior to conducting focused CBB surveys, a database query of CDFW's California Natural Diversity Database (CNDDB; CDFW 2025b), and Xerces Society's Bumble Bee Watch (Xerces Society 2025) for historic and recent CBB occurrences within 5 miles of the Project was conducted. Two CNDDB, 23 iNaturalist, and six Bumble Bee Watch records have been recorded within 5 miles of the site. Two CBB queens were observed during focused surveys. The first CBB individual (CBB-1) was observed foraging in the maintained landscaping on a western redbud (*Cerces occidentalis*) between the landfill entry road and the offices within the 50-foot buffer of the proposed SoCalGas pipeline during the first focused CBB survey conducted on March 19, 2025 (Appendix A, Figure 3). The second CBB individual (CBB-2) was seen foraging on a black sage (*Salvia mellifera*), at the edge of the 50-foot buffer also along the proposed SoCalGas pipeline (Appendix A, Figure 3). Both CBB individuals were not collecting or carrying pollen. No CBB workers, males, or nests were detected during 2025 focused surveys.

3.0 IMPACT ANALYSIS

Suitable CBB habitat within the proposed RNG Plant is comprised primarily of sagebrush scrub with bands of coast live oak (*Quercus agrifolia*) habitat. The Project as currently designed will permanently impact 2.9 acres of sagebrush scrub in the Project site and Fuel Modification Area. The dominant shrub within this habitat is California sagebrush (*Artemisia californica*) which is not a CBB nectar resource. However, preferred nectaring resources are scattered throughout the sagebrush scrub including California buckwheat (*Eriogonum fasciculatum*), deerweed (*Acmispon*), white sage (*Salvia apiana*), black sage, Parry's phacelia (*Phacelia parryi*), and hairy vetch (*Vicia villosa*). A significant amount of landfill trash was present in the northeastern portion of the RNG Plant Project area on the southwest facing slope below Bee Canyon Access Road. Although the habitat quality was greatly diminished in this area at the time of the surveys, the sagebrush scrub as originally mapped is considered high quality habitat that could help support a nesting colony. Due to the presence of a variety of perennial and annual flowering resources that will come into flower at various times, the sagebrush scrub is considered high quality habitat that could help support a nesting colony. Coast live oak trees dominate along the slopes of the proposed RNG Plant with an understory of non-native grasses and some leaf litter. In addition, within the bounds of the

proposed RNG Plant is an approximately 35-foot-wide, unvegetated concrete channel. Multiple smaller concrete-lined channels of approximately one-foot width run downslope from the existing Bowerman Power Plant or Bee Canyon Road into the wider concrete channel. The concrete channels do not provide potential CBB habitat. Because the surrounding NCCP/HCP Reserve supports similar high-quality foraging, nesting, and overwintering habitat, the permanent loss of 2.9 acres of sagebrush scrub would not be significant as long as nests and overwintering queens are not directly affected. CBB choose nest and overwintering sites on an annual basis and locations cannot be determined beforehand based on presence of potential habitat. Should a nest or overwintering queen be present within the Project impact area at the time of construction, ground-disturbing activities may cause death or injury of bumble bees, eggs, and larva; burrow collapse; nest abandonment; and/or reduced nest success.

The proposed pipeline impact area will be limited to the existing developed roads that have been previously stabilized and will only require trenching during placement. Directly outside of the proposed pipeline area are some naturally occurring (i.e., sagebrush scrub) or naturalized habitats (i.e., eucalyptus [*Eucalyptus* sp.] grove), as well as artificial (i.e., ornamental trees) and disturbed habitats. Paved areas do not provide potential CBB habitat. A chain link fence occurs alongside much of the Bee Canyon Access Road, separating much of the surrounding habitat and steep terrain from the road. Ornamental trees included typical roadside species such as acacias (*Acacia* spp.) and conifers (*Pinus* spp.). Trenching activities, including stockpiling of dirt along road shoulders, parking, increased foot traffic, and traffic control associated with pipeline construction may result in temporary impacts, but would not result in significant impacts to CBB unless a CBB nest was present along the disturbed roadsides in locations where stockpiling, parking/staging, silt fence installation, or other ground disturbing activities would occur.

4.0 CROTCH'S BUMBLE BEE AVOIDANCE MEASURES

Biological Resources Mitigation Measures (MMs) identified by the Project's Draft Initial Study and Mitigated Negative Declaration (IS/MND) for the Bowerman Power Renewable Natural Gas Plant Project, SCH No. 2024100760 that would also help avoid, mitigate, and minimize impacts to potential Crotch bumble bee habitat include:

> **IS/MND BIO-1:** To address potential Project impacts to intermediate mariposa lily, an in-lieu fee shall be paid via minor amendment to the NCCP/HCP, as approved by USFWS [US Fish and Wildlife Service] and CDFW. The in-lieu fee will contribute to a management and monitoring program for rare plants in the Nature Reserve of Orange County.
>
> Silt fencing or flagging shall be installed under the guidance of a biological monitor along the limits of coastal sage scrub areas that are immediately outside of the grading/impact limits. The silt fencing/flagging shall be used to minimize impacts to sensitive natural resources including special-status plant species and native plant communities outside and immediately adjacent to the grading limits. Construction activities and personnel will be restricted within these adjacent coastal sage scrub areas and a biological monitor will be present during the silt fence/flagging installation and removal.

IS/MND BIO-2: Impacts to coastal sage scrub habitat shall occur outside the breeding and nesting season of the coastal California gnatcatcher (February 15 through July 15) to the extent practicable.

A pre-construction survey shall be conducted within the Project site and Fuel Modification Area to determine the presence/absence of coastal California gnatcatcher and coastal cactus wren prior to clearing or grading activities. The survey shall include a 100-foot buffer around the grading limits. Any coastal California gnatcatcher or coastal cactus wren observations shall be recorded and marked on the construction/grading plans.

All coastal sage scrub habitat outside of the Project impact area shall be fenced or marked with flagging materials prior to the commencement of grading. No construction access, parking, or storage of equipment or materials will be allowed within these areas.

A qualified biologist shall conduct and document a pre-construction meeting to educate construction staff (including supervisors, equipment operators, and other site employees) on all mitigation measures required for the Project.

A qualified biologist shall monitor the clearing of coastal sage scrub and oak woodland. USFWS/CDFW shall be notified at least 7 calendar days (preferably 14 calendar days) prior to clearing habitat occupied by Target/Identified Species, if observed. The qualified biologist shall ensure that clearing activities and earth-moving equipment do not harm coastal California gnatcatchers or coastal cactus wren. The biologist shall also ensure that these activities do not harm other species that may occur, including western spadefoot, orange-throated whiptail, red-diamond rattlesnake, and coast patch-nosed snake.

The access road(s) shall be sprayed with water on occasion to reduce dust accumulation on the leaves of coastal sage scrub species, as overseen by the biological monitor.

IS/MND BIO-3: Avoid ground-disturbing and vegetation removal activities during the nesting bird season (February 15 to September 15). If these activities must occur during the nesting season, a pre-construction nesting bird survey shall be conducted by a qualified biologist on and within 300 feet of the Project construction area. The survey shall be conducted no more than 10 days prior to initiation of ground-disturbance, vegetation clearing, or construction activities and repeated between delays of greater than 10 days during the nesting season.

If an active nest is found, an appropriate no-disturbance buffer for the species shall be visibly established in the field by a qualified biologist (e.g., flagging, staking, caution tape). No ground-disturbing or vegetation removal activities shall occur within the buffer until the nesting season has ended or the nest is vacated and juveniles have fledged, as determined by the qualified biologist. At the discretion of a qualified biologist, limited encroachment into the buffer may occur for non-listed bird species but no disturbance of active nests or nesting activities is allowed per the Migratory Bird Treaty Act.

In addition to the above applicable IS/MND mitigation measures, the following CBB specific avoidance and minimization measures are proposed for areas with potential CBB nesting, foraging, and

overwintering habitat. Within paved areas that have no CBB habitat such as the developed road where trenching of the pipeline will occur, no avoidance measures are required.

IS/MND BIO-4: For work occurring during Crotch's bumble bee nesting season between March 15 through September 15 where potential nesting habitat occurs, a pre-construction nesting survey shall occur prior to ground disturbing or vegetation trimming activities within the Project's work area and a 50-foot buffer. A qualified CBB biologist, whose resume has been submitted and approved by CDFW, will conduct a nest clearance survey within two weeks of ground disturbing construction activities. Surveys shall be conducted during daylight hours when ambient temperatures are between 60°F-90°F. In the event that a bumble bee nest is suspected (i.e. bumble bee was observed to have entered a burrow or tree cavity, or disappeared under a shrub or into thatch), the suspected nest location will be passively observed for at least 20 minutes to confirm the presence/absence of a nest. A minimum 50-foot no disturbance buffer will be established and visibly flagged for avoidance if a nest location is discovered and the discovery shall be reported to CDFW by the qualified CBB biologist within 24 hours of discovery. If CBB and/or CBB nests are detected, surveys should record the location of the nest, nest substrate, slope, aspect, and distance to nearest active foraging areas (if known), number of CBB observed, and vegetation used by individuals. During active construction, the qualified CBB biologist will monitor the nest on a weekly basis and will update the buffer size as necessary and in coordination with CDFW to ensure protection. Construction activities will not occur within the buffer until the nest is no longer active as determined by the qualified CBB biologist[1] and CDFW will be notified prior to deactivation of the avoidance buffer and commencement of construction activities in this area. The CBB qualified biologist shall submit results of preconstruction surveys to CDFW prior to start of vegetation removal activities and shall provide a weekly status update should a CBB nest no disturbance buffer be established and until the nest is determined to be no longer active.

IS/MND BIO-5: Herbicide and insecticide use shall be limited to spot spraying individual plants that are not in bloom and avoiding all rodent burrows to the greatest extent possible within suitable CBB nesting areas. The qualified CBB biologist will review the proposed spray areas with OCWR and contractor to ensure burrows and nectar sources are avoided to the greatest extent possible.

IS/MND BIO-6: Temporary impacts to nectar sources shall be restored in place through either broadcasting of appropriate CBB seed mix[2] or by incorporating the seed mix into a hydro-mulch

[1] Monitoring periods of 1 hour for 3 consecutive days shall be conducted by the qualified CBB biologist and shall be determined "no longer active" if no activity has been observed and supported by lack of observations of gynes and/or males foraging.

[2] Outside of fuel modification areas, the appropriate seed mix shall include at least one annual and perennial species of preferred nectar sources, that are region-specific herbs/shrubs from the following plant list: sages (*Salvia* spp.), buckwheat (*Eriogonum* spp.), lupines (*Lupinus* spp.), legumes (Fabaceae family), owl's clover (*Orthocarpus* spp.), and milkweed (*Asclepias* spp.). Within fuel modification areas, the seed mix will contain suitable nectar sources that are consistent with the Orange County Fire Authority (OCFA) Fuel Modification Zone Plant List (see Appendix B). The plant palette should be developed in conjunction with the CBB qualified biologist and the OCWR biologist and approved by CDFW to develop a seed mix that satisfies all restoration/stabilization requirements.

application. Minor vegetation trimming to preferred nectar sources, that are expected to recover naturally within one year, do not require restoration.

IS/MND BIO-7: A qualified CBB biologist shall attend the pre-construction meeting (see IS/MND BIO-2) to educate construction staff (including supervisors, equipment operators, other site employees, and biological monitors) on all CBB specific mitigation measures required by this CBB Avoidance Plan. Training Materials (tri-fold colored pamphlet) shall be provided at the training and shall include detailed photos that can be utilized as a reference for qualified biological monitors to identify CBB and implement the avoidance measures appropriately (Appendix C). Training Materials will assist in training contractor staff in recognizing bumble bees and inform them of potential penalties (aka monetary fines, project delays, jail time) for take of CBB or other CESA violations.

IS/MND BIO-8: CDFW shall be notified at least 14 calendar days prior to initial vegetation removal and ground disturbing activities in areas identified as potential CBB nesting, foraging, or overwintering habitat, regardless of time of year. All CBB detections shall be reported to CDFW via email within 24-hours of detection. A qualified biological monitor that has received the CBB training and is in possession of the Training Materials shall monitor the staking of limits, clearing and grubbing, and removal of stockpiled vegetation from the site until the site no longer provides potential CBB habitat. The biological monitor shall be responsible for monitoring CBB when they are detected and shall ensure active foraging patches are not removed until the CBB(s) leave the area on their own volition. The biological monitor, shall monitor the slow and methodical removal of vegetation in patches and by hand where necessary should CBB nesting or overwintering behavior be observed (scanning the ground instead of targeting flowering resources, seen entering a burrow or disappearing into thick vegetation and not re-emerging, sitting on the open ground), until it is confirmed that a CBB nest or overwintering site is not present. Should the project result in unpermitted take of a Crotch's bumble bee individual or nest, work shall immediately halt and CDFW shall be immediately notified by the CBB biologist.

5.0 REFERENCES

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LIST OF APPENDICES

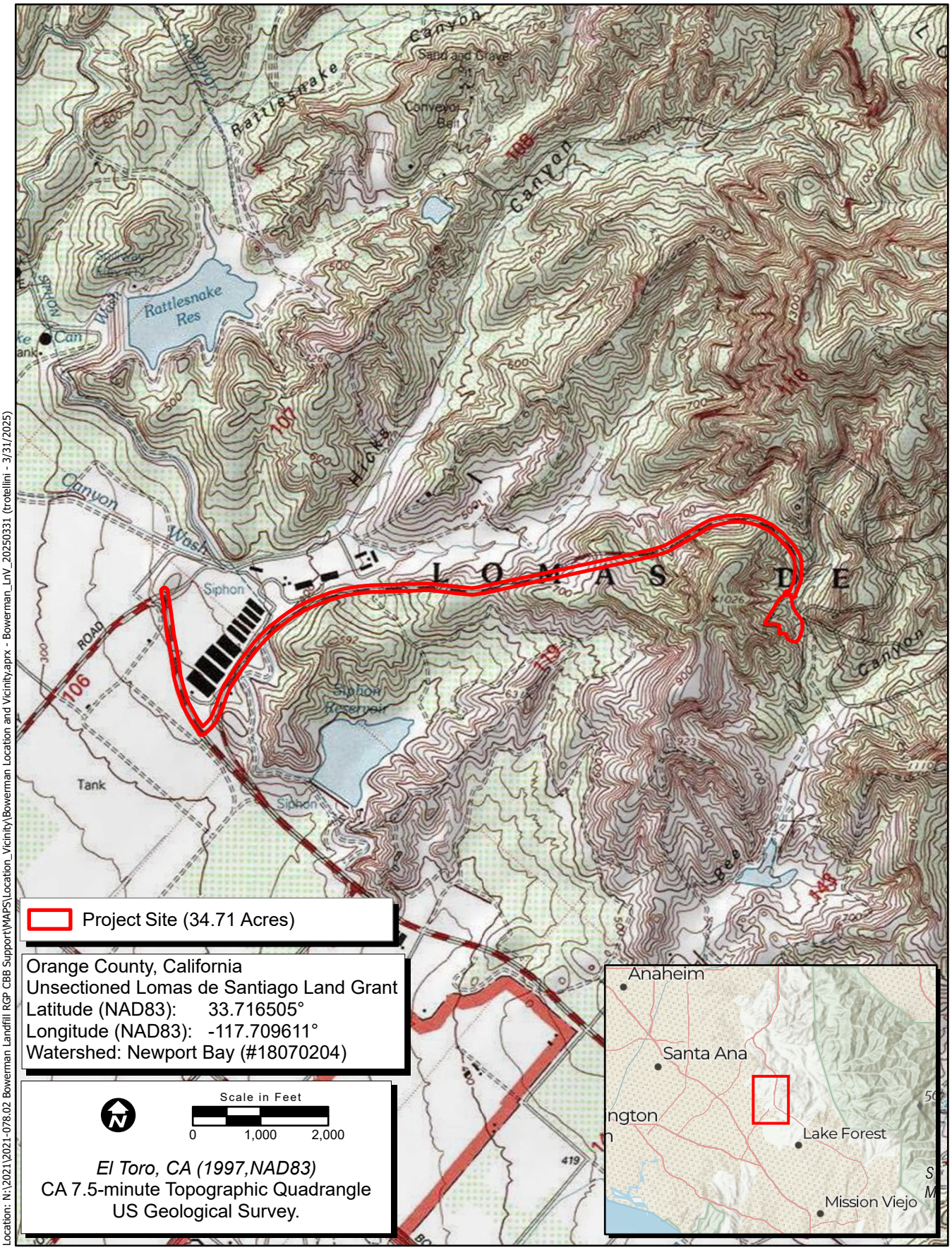
Appendix A – Figures

Appendix B – Orange County Fire Authority Plant Lists

Appendix C – Detailed Identification Photos for Training

APPENDIX A

Figures



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Location_Vicinity\Bowerman Location and Vicinity.aprx - Bowerman_LnV_20250331 (trotellini - 3/31/2025)

Map Date: 3/31/2025
Sources: ESRI, USGS

Figure 1. Project Location and Vicinity



Map Contents

- SoCalGas Pipeline Alignment

Vegetation Communities

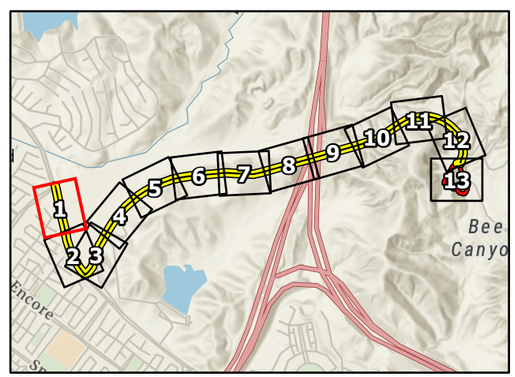
- Ornamental trees

Land Cover Types

- Developed
- Disturbed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

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Scale in Feet
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Figure 2. Vegetation Communities and Land Cover Types
Sheet 1 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- SoCalGas Pipeline Alignment

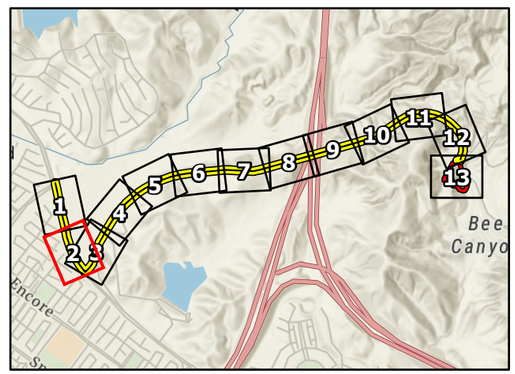
Vegetation Communities

- Eucalyptus
- Ornamental trees
- Sagebrush Scrub
- Disturbed Sagebrush Scrub

Land Cover Types

- Developed
- Disturbed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation.aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

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Scale in Feet
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Figure 2. Vegetation Communities and Land Cover Types
Sheet 2 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- SoCalGas Pipeline Alignment

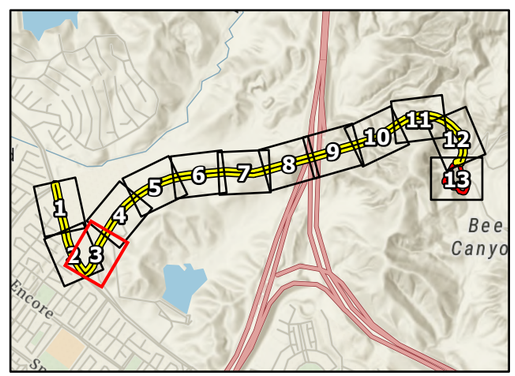
Vegetation Communities

- Eucalyptus
- Ornamental trees
- Sagebrush Scrub
- Disturbed Sagebrush Scrub

Land Cover Types

- Developed
- Disturbed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



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Map Date: 8/13/2025

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Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 3 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

Eucalyptus

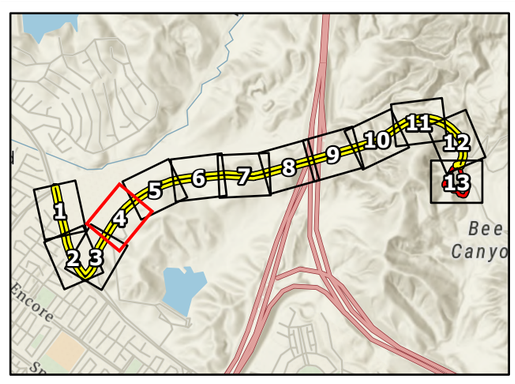
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



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Map Date: 8/13/2025

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Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 4 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

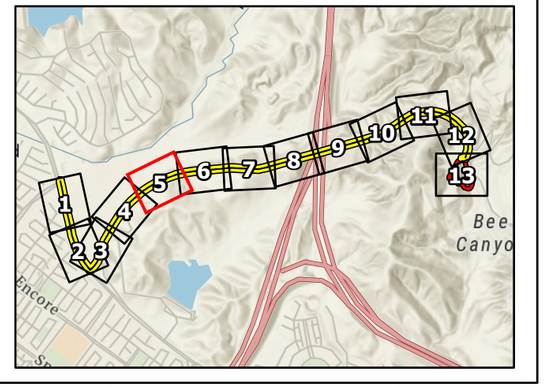
Eucalyptus

Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation.aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

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Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 5 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

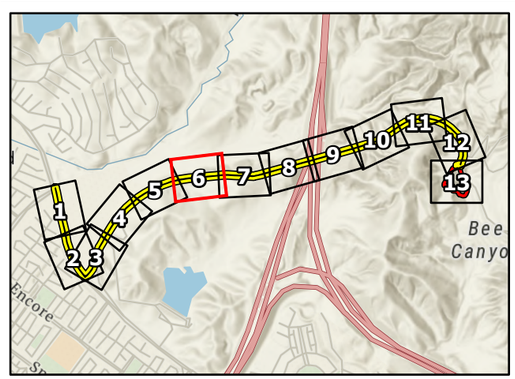
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



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Map Date: 8/13/2025

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Scale in Feet
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Figure 2. Vegetation Communities and Land Cover Types
Sheet 6 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

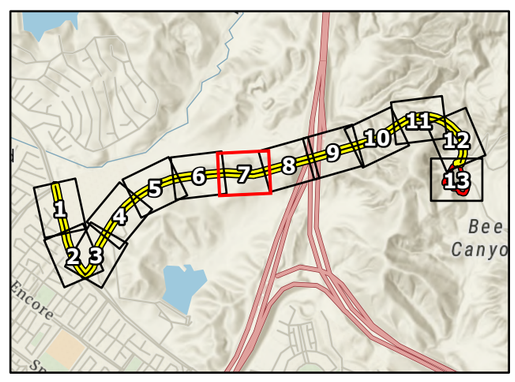
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



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Map Date: 8/13/2025

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Scale in Feet
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Figure 2. Vegetation Communities and Land Cover Types
Sheet 7 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

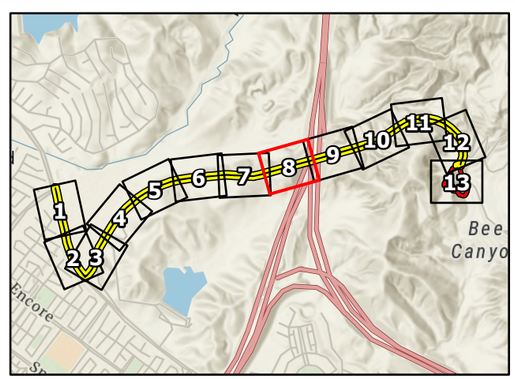
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



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Map Date: 8/13/2025

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Scale in Feet
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Figure 2. Vegetation Communities and Land Cover Types
Sheet 8 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- SoCalGas Pipeline Alignment

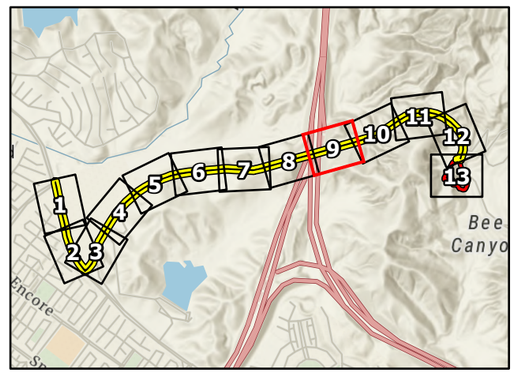
Vegetation Communities

- Sagebrush Scrub

Land Cover Types

- Developed
- Disturbed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation.aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

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Scale in Feet
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Figure 2. Vegetation Communities and Land Cover Types
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2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- SoCalGas Pipeline Alignment

Vegetation Communities

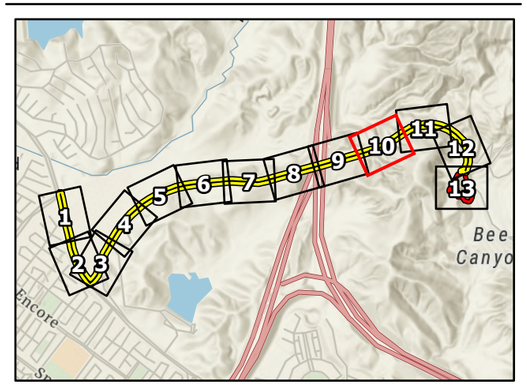
- Sagebrush Scrub

Land Cover Types

- Developed
- Disturbed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

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Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 10 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

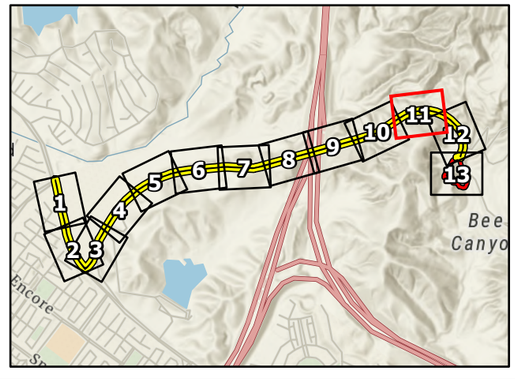
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



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Map Date: 8/13/2025

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Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 11 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- Proposed RNG Plant Boundary
- SoCalGas Pipeline Alignment

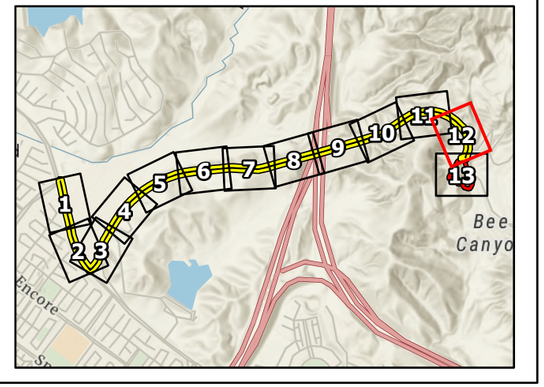
Vegetation Communities

- Sagebrush Scrub

Land Cover Types

- Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

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ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 12 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- Proposed RNG Plant Boundary
- SoCalGas Pipeline Alignment

Vegetation Communities

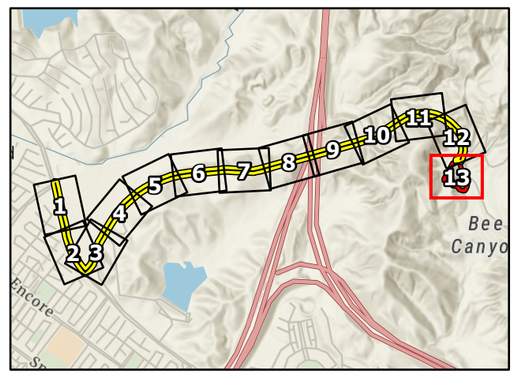
- Coast Live Oak
- Sagebrush Scrub
- Disturbed Sagebrush Scrub

Land Cover Types

- Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\Bowerman Vegetation.aprx - Bowerman_Vegetation_20250331 (kedwards - 8/13/2025)

Map Date: 8/13/2025

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ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 2. Vegetation Communities and Land Cover Types
Sheet 13 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

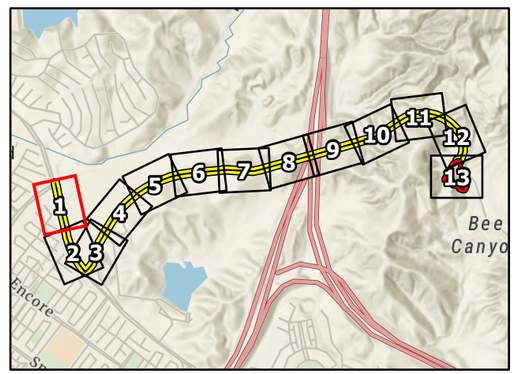
- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- Low Quality Habitat - Potential for Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources aprx - Bowerman_CBB_HA_20250331 (trotellini - 5/16/2025)

Map Date: 5/16/2025

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ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 1 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



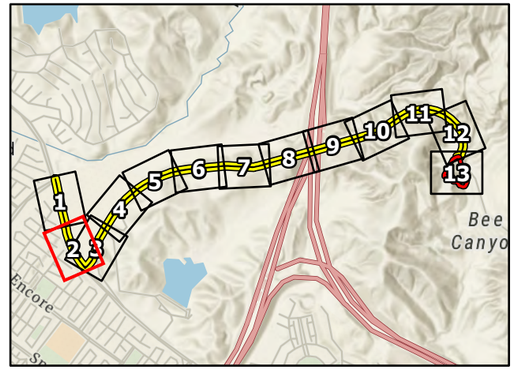
Map Contents

- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Moderate Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting, Foraging, and Overwintering
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 5/16/2025)

Map Date: 5/16/2025

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ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 2 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



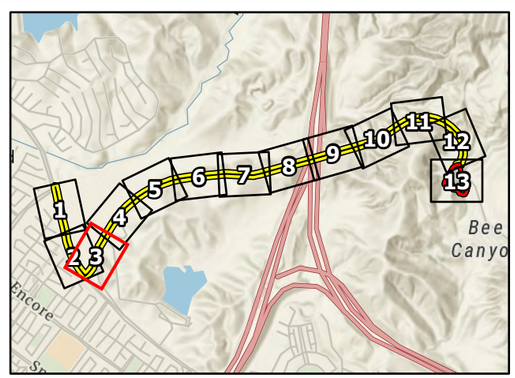
Map Contents

- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Moderate Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting, Foraging, and Overwintering
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 5/16/2025)

Map Date: 5/16/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
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Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 3 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

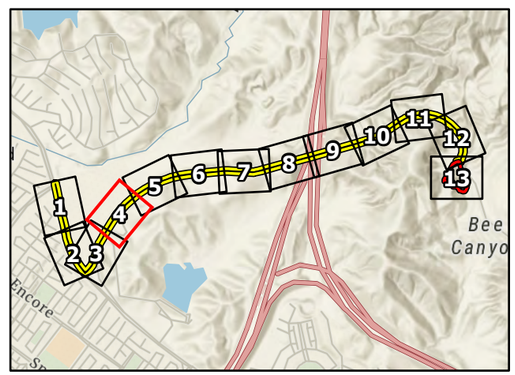
- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting, Foraging, and Overwintering
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (trotellini - 5/16/2025)

Map Date: 5/16/2025

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Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 4 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



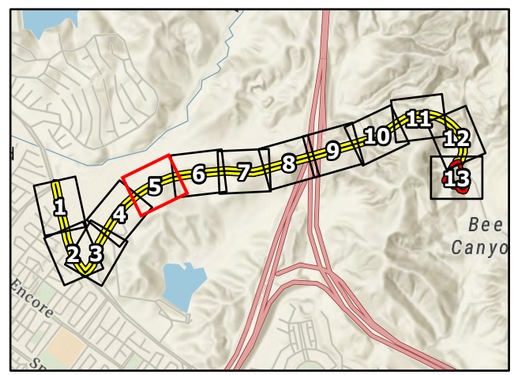
Map Contents

- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting, Foraging, and Overwintering
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources aprx - Bowerman_CBB_HA_20250331 (trotellini - 5/16/2025)

Map Date: 5/16/2025

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Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 5 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

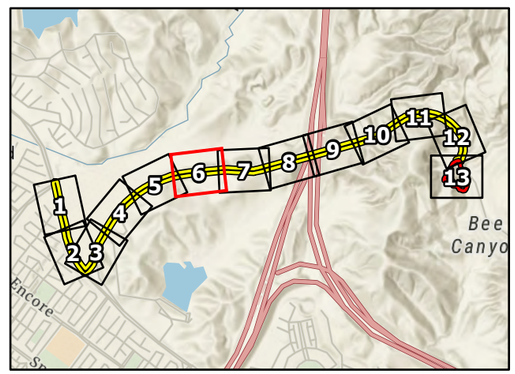
Crotch's Bumble Bee Habitat Suitability

High Quality Habitat - Potential for Nesting and Foraging

No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 5/16/2025)

Map Date: 5/16/2025

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Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 6 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

Crotch's Bumble Bee Observations

Crotch's Bumble Bee Observation (5/7/2025)

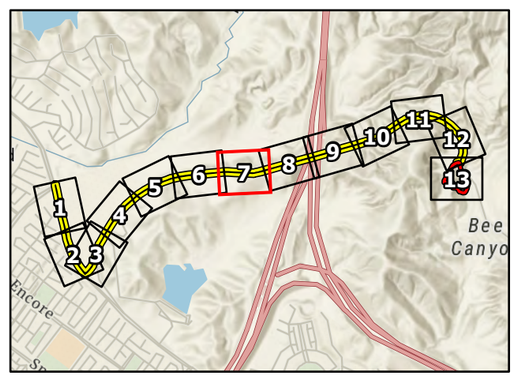
Crotch's Bumble Bee Habitat Suitability

High Quality Habitat - Potential for Nesting and Foraging

No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 5/16/2025)

Map Date: 5/16/2025

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Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 7 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

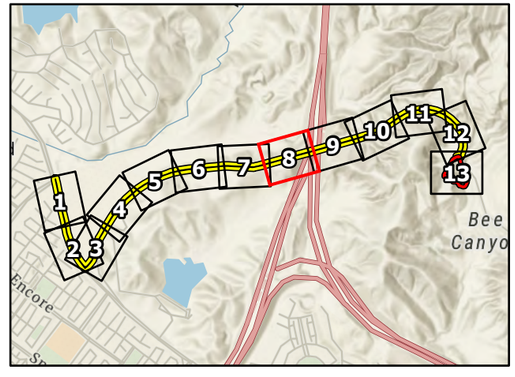
Crotch's Bumble Bee Habitat Suitability

High Quality Habitat - Potential for Nesting and Foraging

No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (trotellini - 5/16/2025)

Map Date: 5/16/2025

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Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 8 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



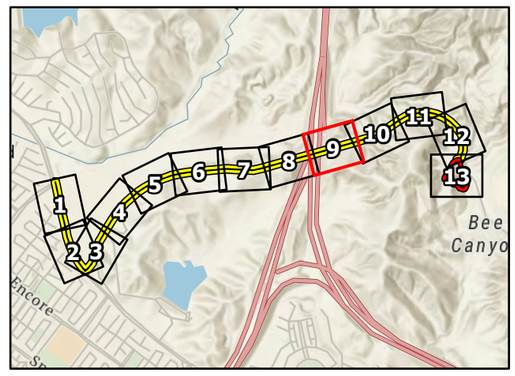
Map Contents

- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttotellini - 5/16/2025)

Map Date: 5/16/2025

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Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 9 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



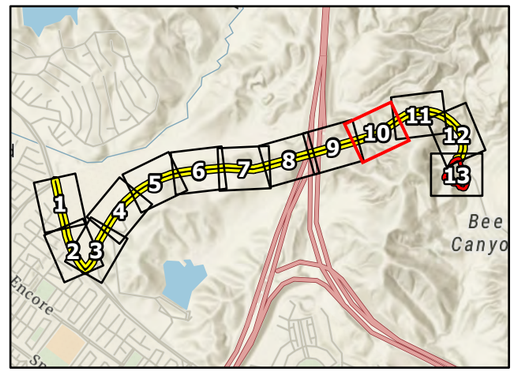
Map Contents

- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



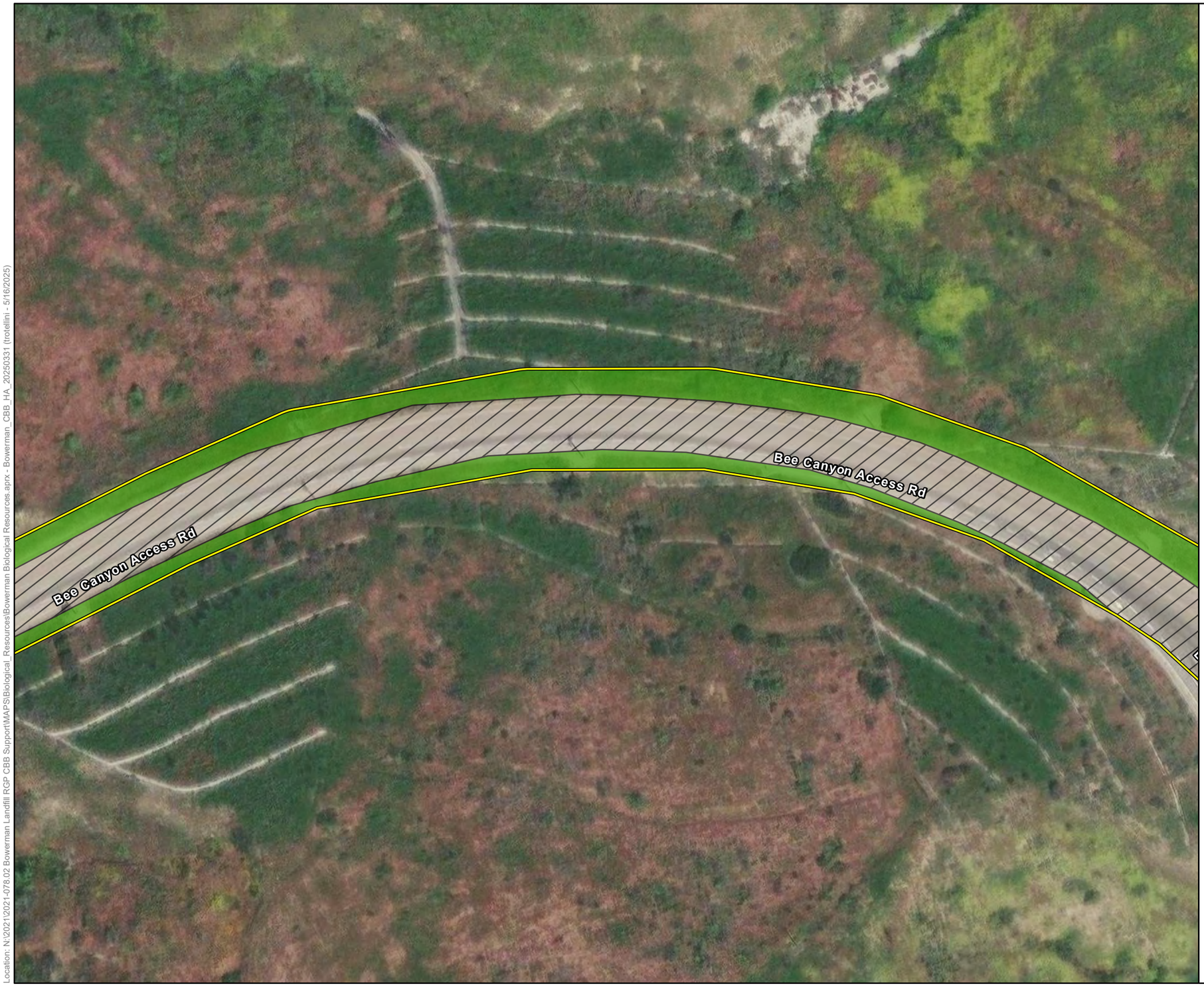
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Map Date: 5/16/2025

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Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 10 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

SoCalGas Pipeline Alignment

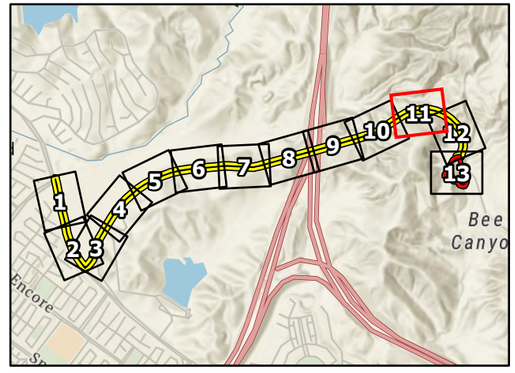
Crotch's Bumble Bee Habitat Suitability

High Quality Habitat - Potential for Nesting and Foraging

No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 5/16/2025)

Map Date: 5/16/2025

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Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 11 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



Map Contents

- Proposed RNG Plant Boundary
- SoCalGas Pipeline Alignment

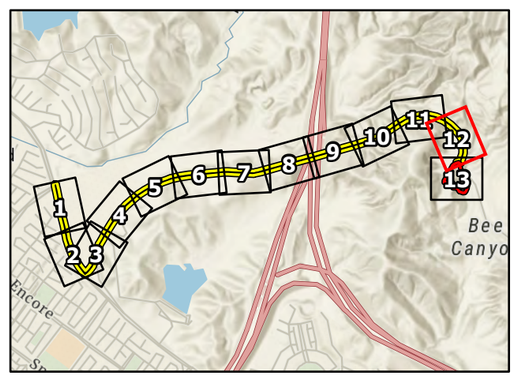
Crotch's Bumble Bee Observations

- Crotch's Bumble Bee Observation (3/19/2025)

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Medium Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 5/16/2025)

Map Date: 5/16/2025

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 12 of 13
2021-078.02 Bowerman Landfill RGP CBB Support



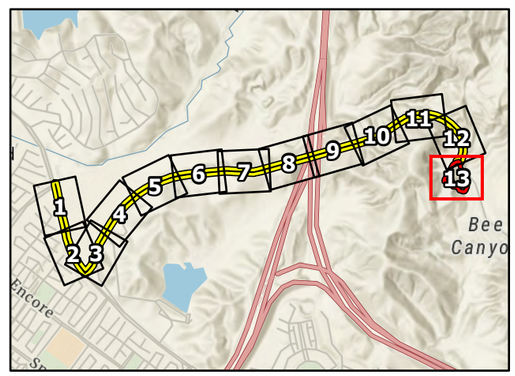
Map Contents

- Proposed RNG Plant Boundary
- SoCalGas Pipeline Alignment

Crotch's Bumble Bee Habitat Suitability

- High Quality Habitat - Potential for Nesting and Foraging
- Medium Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting and Foraging
- Low Quality Habitat - Potential for Nesting, Foraging, and Overwintering
- No Habitat

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)
Other Related Info if Needed



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources.aprx - Bowerman_CBB_HA_20250331 (ttotellini - 5/16/2025)

Map Date: 5/16/2025

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Scale in Feet
0 100

Figure 3. Crotch's Bumble Bee Habitat Suitability
Sheet 13 of 13
2021-078.02 Bowerman Landfill RGP CBB Support

APPENDIX B

Orange County Fire Authority Plant Lists

ATTACHMENT 7

Undesirable and Invasive Plant Species

Certain plants are considered to be undesirable and invasive due to their physical or chemical characteristics. Physical properties that would contribute to high flammability include large amounts of dead material retained within the plant, rough or peeling bark, and the production of copious amounts of litter. Chemical properties include the presence of volatile substances such as oils, resins, wax, and pitch. Certain native plants are notorious for containing these volatile substances.

Plants with these characteristics shall not be planted in any fuel modification zones or anywhere within the area covered by Alternate Methods & Materials agreements (see Section 4: Alternate Materials & Methods). Should these species already exist within these areas, they shall be removed because of their invasiveness or potential threat they pose to structures.

PLANT SPECIES (MANDATORY REMOVAL)

Botanical Name	Common Name
Adenostoma Fasciculatum	Chamise
Adenostoma Sparsifolium	Red Shanks
Anthemix Cotula	Mayweed
Artemisia Californica	California Sagebrush
Brassica Nigra	Black Mustard
Brassica Rapa	Wild Turnip, Yellow Mustard, Field Mustard
Cardaria Draba	Hoary Cress, Perennial Peppergrass
Cirsium Vulgare	Wild Artichoke
Conyza Canadensis	Horseweed
Cynara Cardunculus	Artichoke Thistle
Eriogonum Fasciculatum	Common Buckwheat
Heterothaca Grandiflora	Telegraph Plant
Lactuca Serriola	Prickly Lettuce
Nassella/Stipa tenuissima	Mexican Feathergrass
Nicotiana Bigelevil	Indian Tobacco
Nicotiana Glauca	Tree Tobacco
Pennisetum alopecuroides	Fountain Grass
Ricinus Communis	Castor Bean Plant
Sacsola Austails	Russian Thistle/Tumbleweed
Salvia Mellifera	Black Sage
Silybum Marianum	Milk Thistle
Tamarix Ramosissima	Salt Cedar
Urtica Urens	Burning Nettle
Ornamental:	
Arecaceae (all palm species)	Palms
Cycas Revoluta	Sago Palms
Cortaderia	Pampas Grass
Cupressus sp	Cypress
Eucalyptus sp	Eucalyptus
Juniperus sp	Juniper
Pinus sp	Pine

ATTACHMENT 8
Fuel Modification Zone Plant List

Symbol Legend

X = Plant species prohibited in wet and dry FMZs adjacent to reserve lands. Acceptable on all other fuel modification locations and zones.

W = Plant species appropriate for use in wet FMZs adjacent to reserve lands. Acceptable in all other wet and irrigated dry (manufactured slopes) fuel modification locations and zones.

o = Plant species native to Orange County. Acceptable in all fuel modification wet and dry zones in all locations.

N = Plant species acceptable on a limited basis (maximum 30% of the area) in wet FMZs adjacent to reserve lands. Acceptable on all other FMZs.

* = If locally collected.

** = Not native but can be used in all zones.

n = Plant species acceptable on a limited use basis. Refer to qualification requirements following plant palette.

Yellow row = Plant species susceptible to Invasive Shot Hole Borers (ISHB) infestation.

	Code	Botanical Name	Common Name	Plant Form
1.	W	Abelia x grandiflora	Glossy Abelia	Shrub
2.	n	Acacia redolens desert carpet	Desert Carpet	Ground Cover
3.	o	Acer macrophyllum	Big Leaf Maple	Tree
4.	X	Achillea millefolium	Common Yarrow	Low Shrub
5.	W	Achillea tomentosa	Woolly Yarrow	Low Shrub
6.	X	Aeonium decorum	Aeonium	Ground cover
7.	X	Aeonium simsii	no common name	Ground cover
8.	W	Agave attenuata	Century Plant	Succulent
9.	W	Agave shawii	Shaw's Century Plant	Succulent
10.	N	Agave victoriae-reginae	no common name	Ground Cover
11.	X	Ajuga reptans	Carpet Bugle	Ground Cover
12.	W	Alnus cordata	Italian Alder	Tree
13.	o	Alnus rhombifolia	White Alder	Tree
14.	N	Aloe arborescens	Tree Aloe	Shrub
15.	N	Aloe aristata	no common name	Ground Cover
16.	N	Aloe brevifoli	no common name	Ground Cover
17.	W	Aloe Vera	Medicinal Aloe	Succulent
18.	W	Alogyne huegeii	Blue Hibiscus	Shrub
19.	o	Ambrosia chammissonis	Beach Bur-Sage	Perennial

	Code	Botanical Name	Common Name	Plant Form
20.	o	Amorpha fruticosa	Western False Indigobush	Shrub
21.	W	Anigozanthus flavidus	Kangaroo Paw	Perennial/accent
22	o	Antirrhinum nuttalianum ssp.	no common name	Subshrub
23.	X	Aptenia cordifolia x 'Red Apple'	Red Apple Aptenia	Ground cover
24.	W	Arbutus unedo	Strawberry Tree	Tree
25.	W	Arctostaphylos 'Pacific Mist'	Pacific Mist Manzanita	Ground Cover
26.	W	Arctostaphylos edmundsii	Little Sur Manzanita	Ground Cover
27.	o	Arctostaphylos glandulosa ssp.	Eastwood Manzanita	Shrub
28.	W	Arctostaphylos hookeri 'Monterey Carpet'	Monterey Carpet Manzanita	Low Shrub
29.	N	Arctostaphylos pungens	no common name	Shrub
30.	N	Arctostaphylos refugioensis	Refugio Manzanita	Shrub
31.	W	Arctostaphylos uva-ursi	Bearberry	Ground Cover
32.	W	Arctostaphylos x 'Greensphere'	Greensphere Manzanita	Shrub
33.	N	Artemisia caucasica	Caucasian Artesmisia	Ground Cover
34.	X	Artemisia pycnocephala	Beach Sagewort	Perennial
35.	X	Atriplex canescens	Four-Wing Saltbush	Shrub
36.	X	Atriplex lentiformis ssp. breweri	Brewer Saltbush	Shrub
37.	o	Baccharis emoyi	Emory Baccharis	Shrub
38.	W o	Bacharis pilularis ssp. Consanguinea	Chaparral Bloom	Shrub
39.	X	Baccharis pilularis var. pilularis	Twin Peaks #2	Ground Cover
40.	o	Baccharis salicifolia	Mulefat	Shrub
41.	N	Baileya Multiradiata	Desert Marigold	Ground Cover
42.	N n	Bougainvillea spectabilis	Bougainvillea	Shrub
43.	o	Brickellia californica	no common name	Subshrub
44.	W o	Bromus carinatus	California Brome	Grass
45.	o	Camissonia cheiranthifiloa	Beach Evening Primrose	Perennial Shrub
46.	N	Carissa macrocarpa	Green Carpet Natal Plum	Ground Cover/Shrub
47.	X	Carpobrotus chilensis	Sea Fig Ice Plant	Ground Cover
48.	W	Ceanothus gloriosus 'Point Reyes'	Point Reyes Ceanothus	Shrub
49.	W	Ceanothus griseus 'Louis Edmunds'	Louis Edmunds Ceanothus	Shrub
50.	W	Ceanothus griseus horizontalis	Yankee Point	Ground Cover
51.	W	Ceanothus griseus var. horizontalis	Carmel Creeper Ceanothus	Shrub
52.	W	Ceanothus griseus var. horizontalis	Yankee Point Ceanothus	Shrub
53.	o	Ceanothus megarcarpus	Big Pod Ceanothus	Shrub
54.	W	Ceanothus prostratus	Squaw Carpet Ceanothus	Shrub
55.	o	Ceanothus spinosus	Green Bark Ceanothus	Shrub
56.	W	Ceanothus verrucosus	Wart-Stem Ceanothus	Shrub
57.	W	Cerastium tomentosum	Snow-in-Summer	Ground cover/Shrub
58.	W	Ceratonia siliqua	Carob	Tree
59.	W	Cercis occidentalis	Western Redbud	Shrub/Tree

	Code	Botanical Name	Common Name	Plant Form
60.	X	Chrysanthemum leucanthemum	Oxeye Daisy	Ground Cover
61.	W	Cistus Crispus	no common name	Ground Cover
62.	W	Cistus hybridus	White Rockrose	Shrub
63.	W	Cistus incanus	no common name	Shrub
64.	W	Cistus incanus ssp. Corsicus	no common name	Shrub
65.	W	Cistus salviifolius	Sageleaf Rockrose	Shrub
66.	W	Cistus x purpureus	Orchid Rockrose	Shrub
67.	W	Citrus species	Citrus	Tree
68.	o	Clarkia bottae	Showy Fairwell to Spring	Annual
69.	o	Cneoridium dumosum	Bushrue	Shrub
70.	o	Collinsia heterophyllia	Chinese Houses	Annual
71.	W o	Comarostaphylis diversifolia	Summer Holly	Shrub
72.	N	Convolvulus cneorum	Bush Morning Glory	Shrub
73.	W	Coprosma kirkii	Creeping Coprosma	Ground Cover/Shrub
74.	W	Coprosma pumila	Prostrate Coprosma	Low shrub
75.	o	Coreopsis californica	Califiornia Coreopsis	Annual
76.	W	Coreopsis lanceolata	Coreopsis	Ground Cover
77.	N	Corea pulchella	Australian Fuscia	Ground Cover
78.	W	Cotoneaster buxifolius	no common name	Shrub
79.	W	Cotoneaster congestus ‘Likiang’	Likiang Cotoneaster	Ground Cover/Vine
80.	W	Cotoneaster aprneyi	no common name	Shrub
81.	X	Crassula lactea	no common name	Ground Cover
82.	X	Crassula multicava	no common name	Ground Cover
83.	X	Crassula ovata	Jade Tree	Shrub
84.	X	Crassula tetragona	no common name	Ground Cover
85.	W o	Croton californicus	California Croton	Ground Cover
86.	X	Delosperma ‘alba’	White trailing Ice Plant	Ground Cover
87.	o	Dendromecon rigida	Bush Poppy	Shrub
88.	o	Dichelostemma capitatum	Blue Dicks	Herb
89.	N	Distinctis buccinatoria	Blood-Red Trumpet Vine	Vine/Climbing vine
90.	N	Dodonaea viscosa	Hopseed Bush	Shrub
91.	X	Drosanthemum floribundum	Rosea Ice Plant	Ground Cover
92.	X	Drosanthemum hispidum	no common name	Ground Cover
93.	X	Drosanthemum speciosus	Dewflower	Ground Cover
94.	o	Dudleya lanceolata	Lance-leaved Dudleya	Succulent
95.	o	Dudleya pulverulenta	Chalk Dudleya	Succulent
96.	W	Elaeagnus pungens	Silverberry	Shrub
97.	o	Encelia californica	California Encelia	Small Shrub
98.	o *	Epilobium canum [Zauschneria californica]	Hoary California Fuschia	Shrub
99.	o	Eriastrum Sapphirinum	Mojave Woolly Star	Annual
100.	N	Eriobotrya japonica	Loquat	Tree

	Code	Botanical Name	Common Name	Plant Form
101.	o	Eriodictycon trichocalyx	Yerba Santa	Shrub
102.	W o	Eriophyllum confertiflorum	no common name	Shrub
103.	W	Erythrina species	Coral Tree	Tree
104.	N	Escallonia species	Several varieties	Shrub
105.	W o	Eschscholzia californica	California Poppy	Flower
106.	X	Eschscholzia mexicana	Mexican Poppy	Herb
107.	N	Euonymus fortunei	Winter Creeper Euonymus	Ground Cover
108.	N	Feijoa sellowiana	Pineapple Guava	Shrub/Tree
109.	N	Fragaria chiloensis	Wild Strawberry/Sand Strawberry	Ground Cover
110.	o	Frankenia salina	Alkali Heath	Ground Cover
111.	W	Fremontondendron californicum	California Flannelbush	Shrub
112.	X	Gaillardia x grandiflora	Blanketflower	Ground Cover
113.	W	Galvezia speciosa	Bush Snapdragon	Shrub
114.	W	Garrya ellipta	Silktassel	Shrub
115.	X	Gazania hybrids	South African Daisy	Ground Cover
116.	X	Gazania rigens leucolaena	Training Gazania	Ground Cover
117.	o	Gilia capitata	Globe Gilia	Perennial
118.	W	Gilia leptantha	Showy Gilia	Perennial
119.	W	Gilia tricolor	Bird's Eyes	Perennial
120.	W	Ginkgo biloba	Maidenhair Tree	Tree
121.	o	Gnaphalium californicum	California Everlasting	Annual
122.	W	Grewia occidentalis	Starflower	Shrub
123.	o	Grindelia stricta	Gum Plant	Ground Cover
124.	N n	Hakea suaveolens	Sweet Hakea	Shrub
125.	W	Hardenbergia comptoniana	Lilac Vine	Shrub
126.	N	Heliathemum muutabile	Sunrose	Ground Cover/Shrub
127.	o	Helianthemum scoparium	Rush Rose	Shrub
128.	o	Heliotropium curassavicum	Salt Heliotrope	Ground Cover
129.	X	Helix Canariensis	English Ivy	Ground Cover
130.	W	Hesperaloe parviflora	Red Yucca	Perennial
131.	o n	Heteromeles arbutifolia	Toyon	Shrub
132.	X	Hypericum calycimum	Aaron's Beard	Shrub
133.	N	Iberis sempervirens	Edging Candytuft	Ground Cover
134.	N	Iberis umbellatum	Globe Candytuft	Ground Cover
135.	o	Isocoma menziesii	Coastal Goldenbush	Small Shrub
136.	o	Isomeris arborea	Bladderpod	Shrub
137.	W	Iva hayesiana	Poverty Weed	Ground Cover
138.	N	Juglans californica	California Black Walnut	Tree
139.	o	Juncus acutus	Spiny Rush	Perennial
140.	o	Keckiella antirrhinoides	Yellow Bush Penstemon	Subshrub
141.	o	Keckiella cordifolia	Heart Leaved Penstemon	Subshrub

	Code	Botanical Name	Common Name	Plant Form
142.	o	Keckiella ternata	Blue Stemmed Bush Penstemon	Subshrub
143.	W	Kniphofia uvaria	Red Hot Poker	Perennial
144.	W	Lagerstroemia indica	Crape Myrtle	Tree
145.	W	Lagunaria patersonii	Primrose Tree	Tree
146.	X	Lamprathus aurantiacus	Bush Ice Plant	Ground Cover
147.	X	Lampranthus filicaulis	Redondo Creeper	Ground Cover
148.	X	Lampranthus spectabilis	Trailing Ice Plant	Ground Cover
149.	W	Lantana camara cultivars	Yellow Sage	Shrub
150.	W	Lantana montevidensis	Trailing Lantana	Shrub
151.	o	Lasthenia californica	Dwarf Goldfields	Annual
152.	W	Lavandula dentata	French Lavender	Shrub
152.	W	Leptospermum laevigatum	Australian Tea Tree	Shrub
154.	W	Leucophyllum frutescens	Texas Ranger	Shrub
155.	o	Leymus condensatus	Giant Wild Rye	Large Grass
156.	N	Ligustrum japonicum	Texas privet	Shrub
157.	X	Limonium pectinatum	no common name	Ground Cover
158.	X	Limonium perezii	Sea Lavender	Shrub
159.	W n	Liquidambar styraciflua	American Sweet Gum	Tree
160.	W	Liriodendron tulipfera	Tulip Tree	Tree
161.	X	Lonicera japonica ‘Halliana’	Hall’s Japanese Honeysuckle	Vining Shrub
162.	o	Lonicera subspicata	Wild Honeysuckle	Vining Shrub
163.	X	Lotus corniculatus	Bird’s Foot Trefoil	Ground Cover
164.	o	Lotus hermannii	Northern Woolly Lotus	Perennial
165.	o	Lotus scoparius	Deerweed	Shrub
166.	W	Lupinus arizonicus	Desert Lupine	Annual
167.	W	Lupinus benthamii	Spider Lupine	Annual
168.	o	Lupinus bicolor	Sky Lupine	Flowering annual
169.	o	Lupinus sparsiflorus	Loosely Flowered Annual Lupine or Coulter’s Lupine	Annual
170.	W	Lyonothamnus floribundus ssp. Asplenifolius	Fernleaf Ironwood	Tree
171.	W	Macadamia integrifolia	Macadamia Nut	Tree
172.	W	Mahonia aquifolium ‘Golden Abundance’	Golden Abundance Oregon Grape	Shrub
173.	W	Mahonia nevenii	Nevin Mahonia	Shrub
174.	o	Malacothamnus fasciculatus	Chapparal Mallow	Shrub
175.	X	Malephora luteola	Training Ice Plant	Ground Cover
176.	W	Maytenus boaria	Mayten Tree	Tree
177.	W	Melaleuca nesophila	Pink Melaleuca	Shrub
178.	N	Metrosideros excelsus	New Zealand Christmas Tree	Tree
179.	o *	Mimulus species	Monkeyflower	Flower
180.	o	Mirabilis californica	Wishbone Bush	Perennial
181.	N	Myoporum debile	no common name	Shrub

	Code	Botanical Name	Common Name	Plant Form
182.	W	Myoporum insulare	Boobyalla	Shrub
183.	W	Myoporum parvilfolium	no common name	Ground Cover
184.	W	Myoporum 'Pacificum'	no common name	Ground Cover
185.	o	Nassella (stipa) lepidra	Foothill Needlegrass	Ground Cover
186.	o	Nassella (stipa) pulchra	Purple Needlegrass	Ground Cover
187.	o	Nemophilia menziesii	Baby Blue Eyes	Annual
188.	X	Nerium Oleander	Oleander	Shrub
189.	o	Nolina cismontana	Chapparal Nolina	Shrub
190.	N	Nolina species	Mexican Grasstree	Shrub
191.	W	Oenothera belandieri	Mexican Evening Primrose	Ground Cover
192.	N	Oenothera hookeri	California Evening Primrose	Flower
193.	W	Oenothera speciosa	Show Evening Primrose	Perennial
194.	X	Ophiopogon japonicus	Mondo Grass	Ground Cover
195.	o *	Opuntia littoralis	Prickly Pear	Cactus
196.	o *	Opuntia oricola	Oracle Cactus	Cactus
197.	o *	Opuntia prolifera	Coast Cholla	Cactus
198.	W	Osmanthus fragrans	Sweet Olive	Shrub
199.	X	Osteospermum fruticosum	Training African Daisy	Ground Cover
200.	X	Parkinsonia aculeata	Mexican Palo Verde	Tree
201.	W	Pelargonium peltatum	Ivy Geranium	Ground Cover
202.	X	Penstemon species	Beard Tongue	Shrub
203.	W	Photinia fraseria	no common name	Shrub
204.	W	Pistacia chinesis	Chinese Pistache	Tree
205.	X	Pittosporum undulatum	Victorian Box	Tree
206.	o	Plantago erecta	California Plantain	Annual
207.	**	Plantago insularis	Woolly Plantain	Annual
208.	X	Plantago sempervirens	Evergreen Plantain	Ground Cover
209.	W	Plantanus racemosa	California Sycamore	Tree
210.	W	Plumbago auritulata	Plumbago Cape	Shrub
211.	o	Popolus fremontii	Western Cottonwood	Tree
212.	X	Portulacaria afra	Elephant's Food	Shrub
213.	o	Potentilla glandulosa	Sticky Cinquefoil	Subshrub
214.	X	Potentilla tabernaemontanii	Spring Cinquefoil	Ground Cover
215.	X	Prunus caroliniana	Carolina Cherry Laurel	Shrub/Tree
216.	o	Prunus ilicifolia ssp. Ilicifolia	Holly Leafed Cherry	Shrub
217.	X	Prunus lyonii	Catalina Cherry	Shrub/Tree
218.	N	Punica granatum	Pomegranate	Shrub/Tree
219.	W	Puya species	Puya	Succulent/Shrub
220.	W	Pyracantha species	Firethorn	Shrub
221.	o	Quercus agrifolia	Coast Live Oak	Tree
222.	o n *	Quercus berberdifolia	California Scrub Oak	Shrub
223.	o n *	Quercus dumosa	Coastal Scrub Oak	Shrub

	Code	Botanical Name	Common Name	Plant Form
224.	X	Quercus engelmannii	Engelmann Oak	Tree
225.	X	Quercus suber	Cork Oak	Tree
226.	X	Rhamnus alaternus	Italian Buckthorn	Shrub
227.	o	Rhamnus californica	California Coffee Berry	Shrub
228.	o	Rhamnus crocea	Redberry	Shrub
229.	o	Rhamnus crocea ssp. Ilicifolia	Hollyleaf Redberry	Shrub
230.	N	Rhaphiolepis species	Indian Hawthorne	Shrub
231.	o	Rhus integrifolia	Lemonade Berry	Shrub
232.	N	*Searsia Lancea*	African Sumac	Tree
233.	o n	Rhus ovata	Sugar bush	Shrub
234.	o	Ribes aureum	Golden Currant	Shrub
235.	o	Ribes indecorum	White Flowering Currant	Shrub
236.	o	Ribes speciosum	Fuschia Flowering Gooseberry	Shrub
237.	W	Ribes viburnifolium	Evergreen currant	Shrub
238.	o *	Romneya coulteri	Matilija Poppy	Shrub
239.	X	Romneya coulteri 'White Cloud'	White Cloud Matilija Poppy	Shrub
240.	W n	Rosmarinus officinalis	Rosemary	Shrub
241.	W n	Salvia greggii	Autums Sage	Shrub
242.	W n	Salvia sonomensis	Creeping Sage	Ground Cover
243.	o	Sambucus mexicana	Mexican Elderberry	Tree
244.	W	Santolina chamaecyparissus	Lavender Cotton	Ground Cover
245.	W	Santolina virens	Green Lavender Cotton	Shrub
246.	o	Satureja chandleri	San Miguel Savory	Perennial
247.	o	Scirpis scutus	Hard Stem Bulrush	Perennial
248.	o	Scirpus californicus	California Bulrush	Perennial
249.	X	Sedum acre	Goldmoss Sedum	Ground Cover
250.	X	Sedum album	Green Stonecrop	Ground Cover
251.	X	Sedum confusum	no common name	Ground Cover
252.	X	Sedum lineare	no common name	Ground Cover
253.	X	Sedum x rubrotinctum	Pork and Beans	Ground Cover
254.	X	Senecio serpens	no common name	Ground Cover
255.	o	Sisyrinchium bellum	Blue Eyed Grass	Ground Cover
256.	o	Solanum douglasii	Douglas Nightshade	Shrub
257.	o	Solanum xantii	Purple Nightshade	Perennial
258.	W	Stenicarpus sinuatus	Firewheel Tree	Tree
259.	W	Strelitzia nicolai	Giant Bird of Paradise	Perennial
260.	W	Strelitzia reginae	Bird of Paradise	Perennial
261.	o	Symphoricarpos mollis	Creeping Snowberry	Shrub
262.	W	Tecoma stans (Stenolobium stans)	Yellow Bells	Shrub/Small Tree
263.	X	Tecomaria capensis	Cape Honeysuckle	Ground Cover
264.	N	Teucarium chamedrys	Germander	Ground Cover
265.	N	Thymus serpyllum	Lemon Thyme	Ground Cover

	Code	Botanical Name	Common Name	Plant Form
266.	N	Trachelospermum jasminoides	Star Jasmine	Shrub
267.	o	Trichosstems lanatum	Woolly Blue Curls	Shrub
268.	X	Trifolium hirtum 'Hyron'	Hyron Rose Clover	Ground Cover
269.	X	Trifolium fragerum 'O'Connor's'	O'Connor's Legume	Ground Cover
270.	o	Umbellularia californica	California Laurel	Tree
271.	o	Verbena lasiostachys	Western Vervain	Perennial
272.	N	Verbena peruviana	no common name	Ground Cover
273.	X	Verbena species	Verbena	Ground Cover
274.	X	Vinca minor	Dwarf Periwinkle	Ground Cover
275.	o	Vitis girdiana	Desert Wild Grape	Vine
276.	X	Vulpia myuros 'Zorro'	Zorro Annual Fescue	Grass
277.	W	Westringia fruticosa	no common name	Shrub
278.	W	Xannithorrhoea species	Grass Tree	Perennial, Accent shrub
279.	W	Xylosma congestum	Shiny Xylosma	Shrub
280.	X	Yucca Species	Yucca	Shrub
281.	o	Yucca whipplei	Yucca	Shrub

Approved Plant Palette Qualification Statements for Select Plant Species

2. Acacia redolens desert carpet: May be used in the furthest ½ of the "B" FMZ from the structure, and no closer than 25 feet from the edge of the zone nearest the structure. The plants may be planted with a minimum spacing at 10 feet on center, maximum spacing in meandering zones not to exceed a mature width of 24 feet and mature height of 24 inches. If acacia redolens desert carpet is used in the roadway protection zone, it shall be maintained at a minimum of 25 feet from the curb face. At the time of precise plan review, the mature spacing shall be accounted for.

42. Bougainvillea spectabilis (procumbent varieties): Procumbent to mounding varieties may be used in the mid "B" FMZ. The plants may be planted in groups at 6 feet on center spacing not to exceed eight plants per group. Mature spacing between individual plants or groups shall be at a 30 foot minimum.

125. **Hakea suaveolens:** May be used in the mid "B" FMZ. The plants shall be used as single specimens with mature spacing between plants of 30 feet minimum.

132. Heteromeles arbutifolia: May be used in the mid to lower "B" FMZ. The plants may be planted in groups of up to 3 plants per group. Mature spacing between individual plants or groups shall be at a 30 foot minimum.

160. Liquidambar styraciflua: May be used in the mid "B" FMZ. The plant shall be used as single specimens with mature spacing between trees and a 30 foot minimum.

223. Quercus berberdifolia: Additional information may be required as directed by the OCFA unless approved on the plan as shown.

224. Quercus dumosa: May be used in the mid to lower "B" FMZ. The plants may be planted in groups of up to 3 plants per group. Mature spacing between individual plants or groups shall be at a 30 foot minimum.

234. Rhus ovata & Rhus integrifolia: May be used in the mid to lower "B" FMZ of inland areas only. The plants may be planted in groups of up to 3 plants per group. Mature spacing between individual plants or groups shall be at a 30 foot minimum.

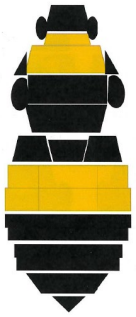
241. Rosmarinus officinalis: When used as a ground cover, it shall be maintained at 2 feet in height. Additional information may be required as directed by the OCFA.

242. Salvia greggii: Additional information may be required as directed by the OCFA unless approved on the plan as shown.

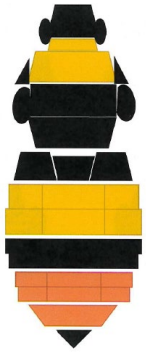
243. Salvia sonomensis: May be used in the mid to upper "B" FMZ. The plants may be planted in groups of up to 3 plants per group. Mature spacing between individual plants or groups shall be at a 15 foot minimum.

Female *Bombus crotchii*









Male *Bombus crotchii*



Males have yellow hair on their face and large "bug-like" eyes, yellow stripe on top and bottom of thorax (middle body segment), and yellow top of abdomen (at least T2) with either black or red at tail end of abdomen.

NOTE: Although these are the most common forms, there are several other color variations for Crotch's bumble bee and 5 additional species of bumble bee known to occur in Southern California as well as numerous bumble bee mimics, therefore, it is best to protect the resource in place until the identification can be determined/confirmed by the Crotch bumble bee biologist.

APPENDIX D: BOWERMAN RNG WATER INFRASTRUCTURE AND AVAILABILITY STUDY

Geosyntec consultants

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Technical Memorandum

Date:	February 25, 2025
To:	Matt Unger, Bowerman Power LFG, LLC
Copies to:	Brian Baumgartner, Bowerman Power LFG, LLC Jeff Friesen, Tent Engineering Kyle Picht, Tent Engineering Hamid Amini, Geosyntec Consultants, Inc. Emily Yates, Geosyntec Consultants, Inc. Alex Lin, Geosyntec Consultants, Inc.
From:	Julie Walters, Geosyntec Consultants, Inc.
Subject:	Bowerman Power Renewable Natural Gas (RNG) Plant Project Water Infrastructure and Availability Study
Project #:	HSW1898

BACKGROUND

Geosyntec Consultants, Inc. (Geosyntec) prepared this Water Infrastructure and Availability Study on behalf of Bowerman Power LFG, LLC (Bowerman Power) for evaluation of potential impacts on Irvine Ranch Water District (IRWD)-owned potable water, non-potable water, and sewage systems associated with the proposed development of a Renewable Natural Gas (RNG) plant at the Frank R. Bowerman (FRB) Landfill. This analysis considers the connection and consumption impacts of the new plant on existing infrastructure and is intended to address comments provided by IRWD in response to the Notice of Intent to adopt an Initial Study / Mitigated Negative Declaration for the RNG plant. This memorandum addresses only the RNG plant and does not address broader impacts of development and landfill operations that occur outside of the Bowerman Power Lease Boundary which are not part of the RNG plant project.

FINDINGS FROM PREVIOUS STUDIES

The *Sewer Connection Feasibility Study* (Feasibility Study) prepared by Geo-Logic Associates (GLA) in August 2020 (GLA, 2020) for the FRB Landfill was reviewed and referred to throughout the preparation of this memorandum. The Feasibility Study examined the practicality of constructing a sewer line connection from the landfill to nearby IWRD-owned systems. The following information was included in the Feasibility Study:

- Sewer service providers, including septic system providers, in or near the desired service area.
- Regulatory guidelines and procedures for sewer improvement plan processing.
- Availability of a sanitary sewer system near the FRB Landfill.

- Conceptual layout plans and alignment alternatives for the proposed sewer system connection.
- Hydraulic capacities for the existing and proposed sewer system alternatives.
- Existing and future estimated quantities of landfill wastewater (i.e., condensate, leachate, and groundwater) generation.

The FRB Landfill is situated towards the northern portion of IRWD's service area. As described in the Feasibility Study, the closest sanitary sewer collection and conveyance piping owned by IRWD is located within a residential community approximately one to two miles south/southwest of the FRB Landfill. Wastewater from this community is conveyed to IRWD's Michelson Water Reclamation Plant for treatment.

Applicability to the Proposed RNG Plant

The Feasibility Study was prepared prior to the proposed development of the RNG plant and does not account for the water infrastructure and potential demands from the RNG plant on IRWD-owned systems; however, an analysis of the condensate generation data included in the Feasibility Study indicates that the future estimated quantity of condensate generation addresses situations of FRB Landfill's ultimate capacity and/or maximum operational condition. These estimates demonstrate that the FRB Landfill has sufficient capacity to handle condensate generated from the RNG plant.

It is Geosyntec's understanding that, currently, there is no sanitary sewer discharge pipeline and active connection from the FRB Landfill to the previously discussed IRWD sanitary sewer collection/conveyance piping and no connection to the IRWD sanitary sewer system is planned as part of the RNG plant project. Therefore, no sanitary sewer discharge from the RNG plant is anticipated to an IRWD-owned system.

PROPOSED RNG PLANT DEVELOPMENT

RNG Plant Operations Overview and Site Description

The proposed RNG plant will process landfill gas (LFG) collected from the FRB Landfill to generate renewable natural gas. The plant will be located northeast of Bowerman Power's existing LFG to electricity generation station at the FRB Landfill and will consist of an outdoor LFG processing system, a one-story, 2,500 square foot control/electrical building, and ancillary systems including an office and bathroom. The plant is planned to operate 24/7, with five full-time operators for eight-hour day shifts (7 AM – 3 PM). While no operators are scheduled to be on-site during the night shift, they will be on-call, as needed.

RNG Plant Design Criteria

According to the RNG plant designer, Tent Engineering, the plant will be sized to process up to 6,000 standard cubic feet per minute (SCFM) of LFG into RNG, which is estimated to produce between 1,300 and 3,140 gallons per day (gpd) of condensate (Friesen, 2025). The LFG processing system will include chillers, blowers, compressors, pressure swing adsorption towers, and a

thermal oxidizer. An overview of the proposed piping plan for the plant is shown on the attached utility piping layout.

ANTICIPATED IMPACTS TO IRWD-OWNED SYSTEMS

Potable Water Use

As illustrated on the attached utility piping layout, no potable water lines are included in the planned plant layout. Due to the small number of employees at the plant the limited hours of occupation, and the absence of potable water being piped into the plant, construction of the proposed RNG plant is not anticipated to impact IRWD-owned potable water systems.

Non-Potable Water Use

The FRB Landfill is contractually obligated to provide non-potable water to Bowerman Power; therefore, it is assumed that the landfill's non-potable water use assumptions consider the demands of Bowerman Power. The RNG plant will tie into the existing non-potable water system as illustrated on the attached utility piping layout. Non-potable water demands will include handwashing stations and toilet flushing in the bathroom facilities. The bathroom facilities at the electricity generation station utilize an on-site disinfection system. Non-potable water is pumped to a tank on top of the building housing the bathroom facilities and treated for potable use. Non-potable water used at the RNG plant will be treated the same way.

Due to the small number of employees at the plant, the limited hours of occupation, and the minimal demand for non-potable water in the RNG plant bathroom facilities, construction of the proposed RNG plant is anticipated to have minimal impacts on IRWD-owned non-potable water systems.

Fire Suppression Water Demand

The preliminary fire suppression water demand for the plant was assessed in the *Bowerman Landfill RNG Facility Alternative Materials and Methods (AM&M) Proposal* (AM&M Proposal) prepared by Tent Engineering in February 2024 (Tent, 2024). The AM&M Proposal evaluated the required fire flow per the *2022 National Fire Protection Association 1142 Standard on Water Supplies for Suburban and Rural Firefighting* (NFPA 1142) and the 2022 California Fire Code (CFC), *California Code of Regulations, Title 24, Part 9, Integrated with the January 2023 Errata*, which state that reduced fire flow requirements can be used in rural areas where development of full fire flow requirements is impractical. Under this definition, the fire suppression water volume required was calculated to be 16,500 gallons.

The fire suppression system for the plant will utilize the 46,000-gallon fire water tank that was constructed in early 2016 to service the adjacent electricity generation station. The system will draw water from the existing tank through dedicated hydrants positioned at the northeastern and southwestern ends of the plant, as illustrated on the attached utility piping layout.

As previously discussed, the FRB Landfill is contractually obligated to provide non-potable water to Bowerman Power, including filling the existing fire water storage tank as needed; therefore, non-

potable water needed to supply the RNG plant's fire suppression system has previously been accounted for and is not anticipated to impact IRWD's non-potable water system infrastructure.

Sewage Generation and Disposal

As illustrated on the attached utility piping layout, no new sewer line connections to the IRWD sewage system are included in the planned plant layout. Septic waste from the plant's bathroom facilities will be pumped to a sanitary holding tank that will be regularly pumped out and hauled off-site by a licensed third-party vendor. The projected flow of sewage is expected to be minimal, consistent with sewage flows generated by office use.

Due to the small number of employees at the plant, the limited hours of occupation, and the lack of a planned sewer system connection at the plant, construction of the proposed RNG plant is not anticipated to impact IRWD-owned sewage systems.

Condensate Generation and Disposal

Condensate is generated through the removal of water from the "wet" LFG that is withdrawn during the LFG upgrading process. As previously discussed, between 1,300 and 3,140 gpd of condensate is expected to be generated at the proposed RNG plant. This condensate will be pumped to the existing FRB Landfill tank farm. According to the *Industrial Activities Stormwater Pollution Prevention Plan for the FRB Landfill*, most recently updated in August 2024, approximately 10,000 gpd of condensate is generated by the landfill and the tank farm has capacity for approximately 20,000 gallons of condensate (Geosyntec, 2024). Currently, condensate is hauled off-site for disposal by a licensed third-party vendor.

As the proposed RNG plant is not anticipated to contribute condensate in quantities that exceed the current capacity of the FRB Landfill tank farm or the future estimates of condensate generation for the FRB Landfill as outlined in the Feasibility Study (GLA, 2020), construction of the proposed RNG plant is not anticipated to impact IRWD-owned sewerage systems should condensate be treated and disposed of in the sewer at some point in the future.

SUMMARY

Overall, construction of the proposed RNG plant is anticipated to have minimal to no impact on IRWD-owned infrastructure as summarized below:

- Potable water use will be negligible and limited to office use. Potable water needs will be met by a third-party potable water supply vendor and are not anticipated to impact IRWD-owned potable water systems.
- Non-potable water use will be negligible and limited to handwashing and toilet flushing activities. Non-potable water needs will be met by the FRB Landfill's existing non-potable system and are not anticipated to impact IRWD-owned non-potable water systems.

- The fire suppression system will operate within the capacity of the existing fire water tank, requiring no additional improvements, and is not anticipated to impact IRWD-owned non-potable water systems.
- Sewage flow will be minimal and managed through on-site systems, including collection via septic tanks and off-site disposal via trucking; therefore, there are minimal to no impacts to IRWD-owned sewage systems anticipated.
- The RNG plant will generate up to an estimated 3,140 gpd of condensate, which will be routed to the existing FRB Landfill tank farm and hauled off-site for disposal. Should condensate generated at the RNG plant be disposed of via IRWD-owned sewer systems in the future, it is assumed that the impacts will not exceed those already estimated in the FRB Landfill's Feasibility Study.

REFERENCES

California Fire Code (CFC), *California Code of Regulations, Title 24, Part 9, Integrated with the January 2023 Errata*, January 2023.

Friesen, J. Email correspondence with Emily Yates, "*RE: Bowerman RNG: IRWD Water Study,"* February 3, 2025.

GeoLogic Associates (GLA), *Sewer Connection Feasibility Study for Frank R. Bowerman Sanitary Landfill, Orange County, California*, August 2020.

Geosyntec Consultants, Inc (Geosyntec). *Industrial Activities Stormwater Pollution Prevention Plan for the FRB Landfill.* August 26, 2024.

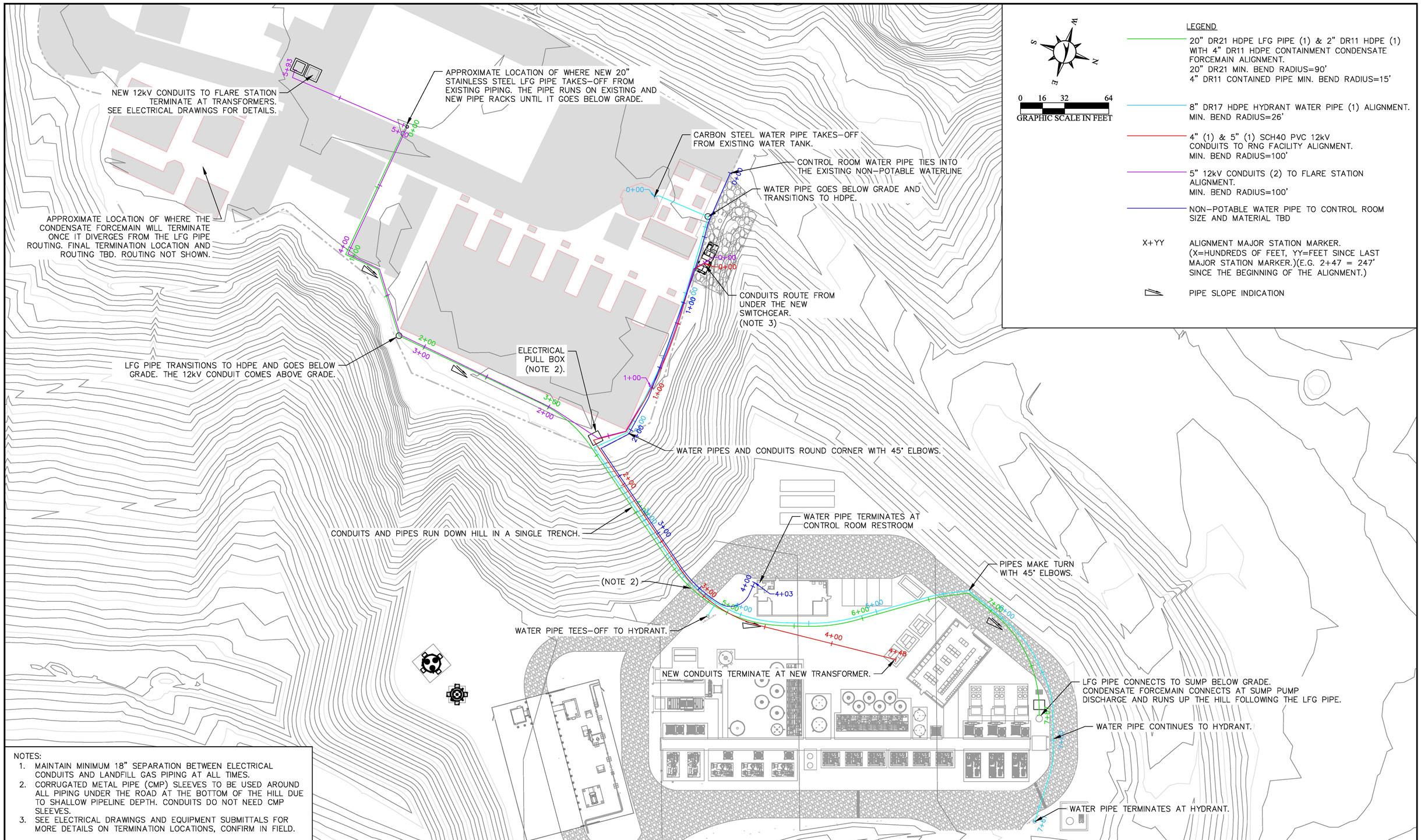
National Fire Protection Association 1142 (NFPA 1142), *Standard on Water Supplies for Suburban and Rural Firefighting*, 2022Geosyntec Consultants Inc. (Geosyntec), *Industrial Activities Stormwater Pollution Prevention Plan for Frank R. Bowerman Landfill*, August 2024.

Tent Engineering (Tent), *Bowerman Landfill RNG Facility Alternative Materials and Methods Proposal,* February 2024.

* * * * *

ATTACHMENT A

Bowerman RNG Plant
Utility Piping Layout Overview



NOTES:
1. MAINTAIN MINIMUM 18" SEPARATION BETWEEN ELECTRICAL CONDUITS AND LANDFILL GAS PIPING AT ALL TIMES.
2. CORRUGATED METAL PIPE (CMP) SLEEVES TO BE USED AROUND ALL PIPING UNDER THE ROAD AT THE BOTTOM OF THE HILL DUE TO SHALLOW PIPELINE DEPTH. CONDUITS DO NOT NEED CMP SLEEVES.
3. SEE ELECTRICAL DRAWINGS AND EQUIPMENT SUBMITTALS FOR MORE DETAILS ON TERMINATION LOCATIONS, CONFIRM IN FIELD.

REV	DATE	DESCRIPTION	DRN BY	DSN BY	CHK BY
0	11/25/24	ISSUED FOR 60% DESIGN	EB	ES-JF	JF-KP

MONTAUK RENEWABLES
5313 Campbells Run Road,
Pittsburgh, PA 15205

TENT ENGINEERING
452 NE Greenwood Ave.
Bend, OR 97701
www.tentengr.com

PIPE ROUTING FROM EXISTING FACILITY - OVERVIEW

Bowerman RNG Facility
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