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

111 Academy Way, Suite 210 ● Irvine, CA 92617 ● Tel: (714) 648-0630 ● Fax: (714) 648-0935 ● www.ecorpconsulting.com

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

REFERENCES

Alford, D. V. 1975. *Bumblebees*. Davis-Poynter, London.

California Department of Fish and Wildlife (CDFW). 2025a. *State and Federally Listed Endangered and Threatened Animals of California*. State of California, Natural Resources Agency, Department of Fish and Wildlife, Biogeographic Data Branch, California Natural Diversity Database (CNDDB). January.

_____. 2025b. *RareFind 5*, Online Version 5.2.14. Dated: March 10, 2025. California Natural Diversity Database. The Resources Agency, Sacramento. https://wildlife.ca.gov/Data/CNDDB/Maps-and-Data#rarefind. Accessed March 10, 2025.

_____. 2023. *Survey and Considerations for California Endangered Species Act (CESA) Candidate Bumble Bee Species*. State of California, Natural Resources Agency, Department of Fish and Wildlife. Published June 2023.

_____. 2022. *CDFW Seeks Public Comment Related to Crotch's Bumble Bee, Franklin's Bumble Bee, Suckley's Cuckoo Bumble Bee and Western Bumble Bee*.

ECORP Consulting, Inc. (ECORP). 2025. *Proposed Survey Plan for Crotch Bumble Bee Focused Surveys for the Frank R. Bowerman Landfill Renewable Natural Gas Plant, Orange County, California*. March 5.

Free, J. B., and Colin Gasking Butler. 1959. *Bumblebees*. Collins.

Fussell, M., and S. A. Corbet. 1992. Flower Usage by Bumble-Bees: A Basis for Forage Plant Management. *Journal of Applied Ecology*. Volume 29.

Google Earth. 2024. Bowerman Landfill - Google Earth. Accessed August 10, 2025.

Hatfield, R., S. Jepsen, S. F. Jordan, M. Blackburn, and A. Code. 2018. *Petition to List Four Species of Bumble Bees as Endangered Species under the California Endangered Species Act*. Submitted by The Xerces Society for Invertebrate Conservation, Defenders of Wildlife, and Center for Food Safety.

Liczner, A.R., Colla, S.R. 2019. A systematic review of the nesting and overwintering habitat of bumble bees globally. J Insect Conserv 23, 787–801 (2019). https://doi.org/10.1007/s10841-019-00173-7.

Lye, G. C., J. L. Osborne, K. J. Park, and D. Goulson. 2012. Using citizen science to monitor *Bombus* populations in the UK; nesting ecology for and relative abundance in the urban environment. *Journal of Insect Conservation* 16:697-707.

Orange County Waste & Recycling. 2024. *Initial Study/Mitigated Negative Declaration Bowerman Power Renewable Natural Gas Plant Project Frank R. Bowerman Landfill Orange County, CA*. October 24.

Sladen, F.W. Lambert. 1912. *The Humble-bee: its Life-history and how to Domesticate it*. Macmillan and Company, Limited.

Tetra Tech, Inc. 2024. *Biological Survey Report Bowerman Power Renewable Natural Gas Plant Project Frank R. Bowerman Landfill Orange County, CA*. October 24.

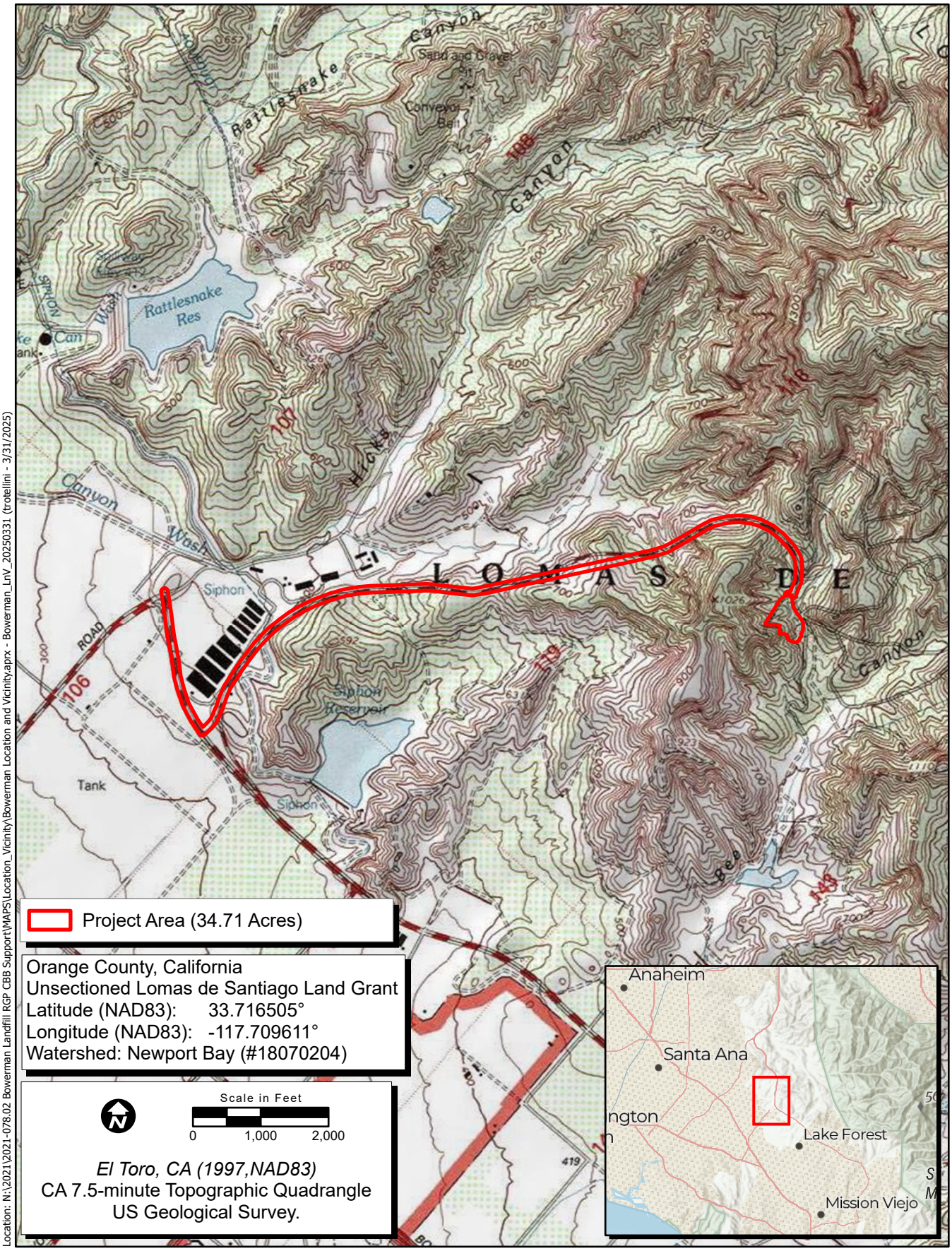
Williams, P. H., R. W. Thorp, L. L. Richardson, and S. R. Colla. 2014. *The Bumble Bees of North America: An Identification Guide*. Princeton University Press, Princeton.

Xerces Society. 2025. *Bumble Bee Watch*. http://www.bumblebeewatch.org/app/#/bees/lists. Accessed March 10, 2025.

LIST OF APPENDICES

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

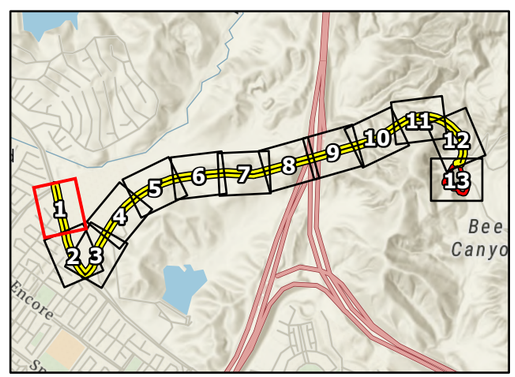
Vegetation Communities

- 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

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

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

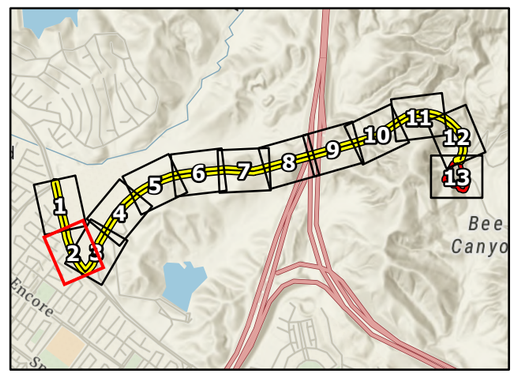
Vegetation Communities

- 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

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 100

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

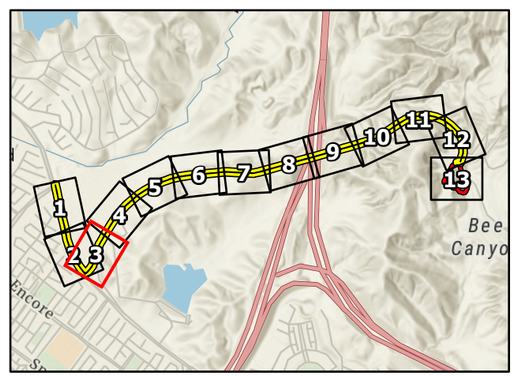
Vegetation Communities

- 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



Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Vegetation_and_LandCover\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 3 of 13
2021-078.02 Bowerman Landfill RGP CBB Support

Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

Eucalyptus

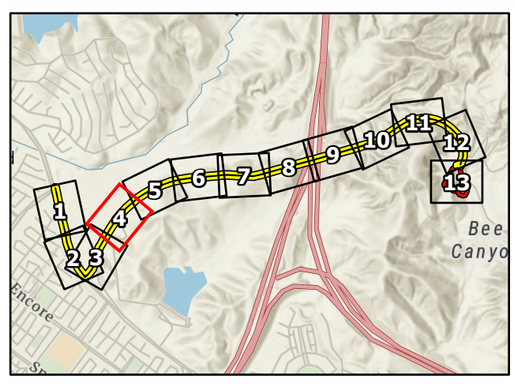
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



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 4 of 13
2021-078.02 Bowerman Landfill RGP CBB Support

Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

Eucalyptus

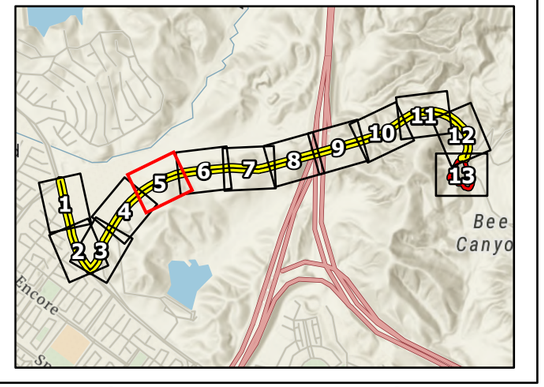
Sagebrush Scrub

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

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

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

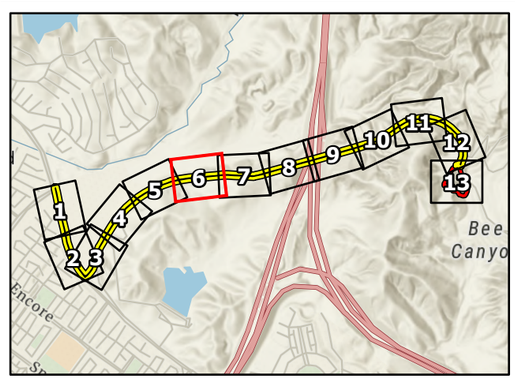
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



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 6 of 13
2021-078.02 Bowerman Landfill RGP CBB Support

Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

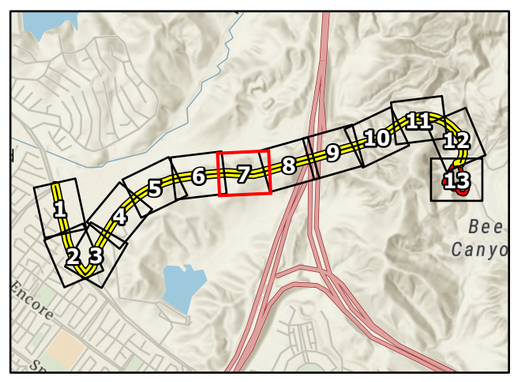
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



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 7 of 13
2021-078.02 Bowerman Landfill RGP CBB Support

Map Contents

SoCalGas Pipeline Alignment

Vegetation Communities

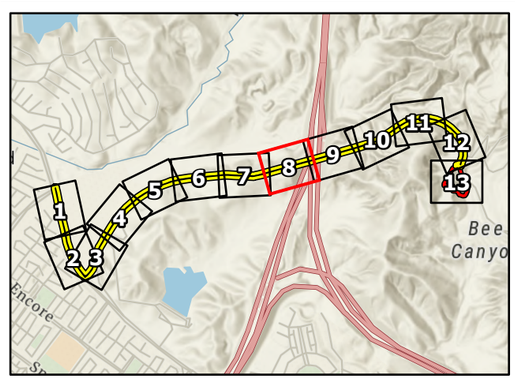
Sagebrush Scrub

Land Cover Types

Developed

Sources: ESRI, Maxar (2023), TetraTech (2023), ECORP (2025)

Other Related Info if Needed



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 8 of 13
2021-078.02 Bowerman Landfill RGP CBB Support

Map Contents

- SoCalGas Pipeline Alignment

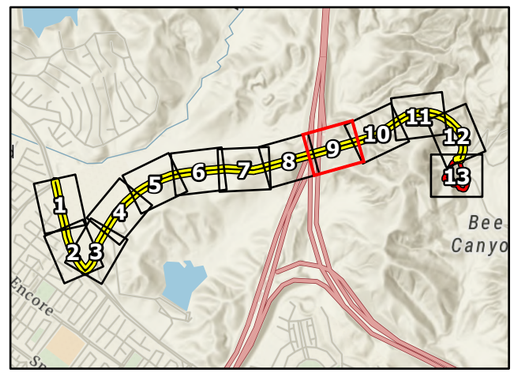
Vegetation Communities

- 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

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

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

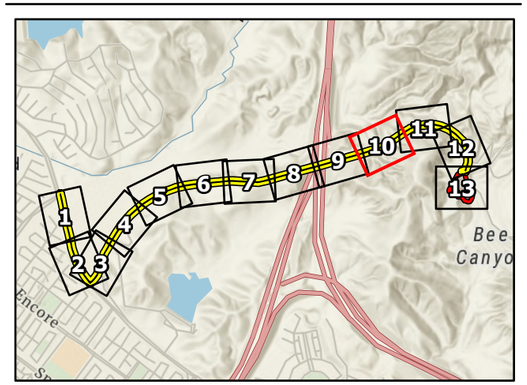
- Sagebrush Scrub

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

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

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

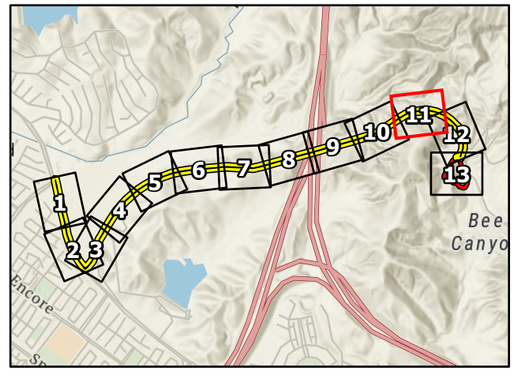
Vegetation Communities

- 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

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

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

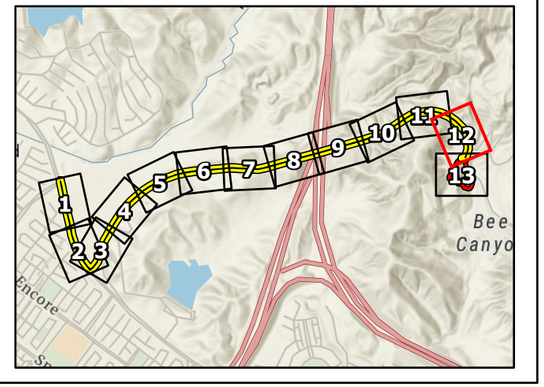
Vegetation Communities

- 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

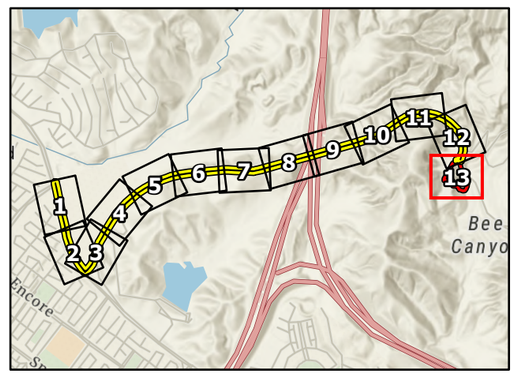
- Coast Live Oak
- Sagebrush Scrub
- Disturbed Sagebrush Scrub

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

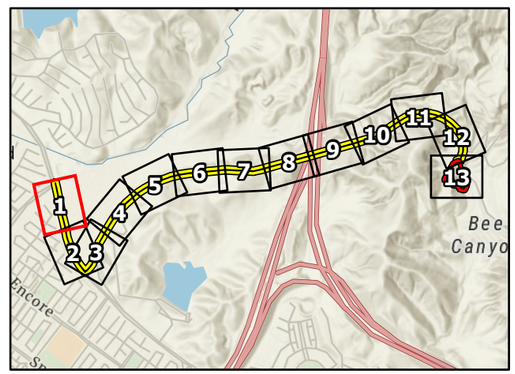
- SoCalGas Pipeline Alignment

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

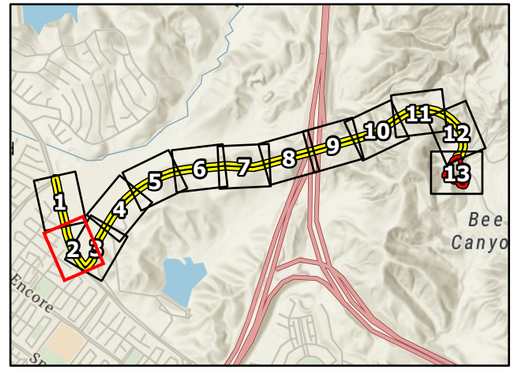
Map Contents

- 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

ECORP Consulting, Inc.
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

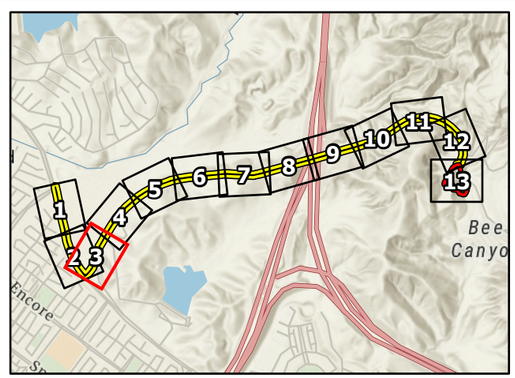
Special-Status Species Detections

- 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

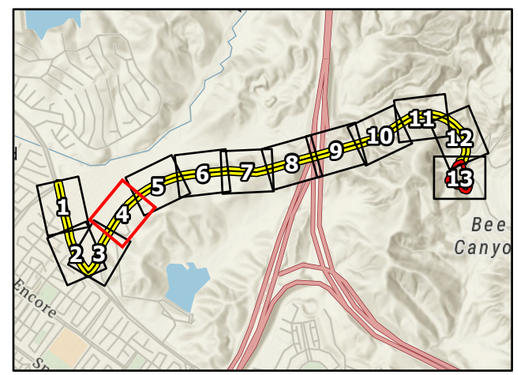
High Quality Habitat - Potential for Nesting and Foraging

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

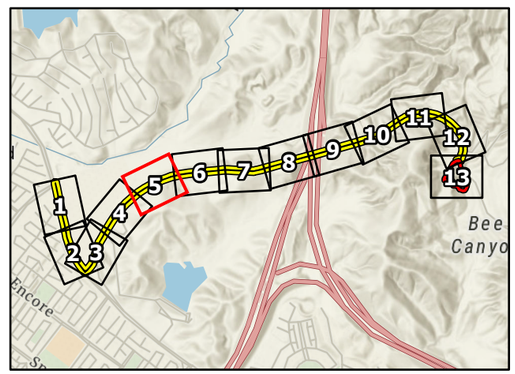
High Quality Habitat - Potential for Nesting and Foraging

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 (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 5 of 13
2021-078.02 Bowerman Landfill RGP CBB Support

Map Contents

SoCalGas Pipeline Alignment

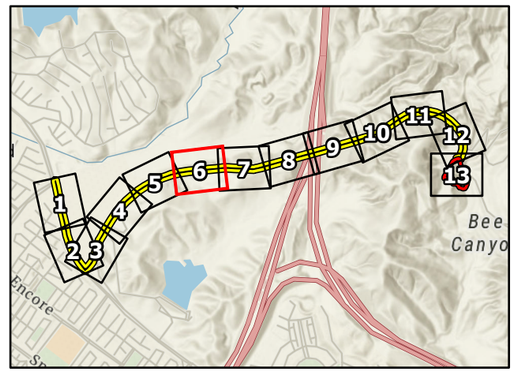
Crotch's Bumble Bee Habitat Suitability

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.
ENVIRONMENTAL CONSULTANTS

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

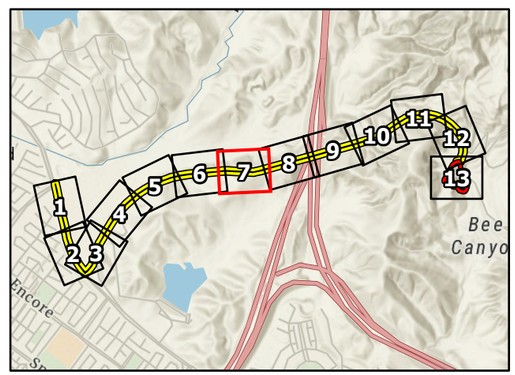
Special-Status Species Detections

- 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

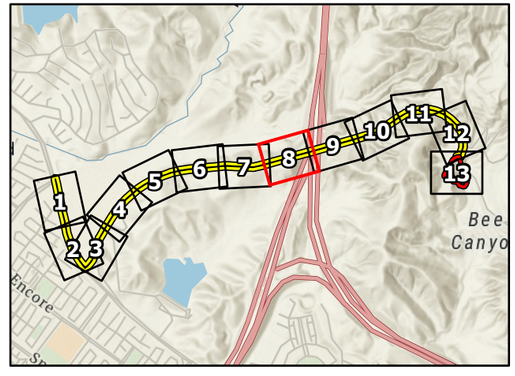
Crotch's Bumble Bee Habitat Suitability

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

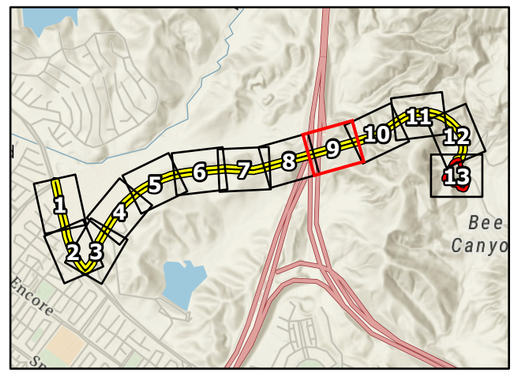
Map Contents

- 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 (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 9 of 13
2021-078.02 Bowerman Landfill RGP CBB Support

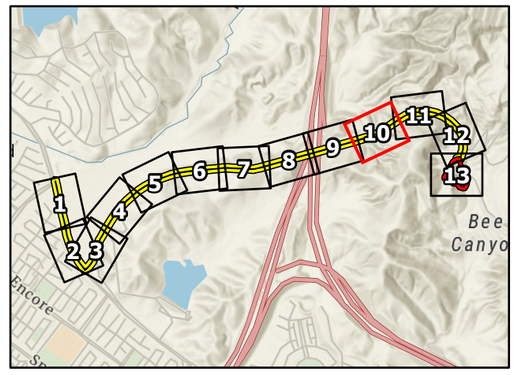
Map Contents

- 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



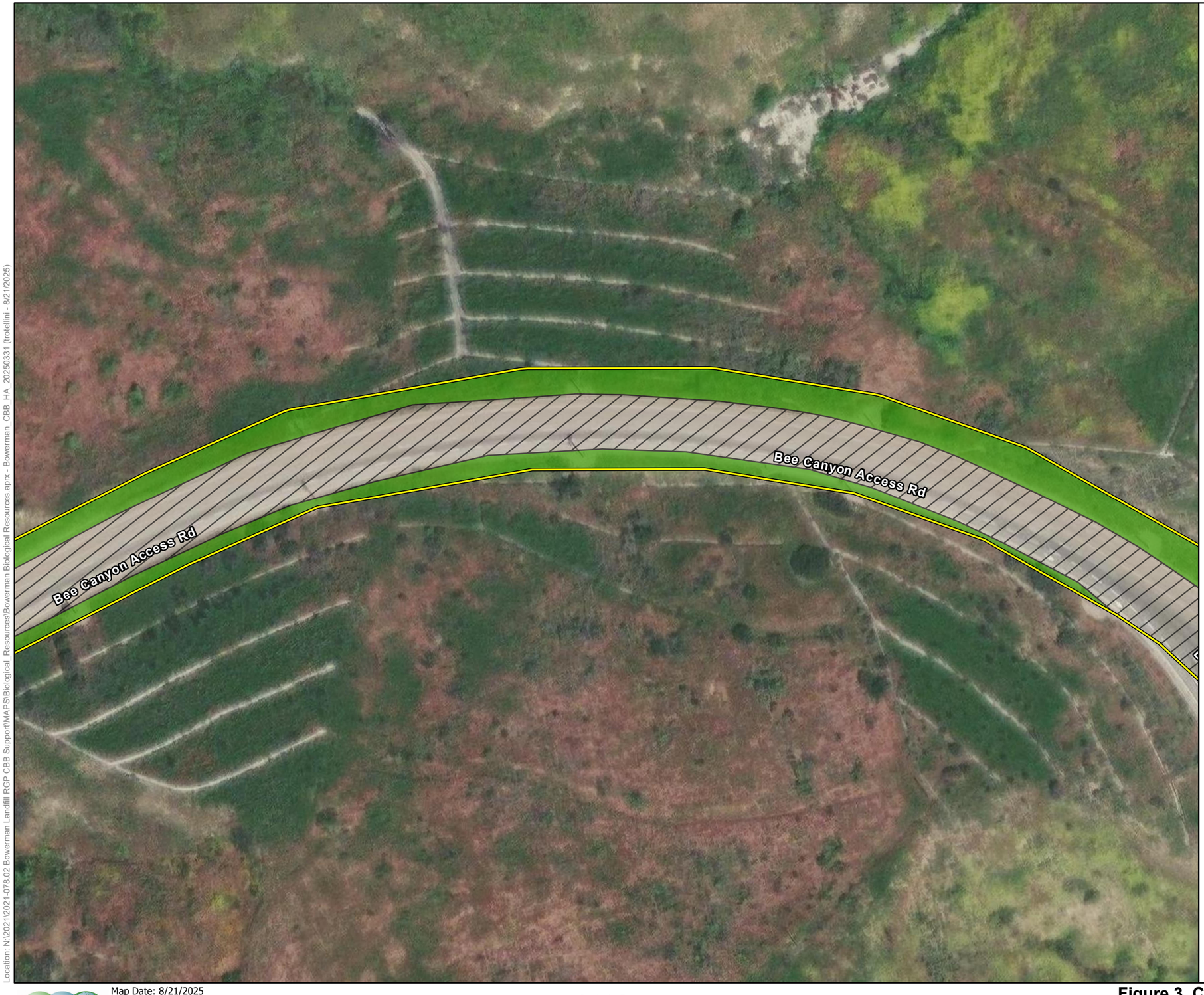
Location: N:\2021\2021-078.02 Bowerman Landfill RGP CBB Support\MAPS\Biological_Resources\Bowerman Biological Resources aprx - Bowerman_CBB_HA_20250331 (ttrotellini - 8/21/2025)

Map Date: 8/21/2025

ECORP Consulting, Inc.
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

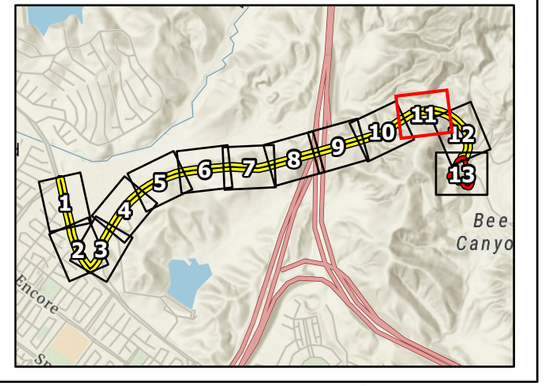
Crotch's Bumble Bee Habitat Suitability

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 (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 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)

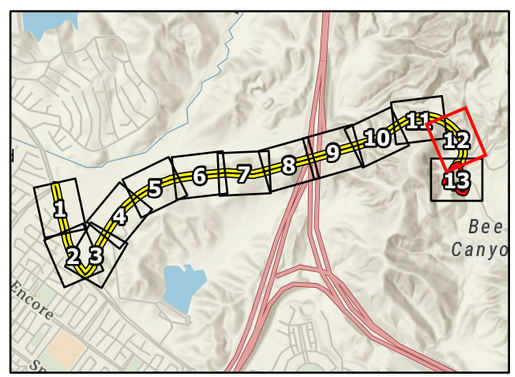
Other

- 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

ECORP Consulting, Inc.
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

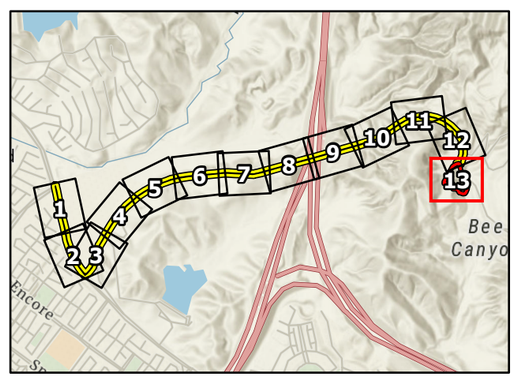
- Least Bell's Vireo
- Woodrat Midden

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

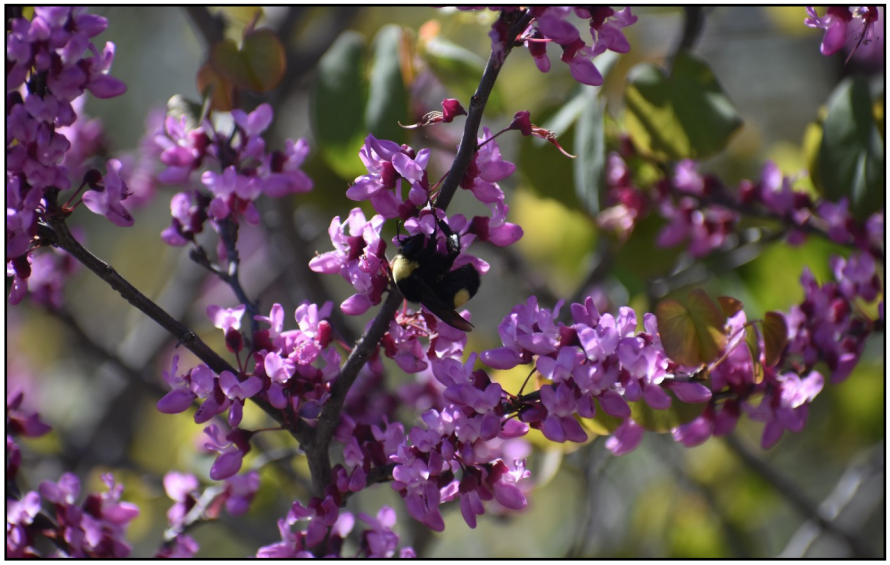
ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

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.