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Responses to California Energy Commission Staff

Data Requests 1 through 114

In support of the

Application for Certification

For the

Mission Rock Energy Center

15-AFC-02

Prepared for

Calpine Corporation

October 2016

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Acronyms and Abbreviations

AFC	Application for Certification
CAISO	California Independent System Operator
CAS	Chemical Abstracts Service
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
CNDDB	California Natural Diversity Database
CR	Cultural Resources
FEMA	Federal Emergency Management Agency
FIRM	Floodplain Insurance Rate Map
LARWQCB	Los Angeles Regional Water Quality Control Board
LORS	laws, ordinances, regulations, and standards
LOS	Level of Services
LSA	Lake and Streambed Alteration
MREC	Mission Rock Energy Center
MW	Megawatt
MVA	Mega volt-amps
OCA	Offsite Consequences Analysis
SAC	Surface air cooler
SCE	Southern California Edison
VCAPCD	Ventura County Air Pollution Control District
V/C	Volume to capacity ratio
WSAC	Wet surface air cooler

Introduction

Attached are Mission Rock Energy Center, LLC's (Applicant) responses to California Energy Commission (CEC) Staff data requests (DRs) numbers 1 through 114 for the Mission Rock Energy Center (MREC) (15-AFC-2). The CEC Staff served the data requests on June 24, 2016 (Set 1, DRs 1-107) and July 15, 2016 (Set 1A, DRs 108-114), as part of the discovery process for the MREC project.

The responses are grouped by individual discipline or topic area. Within each discipline area, the responses are presented in the same order as presented by CEC Staff, and are keyed to the Data Request numbers (1 through 114). New or revised graphics or tables are numbered in reference to the Data Request number. For example, the first table used in response to Data Request 15 would be numbered Table DR15-1. The first figure used in response to Data Request 28 would be Figure DR28-1, and so on.

Additional tables, figures, or documents submitted in response to a data request (supporting data, stand-alone documents such as plans, folding graphics, etc.) are found at the end of a discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

5.1 Air Quality (1-21)

Correspondence regarding permit applications

1. *Please provide copies of all substantive District correspondence regarding the Mission Rock Energy Center (Mission Rock) PDOC and FDOC preparation, including e-mails, within one week of submittal or receipt. This request is in effect until the final Commission Decision has been adopted.*

Response: All substantive VCAPCD correspondence regarding MREC air quality permitting will be supplied to CEC Staff within one (1) week of submittal or receipt.

Appendix 5.1A and 5.1E work sheets

2. *Please provide the spreadsheet version of Appendix 5.1A and Appendix 5.1E work sheets with embedded calculations, live and intact.*

Response: Unlocked copies of the spreadsheets used in both the operational and construction emission calculations will be provided in CD format. These confidential and proprietary files are supplied for CEC staff use only, and are not to be distributed or copied for any use not directly connected to Staff's environmental review of the MREC.

PM10 emission rate

3. *Please clarify the discrepancy between the 4 lb/hr PM10 emission rate listed in Appendix 5.1A, Attachment 5.1A-1 and the 2 lb/hr emission rate used in the air quality modeling analysis and listed in AFC Table 5.1-6.*

Response: General Electric provided the PM10 emission rates listed in Appendix 5.1A at 4 lb/hr. The Applicant, based on operational experience with the GE LM6000 turbine, used an emission rate of 2 lb/hr for all permitted limits. Source test data from similar turbines within the Calpine fleet have extensively demonstrated that the 2 lb/hr PM10 emission rate can be achieved. This value, i.e., 2 lbs/hr, was used in all subsequent modeling and emissions evaluations. The Applicant expects that permit limits will be based on the 2 lb/hr PM emission rate.

4. *Please revise the information in the AFC, Appendices, and impacts analysis as needed to reflect the appropriate PM10 emission rate(s).*

Response: No updates or revised information is required. See the response to Data Request 3.

WSAC auxiliary load

5. *Please confirm whether or not the wet SAC auxiliary load was already included in the original AFC filing.*

Response: The wet SAC auxiliary load was included in the turbine operational profiles provided in the AFC. The PM emissions from the wet SAC heat exchanger were subsequently provided in the supplement to the AFC. (TN#: 210540-2)

6. *If not, please provide updated turbine performance data, including net and gross capacities, and facility heat rates, as found in Appendix 5.1A and Table 5.1-2.*

Response: No updates are necessary.

Testing and commissioning

7. Please explain how onsite procedures would work to ensure no overlap of readiness testing of the fire pump engine and commissioning or startup/shutdowns of the combustion gas turbines would occur.

Response: The fire pump will be limited to routine testing only during non-startup and non-commissioning activities through the establishment of permit limits with the VCAPCD. An engine log will be maintained that shows all the dates and times of testing. Turbine startup dates and times will also be recorded via the digital acquisition system (DAS). Thus, procedures will be in place to demonstrate that the fire pump is not tested during specific events.

Operational procedures in the fire pump operations manual will alert plant personnel that such readiness testing is not allowed during the stated turbine operations. This will ensure that the overlap of operations of the fire pump and any other turbine operational activities such as commissioning, startups, shutdowns, or normal operations does not occur. In addition, a posted sign on the fire pump control panel will also alert plant staff not to perform readiness testing on the fire pump engine if the turbine(s) are in operation. Because the proposed turbines are peaking units, there will be ample opportunity each month to perform the necessary readiness testing without overlapping turbine operations.

Diesel fire pump

8. Please describe the basis for choosing to use a diesel-fueled fire pump engine and describe why other fuels, resulting in lower emissions, could not be used.

Response: National Fire Protection Association (NFPA) 20: *Standard for the Installation of Stationary Pumps for Fire Protection*, requires fire pumps to be either diesel compression engine type or steam driven; spark-ignited internal combustion engines shall not be used. Electric pumps are only allowed when an independent alternate source of electrical power is provided. The fire pump engine will be fired exclusively on California certified ultra-low sulfur diesel fuel. The fire pump engine will be in compliance with the EPA and CARB tiered emissions standards, the CARB/AVAQMD Air Toxics Control Measures (ATCM) for stationary compression ignition engines, and the New Source Performance Standards (NSPS) Subpart IIII. Tier 3 fire pump engine remains the cleanest burning engine category that has a NFPA certification.

Simultaneous commissioning

9. Please explain how the applicant would limit the number of turbines that could be commissioned simultaneously, with corresponding emission rates consistent with the emissions presented in Table 5.1-23 and the air quality modeling analysis.

Response: The number of turbines in any one of the four commissioning phases will be limited by the air district permit conditions. Thus, as required by the conditions, no more than two (2) turbines would be in any phase of the four (4) commissioning activities. The number of turbines and hours of operation within each commissioning activity will be recorded.

Commissioning year

10. Please explain if the applicant is proposing to limit permitted emissions during the first year of operation (commissioning year) to those of all subsequent, routine operating years.

Response: The applicant will limit the permitted emissions during the commissioning year to those of all subsequent (i.e., non-commissioning) operating years.

11. *If not, please provide the modelling and results of the expected commissioning year emissions impacts.*

Response: See Data Response 10 above. No updates are needed.

Modeling results

12. *Please confirm that Modeling Inputs/Results for Mission Rock Construction Impacts table, that was included with the air quality modeling files in the construction modeling folder as an Excel spreadsheet, is the correct table and should be reviewed in place of Table 5.1-4 of Appendix 5.1B.*

Response: Confirmed. Please use the table included with the construction modeling files in place of Table 5.1-4 of Appendix 5.1B. The table in the appendix was in error.

Base elevation

13. *Please confirm that the base elevation for the modeled sources in the air quality modeling specifically accounted for the 10 foot fill that would be required to elevate the site above the 100-yr floodplain elevation.*

Response: Confirmed. The approximately ten-foot site elevation increase due to import fill was accounted for in the air quality modeling.

Cumulative sources

14. *Please provide a copy of the applicant's correspondence to and from the District regarding existing and planned cumulative sources located within eight miles of the project site that would have a net increase in emissions of 5 tons or more per modeled criteria pollutant.*

Response: A copy of the cumulative source inventory request is attached to this response package (Attachment DR14-1).

15. *Please provide a list of all sources to be considered in the cumulative air quality impact analysis for staff review and approval.*

Response: Once the VCAPCD provides a list of cumulative sources, this list will be submitted to the CEC for review and comment.

16. *Upon approval of the list of sources to be included in the cumulative air quality impact analysis, please provide the cumulative modeling and impact analysis for all criteria pollutants.*

Response: The cumulative modeling and impact analysis will be provided following approval of the list of sources to be included. The cumulative modeling will be prepared for the criteria pollutants which includes NOx, CO, PM10, PM2.5 and SO2. Sources of VOCs, which have no ambient air quality standard, will not be modeled.

Offsets

17. *Please provide calculations showing the total amount of offsets required per VCAPCD Rule 26.2, the basis of the offset ratio used and explain how the applicant's approach meets the requirements of this rule.*

Response: Tables 5.1-12 and 5.1H-1 contained a typo for the required offsets for NOx. The correct amount should be 36.62 tons per year which is based on the 1.3:1 VCAPCD offset ratio for NOx. Updated offset tables are included with this response. This discrepancy has been acknowledged and corrected at the air district level.

Table DR17-1 (replaces Table 5.1-12) VCAPCD Emission Bank Credits Required By MREC

	PM10/PM2.5	ROC	NO_x	SO_2	CO
VCAPCD Offset Trigger Thresholds, tpy	15	5	5	15	NA
Facility PTE[a], tpy	13.09	4.98	28.17	1.351	32.32
VCAPCD Offset Ratio	1:1	1.3:1	1.3:1	1:1	1:1
Total Offsets Required, tpy	0	0	36.62	0	0

[a] Values derived from Section 5.1.

Table DR17-2 (REPLACES Table 5.1H-1) VCAPCD Emission Bank Credits Required By MREC

	$PM_{10/2.5}$	ROC	NO_x	SO_2	CO
VCAPCD Offset Trigger Thresholds, tpy	15	5	5	15	NA
Facility PTE[a], tpy	13.09	4.98	28.17	1.351	32.32
VCAPCD Offset Ratio	1:1	1.3:1	1.3:1	1:1	1:1
Total Offsets Required, tpy	0	0	36.62	0	0

[a] Values derived from Section 5.1.

18. *Please provide a tabulated list of all offsets obtained to satisfy the requirements of VCAPCD Rule 26.2, including all necessary documentation to show control or ownership of the required emissions offsets.*

Response: The applicant is currently working with an offset broker to identify and obtain the required offsets per VCAPCD Rule 26.2. Once the offsets are identified and commercial arrangements are in place, the Applicant will provide the requested list.

Mitigation approach

19. *Please provide a detailed description of the proposed approach to mitigate all nonattainment and nonattainment precursor emissions as required by CEQA.*

Response: For ROC, PM, and SO_2, the Applicant anticipates that non-attainment pollutants will be mitigated through participation in one or several of the incentive programs operated by the VCAPCD or through other approved methods. These programs include the Carl Moyer Program, the Lower Emission School Bus Program, and the Clean Air Fund. The Clean Air Fund has been used to provide incentives for electric lawn mowers, commercial leaf blowers, and electric vehicle charging stations. The Applicant will work with CEC Staff to implement a mitigation strategy.

Design efficiency calculations

20. *Please provide calculations deriving the design efficiency for the GE LM6000 PG Sprint turbines.*

Response: Under NSPS Subpart TTTT, design efficiency means the rated overall net efficiency on a lower heating value basis at the base load rating, at ISO conditions, and at the maximum useful thermal output. Design efficiency for turbines is to be determined by either ASME method PTC 22 or ISO Procedure 2314:2009 (gas turbine acceptance tests). The Turbine Performance Data provided in Appendix 5.1A, Attachment 5.1A-1 gives performance data for thirty-three (33) different run scenarios which includes fuel inputs, ambient temperature and humidity data, combustion parameters and by-

products, auxiliary loads, gross and net inputs and outputs, heat rate margins and degradation percentages, etc. The design efficiency of the turbines will vary with each of these performance scenarios, as well as the actual operational conditions at the site over each hour, day, month, and year. GE estimates the design efficiency of the LM6000 PG Sprint turbines, under design conditions, to be approximately 33.9% (using the OEM heat input, OEM net output, and OEM net heat rate).

21. *Please provide calculations showing how Mission Rock qualifies as a non-base load facility under NSPS, Part 60, Subpart TTTT.*

Response: Table 2 (Section 60.5520) of NSPS Subpart TTTT presents the emissions standards for stationary gas turbines. The CO_2 emissions standard applicable to the MREC turbines (on an individual basis) is 120 pounds CO_2/MMBtu. This standard applies to newly constructed turbines that supplies its design efficiency times its potential electric output or less as net electric sales on a 3 year rolling average basis and combusts more than 90% natural gas on a heat input basis on a 12-operating-month rolling average basis.

At ISO conditions, the proposed turbines will each produce approximately 54.36 to 55.34 net MW per hour (per GE Performance Data, Appendix 5.1A-1). Each proposed turbine unit is expected to be limited to an annual operating limit of 2500 hours, which equates to a 29% annual capacity factor. At these levels each turbine would produce between 135,900 to 138,350 MW per year. Using a design efficiency of 33.9% (0.339) multiplied by the potential electrical net output (at 8760 hours per year which ranges from 476,194 to 484,778 MW/year) results in a value range of 161,430 to 164,340 MW/year. Each turbine is well below this value; therefore, the 120 pounds CO_2/MMBtu is the applicable Subpart TTTT standard.

Attachment DR14-1
VCAPCD Cumulative Source Inventory Request

Ventura County
Air Pollution
Control District

Public Records Request Form

Please fill out this form as completely as possible. Please fill out a separate form for each address of interest. The form may be emailed to maree@vcapcd.org or faxed to the District at 805/645-1444. For more information, please contact Maree Penhart at 805/645-1403.

Person Requesting Information

Name:	Gregory Darvin	Date:	9/18/2016
Company:	Atmospheric Dynamics, Inc.		
Mailing Address:	PO Box 5907		
City:	Carmel-by-the-Sea	State: CA	Zip Code: 93921
Telephone Number:	831 620 0481	Fax Number:	831 620 0482
Email address:	darvin@atmosphericdynamics.com		

Standard Facility Information Request

Facility Name:		
Facility Address:		
City:	State:	Zip Code:
Facility Number(s):		

Information Requested (Check All That Are Applicable):

- ☐ Copy of Current Facility Permit to Operate with Facility Permitted Emissions
- ☐ Inspection Summary (1996 to Present)
- ☐ Notice of Violation Summary (1996 to Present)
- ☐ Notice to Comply Summary (1996 to Present)
- ☐ Complaint Summary (1996 to Present)
- ☒ Other (Describe Below)

Please provide a list of all existing or recently permitted sources of NOx, CO, PM10/2.5 and SO2 that are within 8 miles of the following USGS NAD 83 coordinate:306075.7, 3798510.6
The source list should be limited to emissions greather than or equal to 5 tons per year.
The source information should include location, emissions, and stack parameters such as stack height, velocity, temperature and diameter.

Requests for records must be for clearly identifiable records in the District's possession, and for facilities within the District's jurisdiction. The District is not required by law to create a new record or list from an already existing record.

Copying costs are $0.17 per page for requests that are 10 pages or more in length. If the "Other" box is checked, an additional charge for labor may be added to the invoice for the information requested.

NOW AVAILABLE ONLINE !
Facility Info System
Find information on facilities with APCD Permits at:
http://www.vcapcd.org/FIS.htm

5.2 Biological Resources (22-28)

Southwest Willow Flycatcher

22. Provide a habitat assessment for the southwestern willow flycatcher.

Response: A habitat assessment for the southwestern willow flycatcher is provided in the *Protocol Surveys for Least Bell's Vireo Habitat Assessment for Southwestern Willow Flycatcher Mission Rock Energy Center Generator Tie-Line Tower 3* technical memorandum (Attachment DR22-1).

Riparian Habitat Figure

23. Please revise Figure 5.2-6 to show the areas of riparian habitat.

Response: Figure DR23-1, showing riparian habitat areas, is attached.

Temporary and Permanent Impact Acreage

24. Please explain how it was calculated that the gen-tie would have 0.216 acre (Table 5.2-3) of temporary and permanent impacts to riparian habitat. Please clarify which towers would have temporary and permanent impacts to riparian habitat as listed in Table 5.2-3?

Response: Because detailed construction schematics are not required until the post-certification detailed design stage, the Applicant made conservative estimates as to the potential disturbance acreages. AFC Table 5.2-3 provides a summary of permanent and temporary disturbance areas that could occur in each land cover and/or habitat type.

Towers 3 and 18 are located adjacent to riparian habitat, but are expected to be sited in agricultural areas. Tower 3 would be located within row crops and Tower 18 would be in an orchard. Tower 16 would be located on a terrace, and not within the drainage channel of Ellsworth Barranca. Vegetation in this area consists of a large coast live oak (*Quercus agrifolia*) tree and several *Eucalyptus* trees. There is also a large California sycamore (*Platanus racemosa*) to the northwest of the proposed tower location, adjacent to the stream channel. Understory vegetation consists of scattered saltbush (*Atriplex sp.*), coyote brush (*Baccharis pilularis*), grasses, and some small tree plantings because the area has been previously disturbed and/or modified. Information about Tower 16 is also provided in the *Supplemental Biological Resources Survey for Mission Rock Energy Center* that was submitted as Attachment DA5.3-1 to the Data Adequacy Supplement to the AFC. At this time, it is unknown if any coast live oak, sycamore (*Platanu*s sp.), or black walnut (*Juglans californica*) trees will need to be altered or removed at the proposed location for Tower 16. If tree alteration or removal is required, the necessary tree removal permits would be obtained from the County of Ventura prior to any action being taken.

Sensitive and Special Status Species Habitat

25. Please explain how it was calculated that the gen-tie would temporarily impact 0.357acre of sensitive and special-status species habitat.

Response: Disturbance calculations were provided as conservative estimates, based on ground disturbances and vegetation removal of coastal sage scrub habitat. The AFC was docketed in October 2015 and the rare plant surveys were completed thereafter during the proper floristic period. Rare plant surveys were conducted on April 20-21, 2016 and survey results are provided in the *Focused Rare Plant Survey for Mission Rock Energy Center* (Attachment DR25-1). Please see this document for additional information. Only one special-status plant species was identified during the rare plant surveys. The

Catalina mariposa lily (*Calochortus catalinae*; CNPS Rare Plant Rank 4.2) was identified approximately 180 feet north of Tower 26. Impacts to this species are not anticipated because it was identified along an overgrown access road not impacted by MREC construction or operations. If ground disturbance and/or grading occurs during April through June, pre-construction clearance surveys are recommended to mark areas for avoidance as necessary.

In addition, the generator tie-line is located outside of the known breeding range for coastal California gnatcatcher (*Polioptila californica californica*; Federal Threatened [FT], California Department of Fish and Wildlife [CDFW] Species of Special Concern [SSC]) (Mock, P. 2004)[1]. Therefore, impacts to this species are not anticipated. However, if ground disturbance and/or grading occurs during the nesting season (February 1st through August 31st), pre-construction clearance surveys are recommended to identify any nesting birds that are protected under the Migratory Bird Treaty Act (MBTA) and Fish and Game Codes.

Gas and Water Pipeline Impacts

26. Provide a discussion of impacts (temporary and permanent) to riparian habitat from the natural gas pipeline and the process water supply line and explain how the impact acreages reported in Table 5.2-3 for the linears were calculated.

Response: As previously noted, conservative estimates of temporary and permanent impact acreages to riparian habitat from the natural gas pipeline and the process water supply line were provided in the AFC. The estimates were calculated based on GIS analysis of the project alignment and digitized riparian boundaries. Temporary and permanent impacts to riparian vegetation are not expected to be significant and would most likely consist of tree trimming as applicable. If any protected trees (as listed in the Ventura County Non-Coastal Zoning Ordinance, Section 8107-25, Tree Protection Regulations) are identified within the proposed tower locations, appropriate tree removal permits would be obtained prior to any tree trimming and/or alterations were made.

The following estimates of permanent and temporary disturbance were used:

1. Generator tie-line (temporary): 710 square feet (roughly 30-foot diameter circle)
2. Generator tie-line (permanent): 80 square feet (10-foot diameter circle)
3. Natural gas pipeline and water pipeline (temporary): 40 feet wide
4. Natural gas pipeline and water pipeline (permanent): No impacts

Plant Species Impacted

27. Provide a list of plant species impacted (temporary and permanent) by the construction of the gen-tie towers and gas and water lines.

Response: The proposed plant site, natural gas pipeline, recycled water pipeline and potable water pipeline are all located in existing developed or agricultural areas that were not considered to provide suitable habitat for special-status plants and were therefore not included as part of the April 2016 botanical survey. Additionally, portions of the gen-tie line that are located on developed or agricultural lands were also excluded. The botanical survey focused primarily on the western part of the transmission line alignment in area generally characterized by coastal sage scrub habitat. A plant list is provided in Attachment DR25-1 including a list of plant species observed at the tower locations of the *Focused Rare Plant Survey for Mission Rock Energy Center* technical memorandum (Attachment DR25-1).

[1] Mock, P. 2004. California Gnatcatcher Range Gnatcatcher (*Polioptila californica*). In The Coastal Scrub and Chaparral Bird Conservation Plan: a strategy for protecting and managing coastal scrub and chaparral habitats and associated birds in California. California Partners in Flight. Available online at: http://www.prbo.org/calpif/htmldocs/scrub.html

Lake and Streambed Alteration Notification

28. Please provide a completed Notification of a Lake and Streambed Alteration.

Response: The Applicant objected to Data Request 28 on the basis that a Notification of Lake and Streambed Alteration was not required because the project would not do any of the activities covered in Fish and Game Code section 1602. In lieu of requesting a Notification of Lake and Streambed Alteration, Staff identified the information that it sought to obtain from this data request at the August 26, 2016 workshop. The requested additional information is provided below in Staff Queries (SQ) 1-3.

Additional Biological Resources Workshop Questions

The following additional questions were asked by Staff during the workshop held on August 26, 2016. These additional questions are presented as SQ-1 through SQ-3.

SQ-1. Describe impacts to riparian habitat associated with the gen-tie line.

Response: Please see the response to DR-26 for a discussion on impacts associated with riparian habitat within the proposed generator-tie line alignment.

SQ-2. Describe techniques to prevent sediment from entering drainages.

Response: A stormwater pollution prevention plan (SWPPP) will be prepared and implemented prior to the start of any construction-related activities. Some methods that can be used to prevent sediment from entering drainages include, but are not limited, to the following:

- All work areas boundaries (temporarily or permanently disturbed) will be delineated.
- Best management practices (BMPs) will be used to protect drainages and to control site runoff during construction-related activities.
- Water applied to dirt roads and construction areas (trenches or spoil piles) for dust abatement will be the minimal amount needed to meet safety and air quality standards and to prevent the formation of puddles.

SQ-3. Describe mitigation and/compensation to protect riparian habitat.

Response: General impact avoidance and minimization measures would be implemented during site mobilization-, construction-, operation-, and closure-related activities to protect riparian habitat. The following avoidance and minimization measures could be used:

- All work areas boundaries (temporarily or permanently disturbed) will be delineated to prevent any additional impacts to riparian habitat adjacent to the work areas.
- Spoils will not be stockpiled near adjacent waterways or within riparian corridors.
- All vehicles and equipment will be properly maintained to reduce the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials.
- All trash and food-related waste will be properly discarded in self-closing containers and removed weekly or more frequently from the site.
- Vegetation and/or ground disturbance will be limited to the minimum extent feasible for safe completion of project-related activities. This includes limiting ingress and egress to defined routes.
- Only weed-free straw, hay bales, and seed for erosion control and sediment barrier installations will be used.

Additional measures that could be used include the following:

- Preconstruction surveys nesting birds and special-status species will be conducted prior to any construction-related activities.
- Biological monitoring will be conducted in natural vegetation communities or within areas adjacent to riparian corridors.

Compensatory mitigation for the loss of riparian habitat is not anticipated because riparian vegetation impacts are expected to be limited in nature. Please see the response to DR-26 for a discussion on potential impacts associated with riparian habitat.

Attachment DR22-1
Willow Flycatcher Habitat Assessment and Least Bell's Vireo Protocol Survey Assessment

TECHNICAL MEMORANDUM

Protocol Surveys for Least Bell's Vireo
Habitat Assessment for Southwestern Willow Flycatcher

Mission Rock Energy Center
Generator Tie-Line Tower 3

PREPARED FOR:	Calpine Corporation
PREPARED BY:	Mark Canfield and Melissa Fowler/CH2M
DATE:	August 5, 2016

Introduction

Mark Canfield and Melissa Fowler (Staff Biologists/CH2M) conducted eight (8) Least Bell's Vireo (*Vireo bellii pusillus*; Federal Endangered [FE], State Endangered [SE]) protocol presence/absence surveys and a habitat assessment for southwestern willow flycatcher (*Empidonax traillii extimus*; FE, SE) for the Calpine Corporation (Calpine) Mission Rock Energy Center (MREC) for generator tie-line Tower #3. The surveys were conducted in and adjacent to Todd Barranca, a corridor of riparian habitat adjacent to the proposed location for Tower #3, between the dates of April 20 and July 12, 2016.

Location and Background

Calpine plans to develop new electrical power generation in southern California and has identified a site for the proposed MREC in an unincorporated area of Ventura County, California. The project site is approximately 181-186 feet above mean sea level (msl). The project site, laydown area, natural gas pipeline, and process water supply are depicted on the U.S. Geological Survey (USGS) Saticoy and Santa Paula, California 7.5-minute series topographic quadrangles within Township 14 North, Range 21 West (San Bernardino Meridian). The generator tie-line is within Township 14 North, Range 21 West and Township 14 North, Range 22 West (San Bernardino Meridian). The project site will be located 0.8 mile east of State Route (SR) 126 and intersects the south end of Mission Rock Road. The site for the MREC is located in a designated industrial park. Land use in the surrounding area includes industrial, commercial, agricultural, and open space.

Calpine proposes to develop a 275 megawatt (MW) peaking power plant consisting of five General Electric (GE) Energy LM-6000 combustion turbine generators and ancillary equipment including chillers, gas compressors, and electrical transformers. Calpine also proposes to site an array of batteries for energy storage on the project site for coordinated operation with the combustion turbine generators.

Linear appurtenances include the following:

- Generator tie-line to Southern California Edison's (SCE's) Santa Clara Substation via a new 6.6-mile, 230-kV transmission line that runs west and southwest from MREC site.
- Natural gas pipeline connection via 2.4 miles of new 16-inch-diameter pipe that will run southwest from the project site along Shell Road and the Southern Pacific Railroad right-of-way (ROW) to

interconnect with Southern California Gas Company's (SCGC's) existing high-pressure natural gas transmission pipeline (Line 404/406).

- A new 1.7-mile-long pipeline to bring recycled water from the Limoneira Corporation's wastewater discharge line to the project site. The pipeline extends along the generator tie-line to the southwest.
- Potable water and industrial wastewater connections are to pipes adjacent to the site.

Generator tie-line Tower #3 would be located within an agricultural, upland area that is adjacent to Todd Barranca. Todd Barranca is a riparian corridor bisecting agricultural fields, approximately 0.3 miles southwest of the project site. A low gradient perennial stream flows northwest to southeast in the barranca, terminating in the Santa Clara River. The width of the riparian corridor vegetation is approximately 20 meters.

Species Preferences

Least Bell's Vireo

Least Bell's vireo nest and forage almost exclusively in lowland riparian woodland habitats (Garrett and Dunn, 1981; Franzreb, 1989). This species is typically associated with willow (*Salix* spp.), cottonwood (*Populus* sp.), mule fat (*Baccharis salicifolia*), or other riparian plant species, and often in areas with high structural diversity, including overstory trees and understory saplings and shrubs. Least Bell's vireo nest in dense riparian understory, primarily in mule fat (*Baccharis salicifolia*) and willows (Pike et al., 2004). According to Pike et al. (2004), of the 304 least Bell's vireo nests that were examined in 2004, only 5% of the nests occurred in gum trees and 52% of the nests were in willows, which demonstrates a preference among this species. The nesting season for least Bell's vireo is generally between April 10 to July 31, and the entire breeding season lasts up to August 31 (USFWS, 1986 and 2001). Least Bell's vireo are a rare and local summer resident of southern California's lowland riparian woodlands. Habitat for this species occurs approximately 0.6 miles southwest of Tower #3 and least Bell's vireo have been documented in the Santa Clara River in 2011 (CDFW, 2016a).

Southwestern Willow Flycather

Southwestern willow flycatchers also inhabit riparian areas along watercourses that have a dense growth of willows, mule fat, arrowweed (*Pluchea* sp.), buttonbush (*Cephalanthus* sp.) and other wetland plants and this species builds nests in dense thickets (Pike et al., 2004). This species has been documented within 10 miles of MREC (CDFW, 2016a).

Survey Methods

Least Bell's Vireo

Protocol surveys for least Bell's vireo developed following the United States Fish and Wildlife Service (USFWS) *Least Bell's Vireo Survey Guidelines* (USFWS, 2001). In accordance with the USFWS guidelines, biologists who conducted the surveys were familiar with least Bell's vireo songs, calls, and plumage characteristics of adult and juveniles vireos. Eight surveys were performed between the period April 10 and July 30, 2016, separated by a minimum of ten days between each survey. The survey area was a linear (northwest to southeast) 1,000-foot transect in the barranca, centered on the proposed Tower #3 location and encompassing the entire width of Todd Barranca riparian vegetation (Survey Area). Pedestrian surveys were conducted between sunrise and 1100 hours moving slowly up and down the barranca along the transect. Surveys focused on both visual and audio detection of least Bell's vireo. Incidental species observations were also recorded.

Southwestern Willow Flycatcher

A habitat assessment for southwester willow flycatcher was conducted at the same time as the protocol surveys for least Bell's vireo. Habitat conditions and vegetation were documented, as described below.

Survey Results

Survey dates and atmospheric conditions are presented in Table 1. A summary of survey results and least Bell's vireo detections is provided in Table 2. Site photographs are presented in Attachment 1. Incidental species observations are provided in Attachment 2.

Table 1. Survey dates and atmospheric data.

Date	Time (24-hour)	Temperature (°F)	Wind (mph)	Humidity (%)	Precipitation	Cloud Cover and Visibility Conditions
04/20/2016	0610	55	1-3	54	None	Clear, good visibility
04/20/2016	1100	77	1-3	25	None	Clear, good visibility
05/04/2016	0546	57	0	89	None	Overcast, good visibility
05/04/2016	1054	63	1-3	72	None	Overcast, good visibility
05/16/2016	0540	54	1-3	78	None	Clear, good visibility
05/16/2016	1110	69	3-7	60	None	Partly cloudy, good visibility
05/26/2016	0540	56	1-3	70	None	Clear, good visibility
05/26/2016	1100	68	1-3	65	None	Partly cloudy, good visibility
06/10/2016	0540	60	1-3	60	None	Overcast, good visibility
06/10/2016	1055	70	3-7	69	None	Clearing, good visibility
06/21/2016	0544	67	1-3	56	None	Clear, good visibility
06/21/2016	1052	77	3-7	76	None	Clear, good visibility
07/01/2016	0546	62	1-3	66	None	Overcast, good visibility
07/01/2016	1100	74	7-10	63	None	Clear, good visibility
07/12/2016	0550	57	4	100	None	Overcast, average visibility

Notes: °F = degrees Fahrenheit
% = percent
mph = miles per hour

Survey Area

The Survey Area of Todd Barranca is characterized as a fragmented southern willow scrub (Holland 1986) community with scattered southern black walnut (*Juglans californica*) and eucalyptus (*Eucalyptus* ssp.) trees. The barranca habitat is being actively managed as evidenced by significant selective pruning and vegetation clearing throughout the barranca vegetation understory. Dominant plant species observed in the barranca include: arundo (*Arundo donax*), mulefat (*Baccharis salicifolia*), black mustard (*Brassica nigra*), thistle (*Carduus* sp.), hemlock (*Cicuta* sp.), fennel (*Foeniculum vulgare*), cottonwood (*Populus fremontii*), black raspberry (*Rubus occidentalis*), elderberry (*Sambucus* sp.), poison oak (*Toxicodendron diversilobum*), nasturtium (*Tropaeolum majus*), and non-native grasses. The stream in the barranca appears to be a perennial a low gradient stream containing a small number of pools and fed upstream by agriculture run-off or other anthropogenic sources.

Least Bell's Vireo

Least Bell's vireo vocalizations were identified during three of the eight surveys on June 21, July 1, and July 12, 2016 (Table 2). During the June 21 survey, least Bell's vireo vocalizations were detected primarily at the northern and southern margins of transect. On July 1, 2016, least Bell's vireo vocalizations were detected once on the south boundary of the Survey Area during the early morning hours. During the July 12, 2016 survey, least Bell's vireo vocalizations were detected once at the southern boundary of the Survey Area during the early morning hours.

Table 2. Least Bell's vireo detections.

Date	Time (24-hour)	Latitude	Longitude	Observation Method (Vocalization, Visual)
06/21/2016	0644	34.30604	-119.11233	Vocalization
06/21/2016	0710	34.304663	-119.111312	Vocalization
06/21/2016	0831	34.306625	-119.112768	Vocalization
06/21/2016	0910	34.304624	-119.111214	Vocalization
06/21/2016	0959	34.306574	-119.112613	Vocalization
06/21/2016	1013	34.306610	-119.112569	Vocalization
07/01/2016	0745	34.304220	-119.110987	Vocalization
07/12/2016	0609	34.30449	-119.110971	Vocalization

Geographic coordinates : WGS 84

Southwestern Willow Flycather

As previously noted, riparian habitat within Survey Area is fragmented and appears to be actively managed (Photographs 6-8, Attachment 1). There is significant selective pruning and clearing throughout the understory vegetation. The understory within the Survey Area is not dense and is not expected to be preferred nesting habitat for the southwestern willow flycatcher.

Special-Status Species

Four special-status species were observed within the Survey Area (Attachment 2). Two western pond turtles (*Actinemys marmorata)*, a State Species of Special Concern (SSC), were observed within the Todd Barranca stream on April 20, 2016 and one was observed on May 16, 2016. A snowy egret (*Egretta thula*; no formal designation, but is listed on the CDFW Special Animals List) was observed flying over the barranca on May 26, 2016. Nuttall's woodpeckers (*Picoides nuttallii*; Federal Bird of Conservation Concern [BCC]) were observed on multiple dates in the Survey Area. Lastly, a threespine stickleback species (*Gasterosteus* sp.) was also observed in the Todd Barranca stream; however, it could not be determine what subspecies was present. Sticklebacks are listed in the CDFW Special Animals List as the American Fisheries Society (AFS) Endangered ([EN]; CDFW, 2016b). The unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*; FE, SE, CDFW Fully Protected [FP]) has been documented in the Santa Clara River and its tributaries in the Santa Paula area (CDFW, 2016a). Determination of which stickleback species is present in the Survey Area of Todd Barranca would require properly permitted personnel following protocol stream sampling methods.

Discussion

Least Bell's vireo were detected in Todd Barranca on June 21, July 1, and July 12, 2016. The observations occurred in a transient north/south and south/north pattern that suggests these birds were not resident to the barranca, but moving through the barranca on each occasion. Although there was no visual confirmation of age class, one likely explanation for the transient detection pattern is that these are juvenile birds of this year's clutch dispersing from prime habitat (Santa Clara River). General nesting activity for all bird species began early this year (2016), presumably because of unseasonably warm weather conditions. This was repeatedly observed during other surveys throughout the greater southern California region, which could also explain the relatively early fledging of this year's clutch.

The vegetation community and structure of the Survey Area can be characterized as marginal to low quality least Bell's vireo and southwestern willow flycatcher habitat. As previously noted, least Bell's vireo habitat is typically comprised of willow, cottonwood, and mule fat with a diverse structural mix of overstory trees and a dense understory consisting of saplings, shrubs, and herbs (Franzreb, 1989). The vegetation in the Survey Area consists of two, approximately 10-meter-wide strips of vegetation on each side of the stream. The vegetation is being actively managed and the understory is open. Although the Survey Area vegetation community typically associated with least Bell's vireo is present, the altered, narrow structure of this area of the barranca offers marginal to low quality habitat for least Bell's vireo. Nesting habitat for southwestern willow flycatcher is not present because there is a lack of emergent vegetation and a dense understory.

Summary and Recommendations

Least Bell's vireo that were detected in Todd Barranca were most likely juvenile birds, of this year's clutch, dispersing from the Santa Clara River riparian habitat (south of the Survey Area). It is unlikely that the Survey Area would support nesting least Bell's vireo unless there is a significant increase in the Santa Clara River population to the south, resulting in birds utilizing sub-optimal habitat.

The proposed location of Tower #3 lies east of Todd Barranca, outside of the riparian habitat. It is unlikely that tower construction would affect least Bell's vireo or other special-status species (western pond turtle) at this location. A combination of worker's environmental awareness training, biological monitoring, and construction best management practices (BMPs) are recommended.

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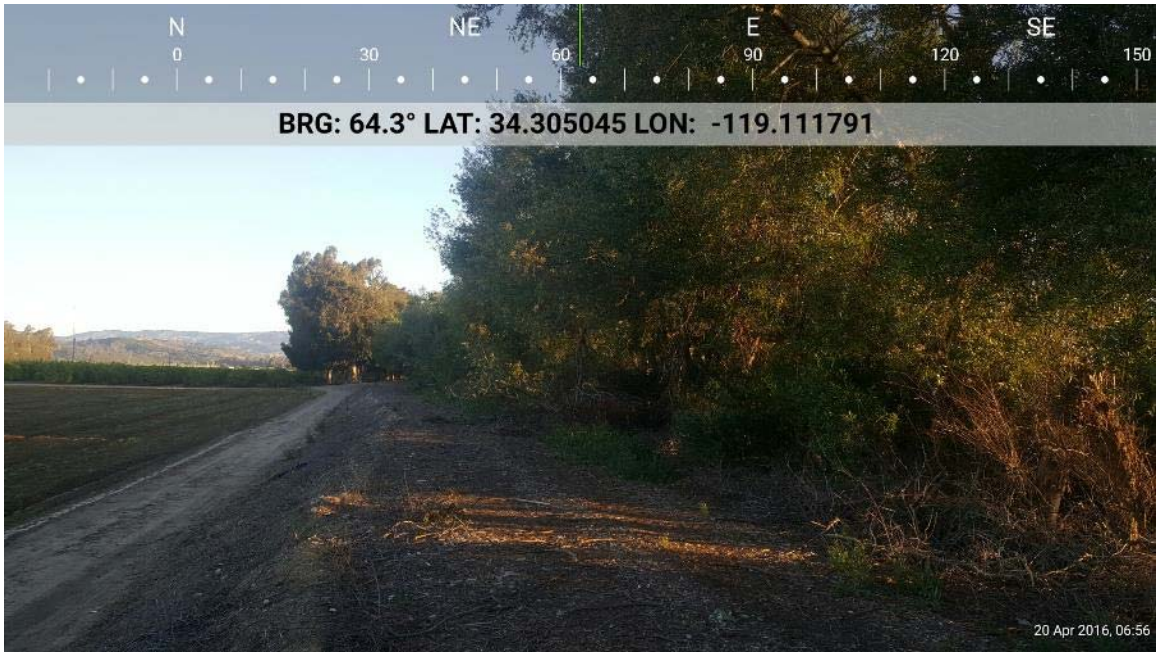
Attachment 1
Site Photographs



Photograph 1. *Representative photograph of the west side of Todd Barranca, facing northeast. Taken: 04/20/16.*

Photograph 2. *Representative photograph of the west side of Todd Barranca, facing southwest. Taken: 04/20/16.*

Photograph 3. *Representative photograph of the east side of Todd Barranca, facing northwest. Taken: 04/20/16.*

Photograph 4. *Representative photograph of the east side of Todd Barranca, facing southeast. Taken: 04/20/16.*

Photograph 5. *Representative photograph of the east side of Todd Barranca, facing southeast. The riparian edge of the Santa Clara River is visible as the trees in the far background. Taken: 04/20/16.*

Photograph 6. *Representative photograph of the perennial stream running through Todd Barranca, facing north. Taken: 05/04/16.*

Photograph 7. *Photograph of the north edge of the Survey Area where the road crosses the barranca, facing northwest. Taken: 04/20/16.*

Photograph 8. *Representative photograph of the riparian vegetation in Todd Barranca, facing southeast. Taken: 04/20/16.*

Photograph 9. *Photograph of one of the deeper pools in the barranca, facing southeast. Taken: 04/20/16.*

Photograph 10. *A wide, open section of the barranca, facing south. Taken: 05/04/16.*

Attachment 2
Observed Species List

Attachment 2 Observed Species List

Common Name	Scientific Name	Status[a] (Federal/State/ Other)
Birds		
American crow	*Corvus brachyrhynchos*	---/---/---
American goldfinch	*Spinus tristis*	---/---/---
American Robin	*Turdus migratorius*	---/---/---
Anna's hummingbird	*Calypte anna*	---/---/---
Bewick's wren	*Thryomanes bewickii*	---/---/---
Black phoebe	*Sayornis nigricans*	---/---/---
Cliff swallow	*Petrochelidon pyrrhonota*	---/---/---
California towhee	*Melozone crissalis*	---/---/---
Common raven	*Corvus corax*	---/---/---
Common yellowthroat	Geothlypis trichas	---/---/---
Dark-eyed junco	*Junco hyemalis*	---/---/---
Downey woodpecker	*Picoides pubescens*	---/---/---
Great horned owl	*Bubo virginianus*	---/---/---
House finch	*Haemorhous mexicanus*	---/---/---
Least Bell's vireo	*Vireo bellii pusillus*	FE/SE/---
Lesser goldfinch	*Spinus psaltria*	---/---/---
Mallard	*Anas platyrhynchos*	---/---/---
Mourning dove	*Zenaida macroura*	---/---/---
Nuttall's woodpecker	*Picoides nuttallii*	BCC/---/---
Orange crowned warbler	*Oreothypis celata*	---/---/---
Pacific slope flycatcher	*Empidonax difficilis*	---/---/---
Red-tailed hawk	*Buteo jamaicensis*	---/---/---
Snowy egret	*Egretta thula*	---/---/---
Song sparrow	*Melospiza melodia*	---/---/---
Yellow warbler	*Setophaga petechia*	---/---/---
Fish		
Threespine stickleback	*Gasterosteus sp.*	---/---/AFS: EN
Mammals		
Raccoon	*Procyon lotor*	---/---/---
Reptiles & Amphibians		
Baja California treefrog	*Pseudacris hypochondriaca*	---/---/---
Common side-blotch lizard	*Uta stansburiana*	---/---/---
Western fence lizard	*Sceloporus occidenatlis*	---/---/---
Western pond turtle	*Actinemys marmorata*	---/CSC/CDF-S

[a] Key to Status Designations (USFWS 2016, 2016a, CDFW 2016a):

Federal Designations:

(FE) Federally Endangered, (FT) Federally Threatened, (FPE) Federally Proposed Endangered, (FPT) Federally Proposed Threatened, (FSC) Species of Concern, (FC) Candidate, (BCC) Birds of Conservation Concern

State Designations:

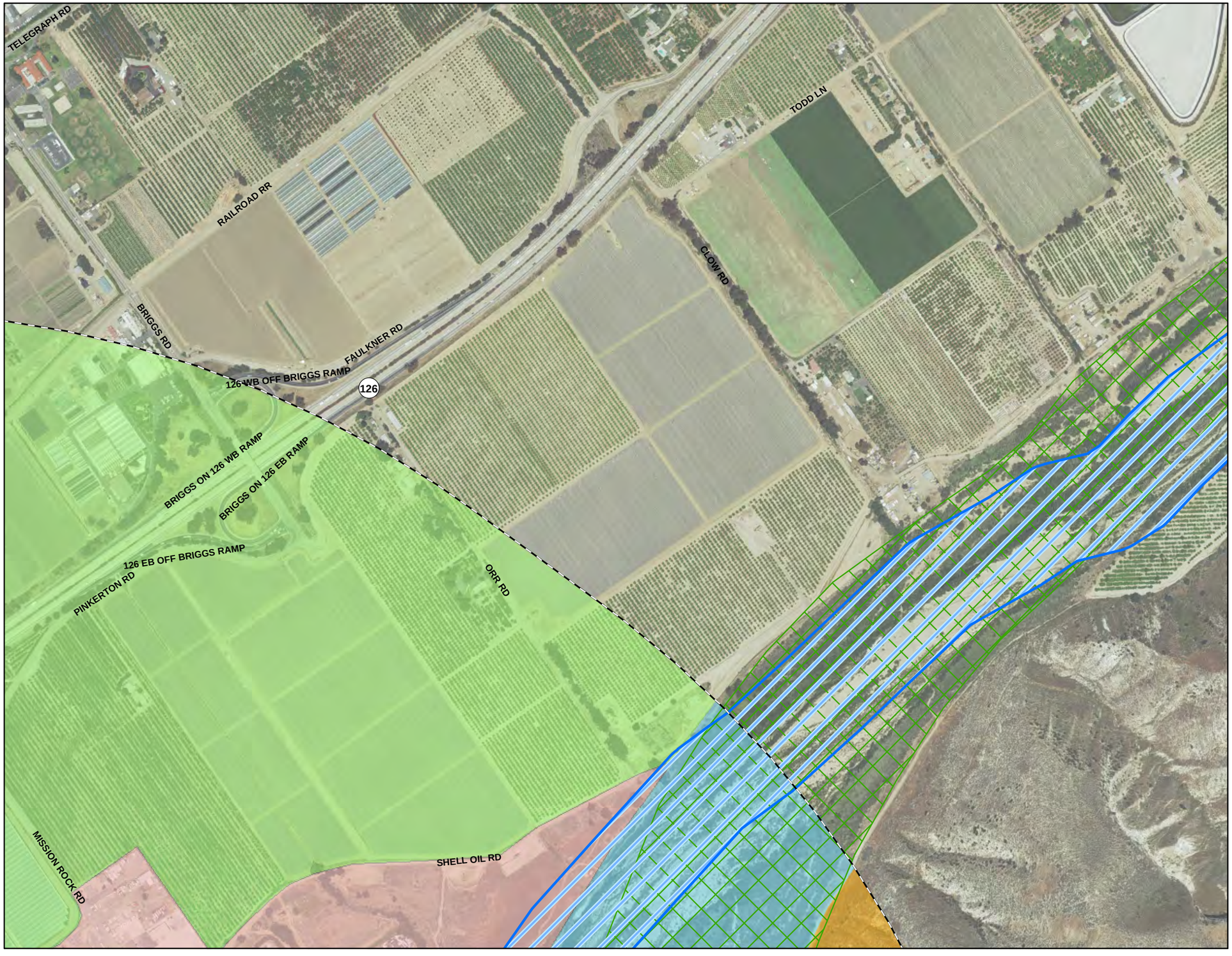
(SE) State Endangered, (ST) State Threatened, (SR) State Rare, (CSC) Species of Special Concern, (CFP) Fully Protected Species

Other State Designations:

American Fisheries Society (AFS) – Endangered (EN)

California Department of Forestry (CDF) - Sensitive (S)

Attachment DR23-1
Riparian Habitat Map



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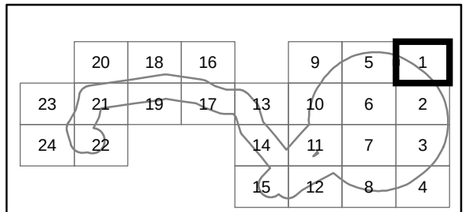

LEGEND

- Project Site
- Laydown Area
- Tower
- Natural Gas Pipeline Route
- Generator Tie-Line
- Process Water Supply Line
- Biology Study Area
- Agricultural
- Coastal Sagebrush Scrub
- Riparian
- Santa Clara River/Riparian
- Urban/Developed

Animals

- least Bell's vireo
- American badger
- unarmored threespine stickleback
- steelhead - southern California DPS
- South Coast garter snake

Terrestrial Community

- Southern Riparian Scrub

Source:
CNDDB (2015).
CH2M (2015).

N

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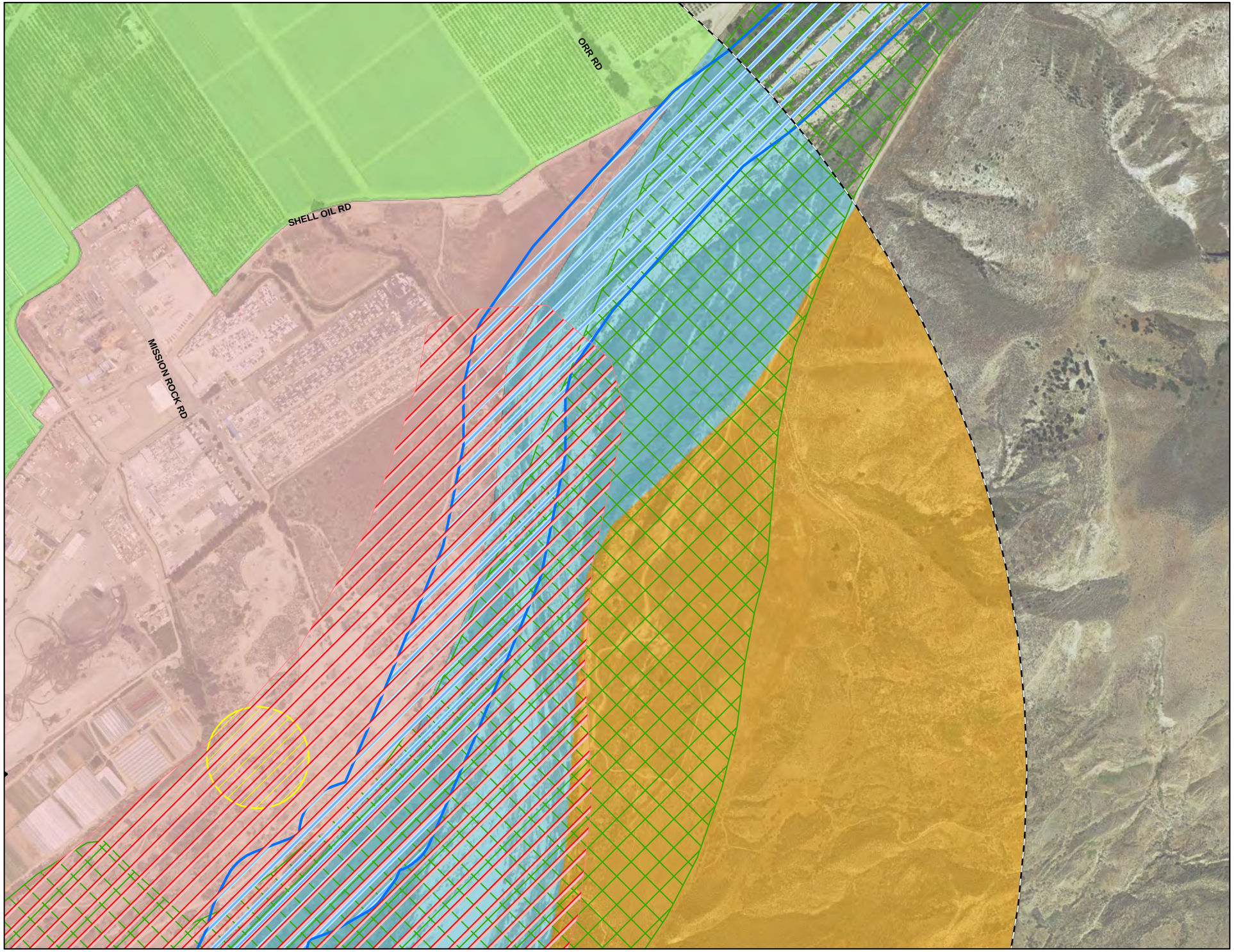
Feet

Figure DR23-1 (Page 1 of 24)
Land Cover

Mission Rock Energy Center
Ventura County, California



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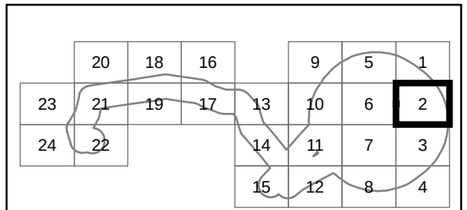

LEGEND

- Project Site
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Terrestrial Community

- Southern Riparian Scrub

Source:
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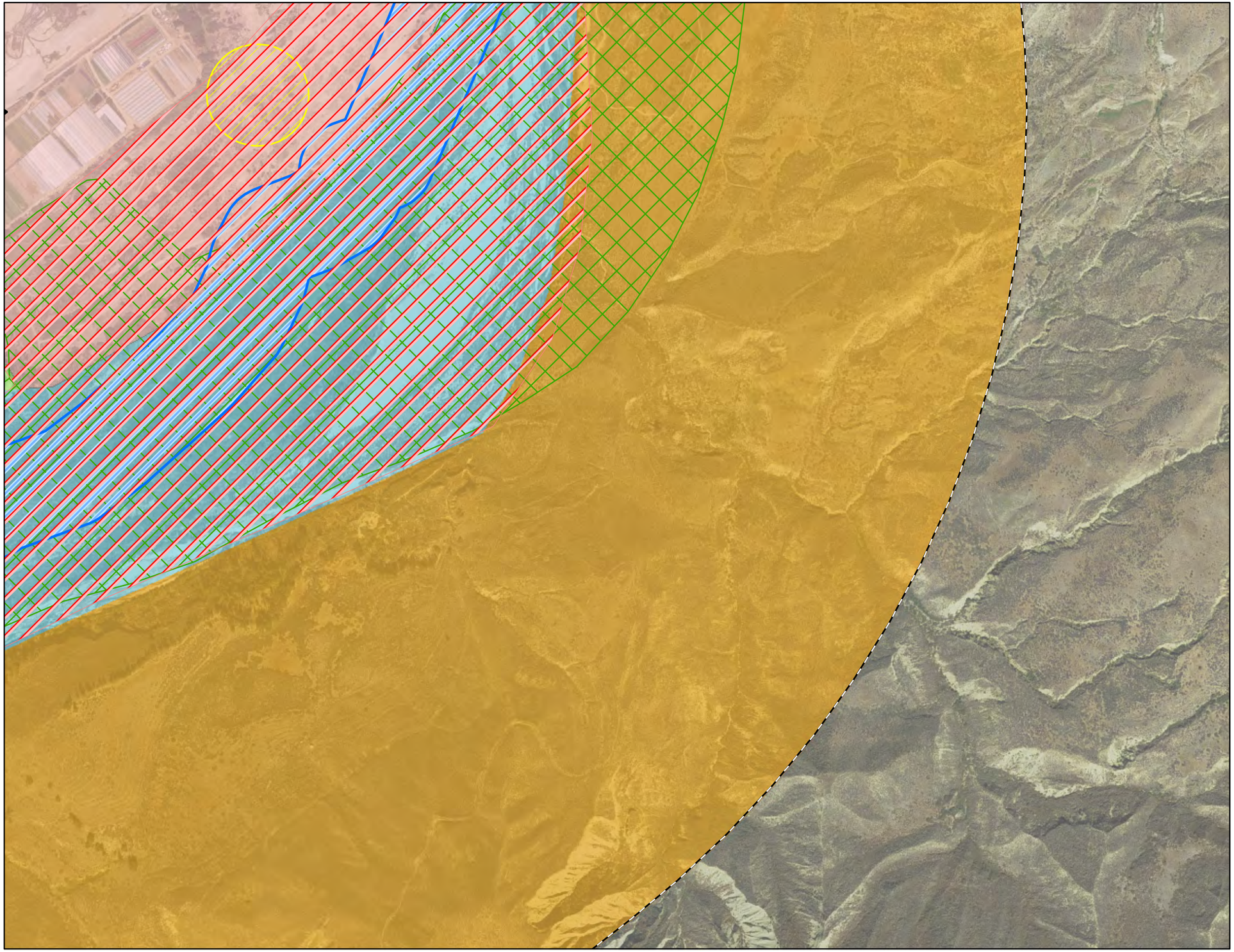
Figure DR23-1 (Page 2 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California



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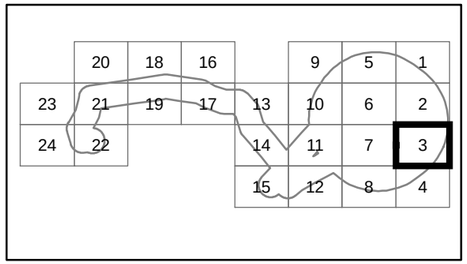

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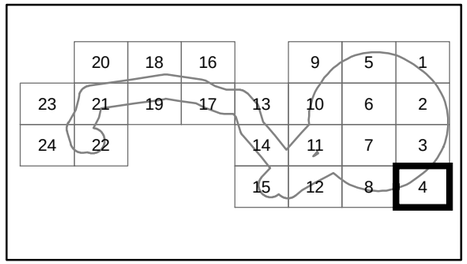
Feet

Figure DR23-1 (Page 3 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California

VICINITY MAP



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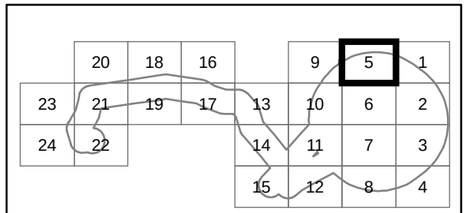
Feet

Figure DR23-1 (Page 4 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California

VICINITY MAP



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N

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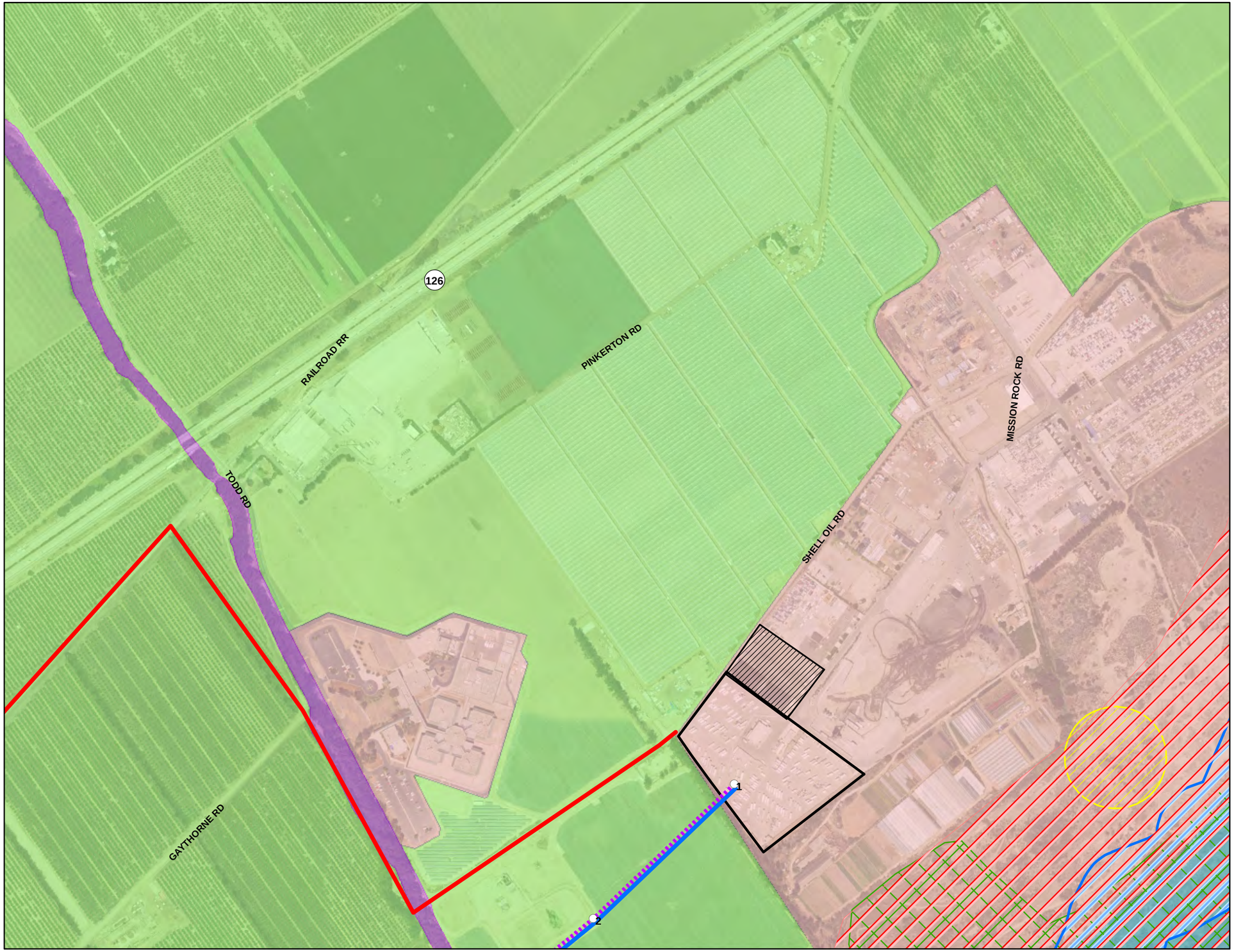
Feet

Figure DR23-1 (Page 5 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California



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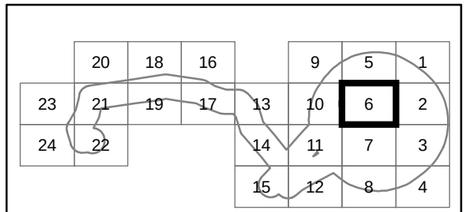

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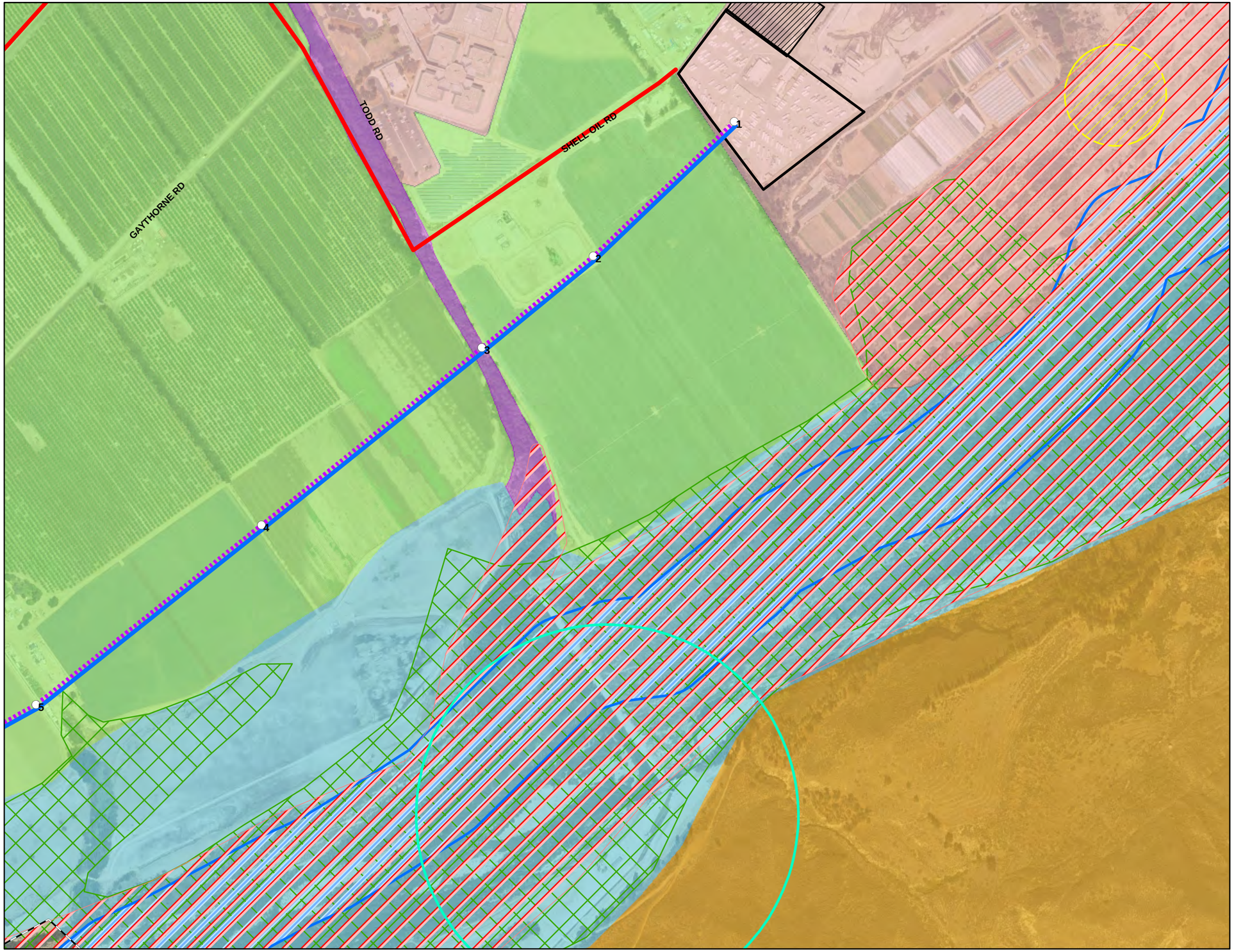

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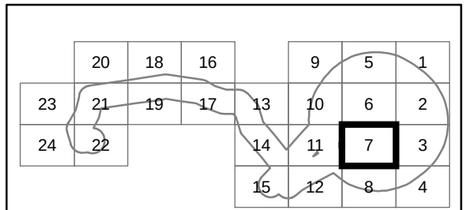

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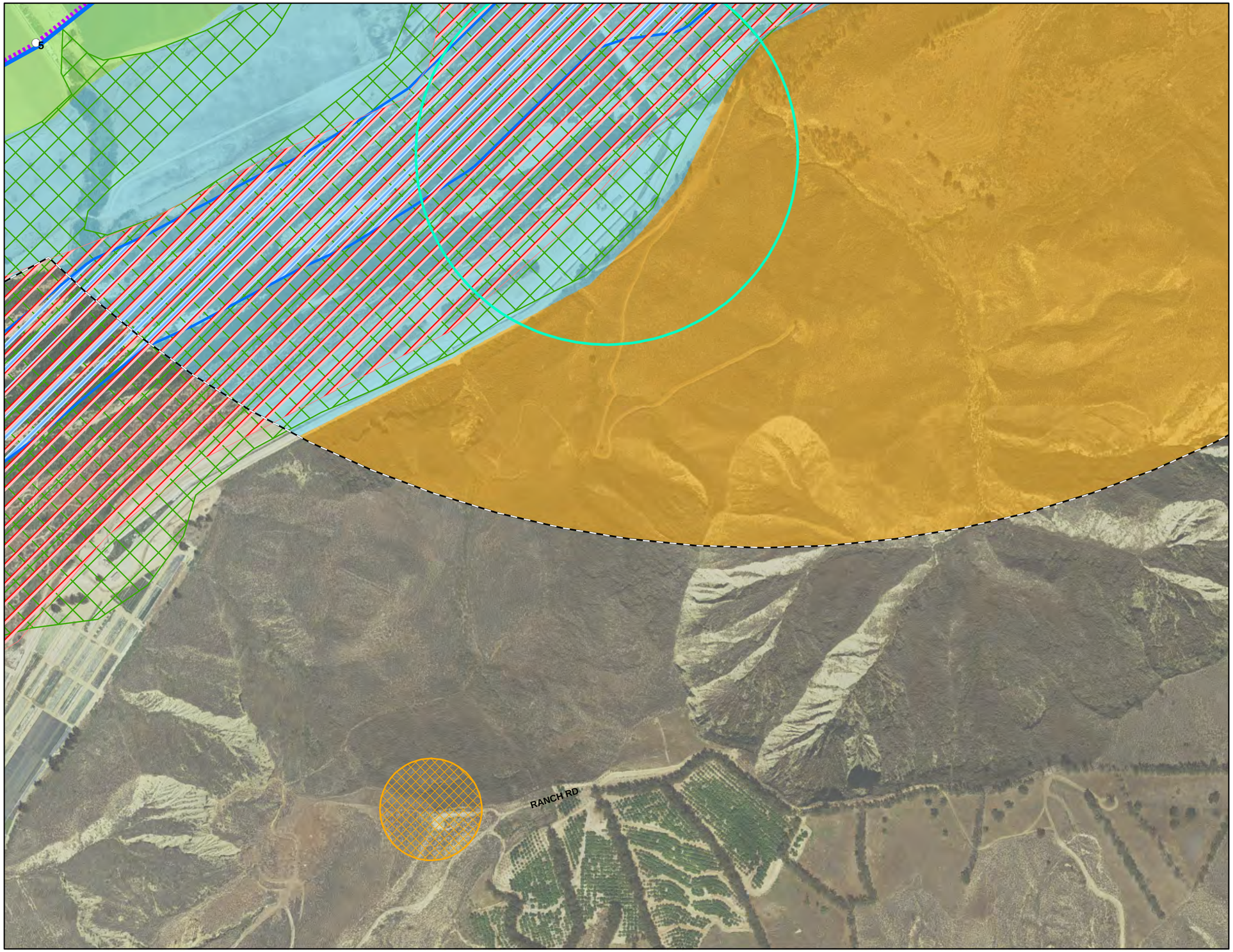
Figure DR23-1 (Page 7 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California



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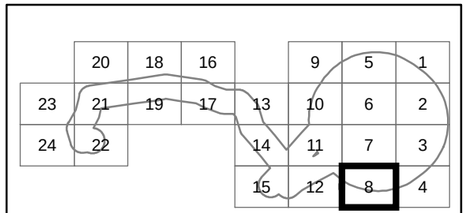

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Feet

Figure DR23-1 (Page 8 of 24)
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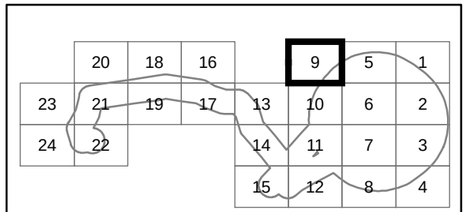
Mission Rock Energy Center
Ventura County, California

VICINITY MAP



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- South Coast garter snake

Terrestrial Community

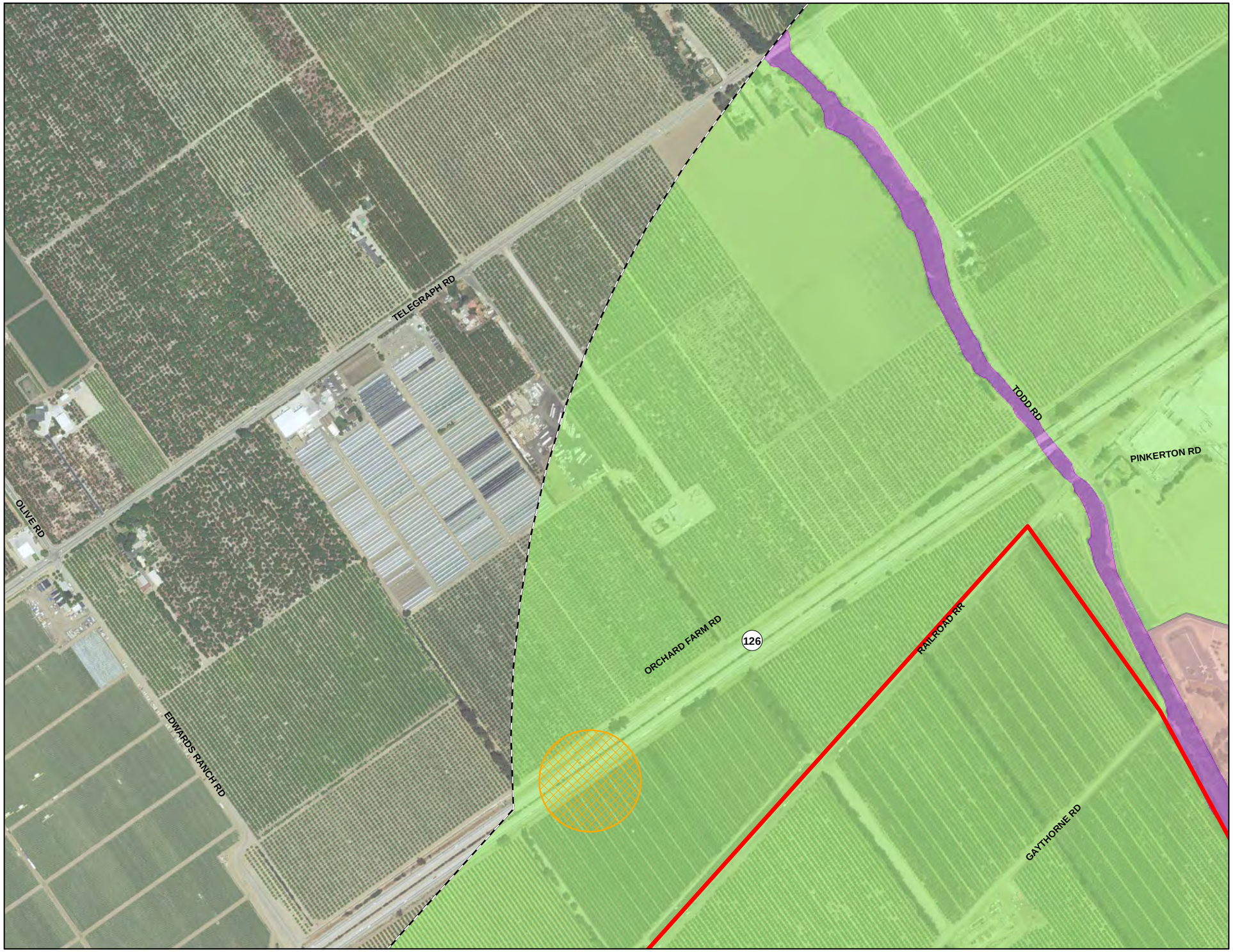
- Southern Riparian Scrub

Source:
CNDDB (2015).
CH2M (2015).

N

0 250 500
Feet

Figure DR23-1 (Page 9 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California



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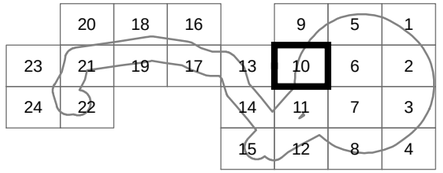


LEGEND

- Project Site
- Laydown Area
- Tower
- Natural Gas Pipeline Route
- Generator Tie-Line
- Process Water Supply Line
- Biology Study Area
- Agricultural
- Coastal Sagebrush Scrub
- Riparian
- Santa Clara River/Riparian
- Urban/Developed

Animals

- least Bell's vireo
- American badger
- unarmored threespine stickleback
- steelhead - southern California DPS
- South Coast garter snake

Terrestrial Community

- Southern Riparian Scrub

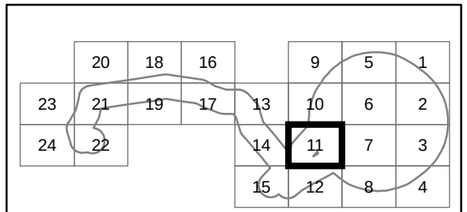
Source:
CNDDB (2015).
CH2M (2015).

N

0 250 500
Feet

Figure DR23-1 (Page 10 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California

VICINITY MAP



LEGEND

- Project Site
- Laydown Area
- Tower
- Natural Gas Pipeline Route
- Generator Tie-Line
- Process Water Supply Line
- Biology Study Area
- Agricultural
- Coastal Sagebrush Scrub
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- Santa Clara River/Riparian
- Urban/Developed

Animals

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- American badger
- unarmored threespine stickleback
- steelhead - southern California DPS
- South Coast garter snake

Terrestrial Community

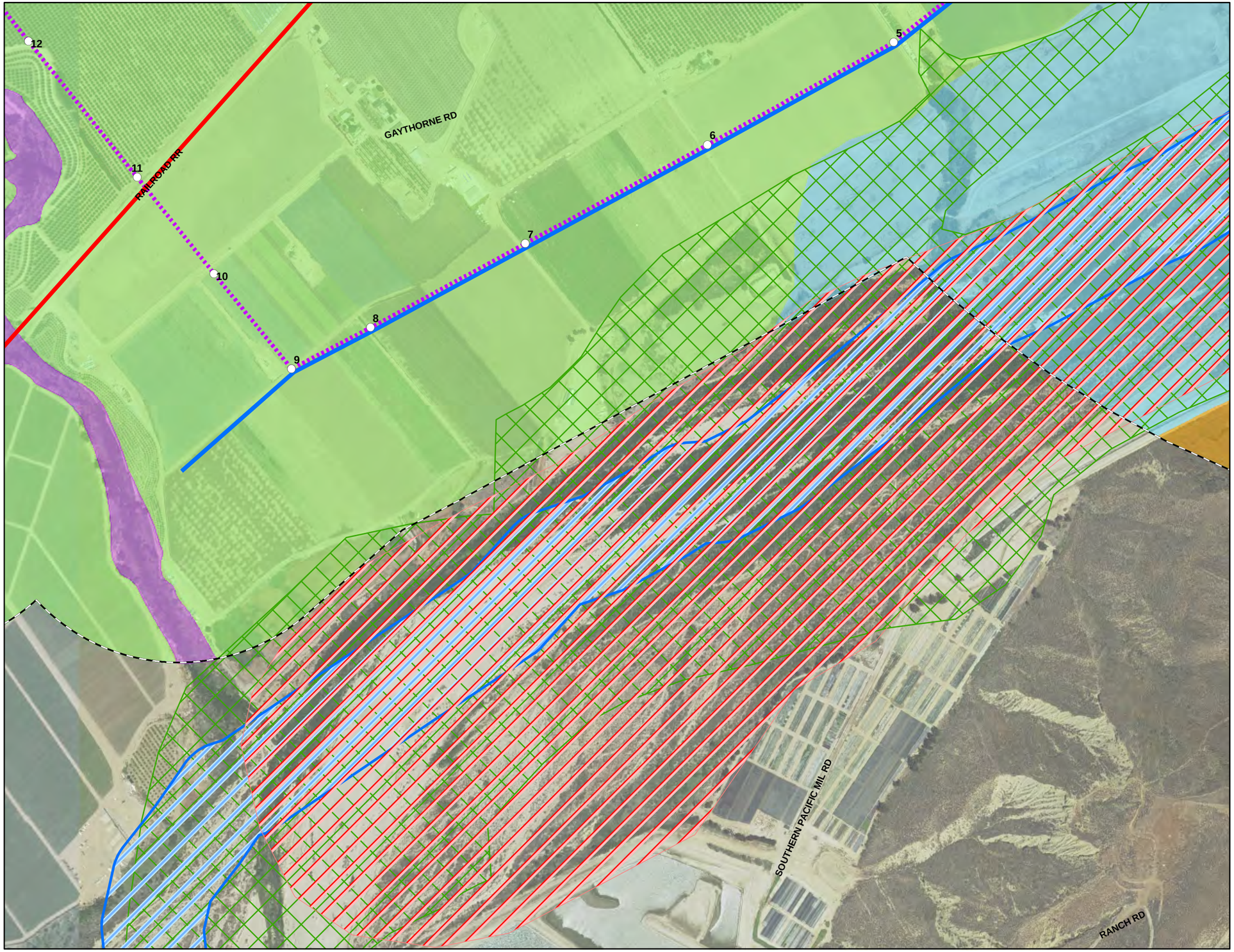
- Southern Riparian Scrub

Source:
CNDDB (2015).
CH2M (2015).

N

0 250 500
Feet

Figure DR23-1 (Page 11 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California



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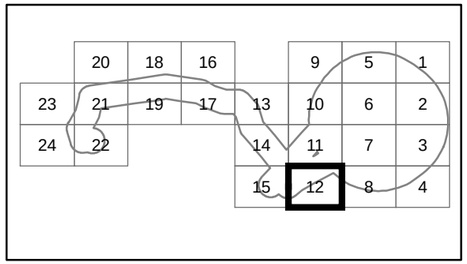

LEGEND

- Project Site
- Laydown Area
- Tower
- Natural Gas Pipeline Route
- Generator Tie-Line
- Process Water Supply Line
- Biology Study Area
- Agricultural
- Coastal Sagebrush Scrub
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Animals

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- American badger
- unarmored threespine stickleback
- steelhead - southern California DPS
- South Coast garter snake

Terrestrial Community

- Southern Riparian Scrub

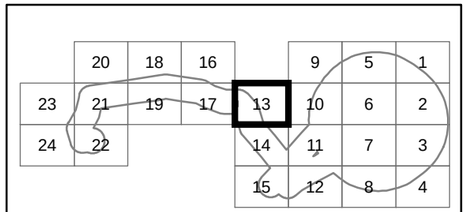
Source:
CNDDB (2015).
CH2M (2015).

N

0 250 500
Feet

Figure DR23-1 (Page 12 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California

VICINITY MAP



LEGEND

- Project Site
- Laydown Area
- Tower
- Natural Gas Pipeline Route
- Generator Tie-Line
- Process Water Supply Line
- Biology Study Area
- Agricultural
- Coastal Sagebrush Scrub
- Riparian
- Santa Clara River/Riparian
- Urban/Developed

Animals

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- American badger
- unarmored threespine stickleback
- steelhead - southern California DPS
- South Coast garter snake

Terrestrial Community

- Southern Riparian Scrub

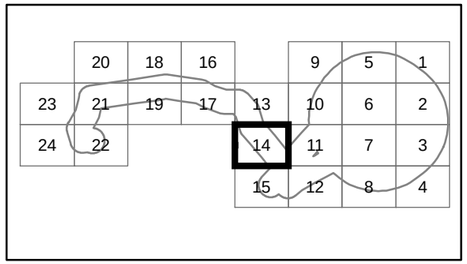
Source:
CNDDB (2015).
CH2M (2015).

N

0 250 500
Feet

Figure DR23-1 (Page 13 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California

VICINITY MAP



LEGEND

- Project Site
- Laydown Area
- Tower
- Natural Gas Pipeline Route
- Generator Tie-Line
- Process Water Supply Line
- Biology Study Area
- Agricultural
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- Santa Clara River/Riparian
- Urban/Developed

Animals

- least Bell's vireo
- American badger
- unarmored threespine stickleback
- steelhead - southern California DPS
- South Coast garter snake

Terrestrial Community

- Southern Riparian Scrub

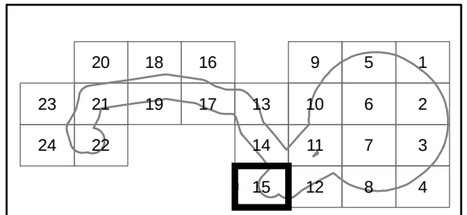
Source:
CNDDB (2015).
CH2M (2015).

N

0 250 500
Feet

Figure DR23-1 (Page 14 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California

VICINITY MAP



LEGEND

- Project Site
- Laydown Area
- Tower
- Natural Gas Pipeline Route
- Generator Tie-Line
- Process Water Supply Line
- Biology Study Area
- Agricultural
- Coastal Sagebrush Scrub
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- Santa Clara River/Riparian
- Urban/Developed

Animals

- least Bell's vireo
- American badger
- unarmored threespine stickleback
- steelhead - southern California DPS
- South Coast garter snake

Terrestrial Community

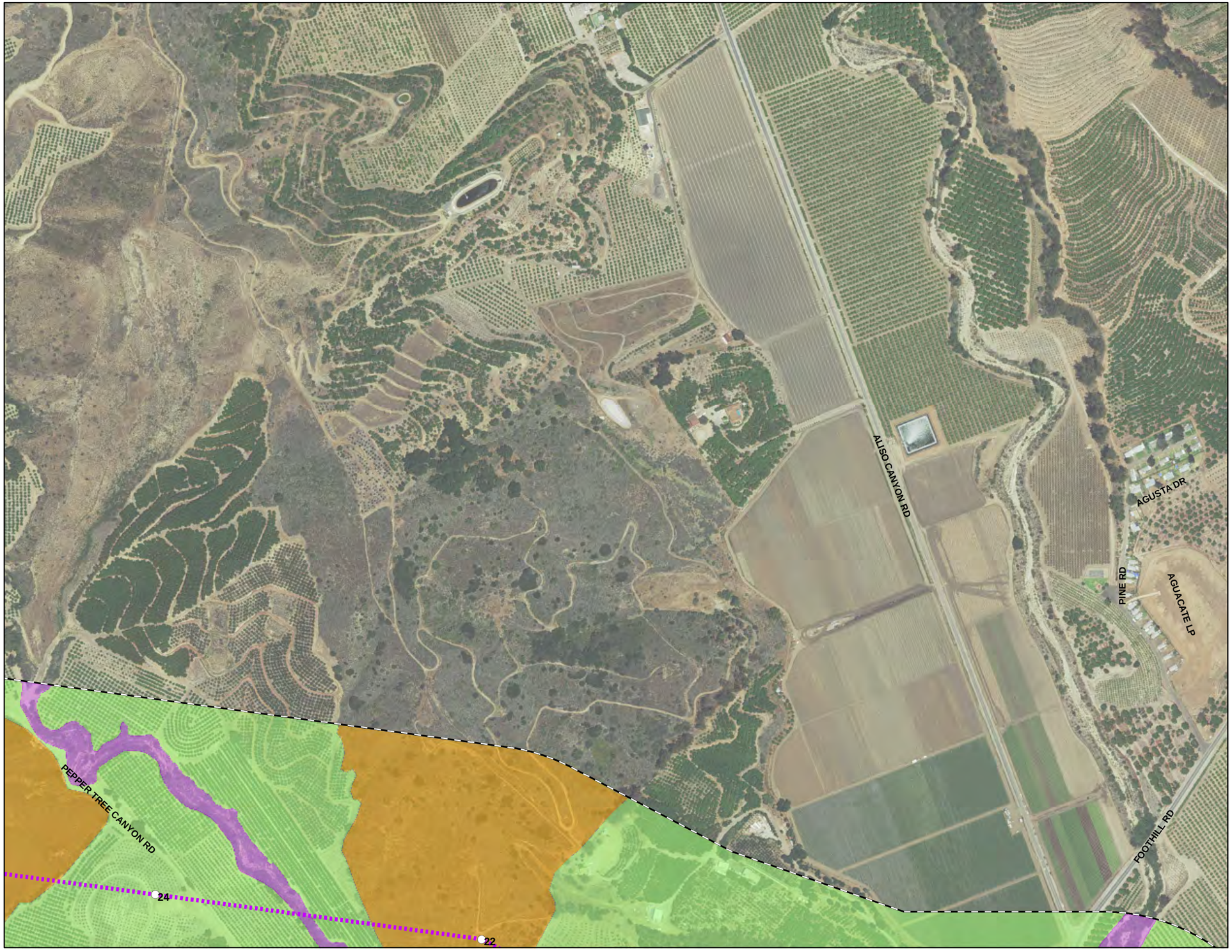
- Southern Riparian Scrub

Source:
CNDDB (2015).
CH2M (2015).

N

0 250 500
Feet

Figure DR23-1 (Page 15 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California



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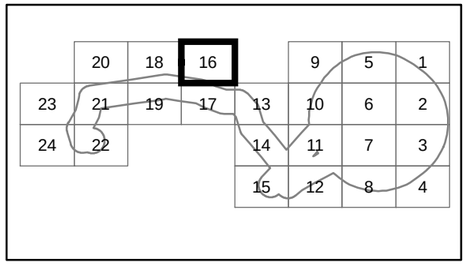

LEGEND

- Project Site
- Laydown Area
- Tower
- Natural Gas Pipeline Route
- Generator Tie-Line
- Process Water Supply Line
- Biology Study Area
- Agricultural
- Coastal Sagebrush Scrub
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- Urban/Developed

Animals

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- American badger
- unarmored threespine stickleback
- steelhead - southern California DPS
- South Coast garter snake

Terrestrial Community

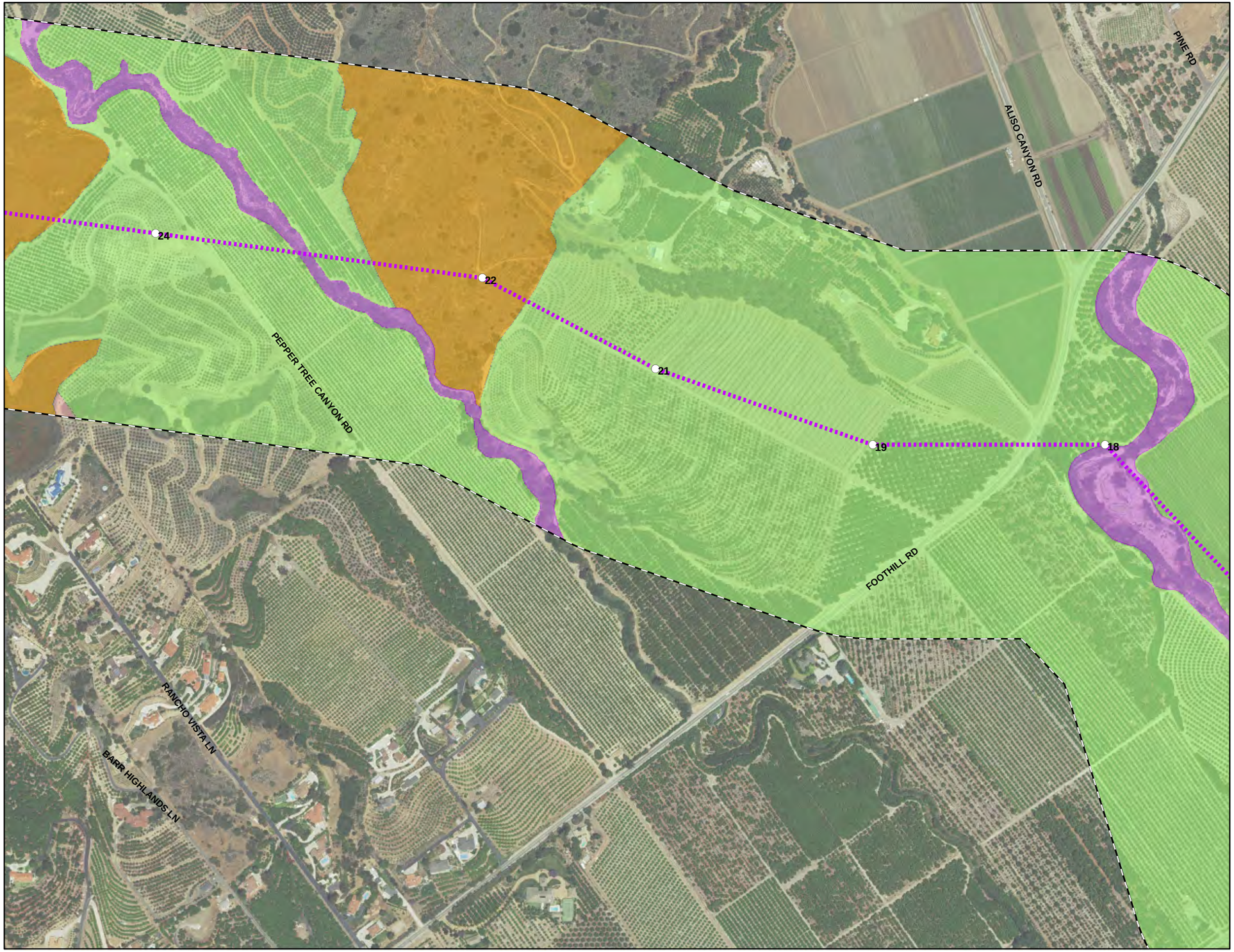
- Southern Riparian Scrub

Source:
CNDDB (2015).
CH2M (2015).

N

0 250 500
Feet

Figure DR23-1 (Page 16 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California



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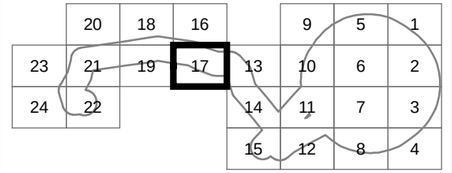


LEGEND

- Project Site
- Laydown Area
- Tower
- Natural Gas Pipeline Route
- Generator Tie-Line
- Process Water Supply Line
- Biology Study Area
- Agricultural
- Coastal Sagebrush Scrub
- Riparian
- Santa Clara River/Riparian
- Urban/Developed

Animals

- least Bell's vireo
- American badger
- unarmored threespine stickleback
- steelhead - southern California DPS
- South Coast garter snake

Terrestrial Community

- Southern Riparian Scrub

Source:
CNDDB (2015).
CH2M (2015).

N

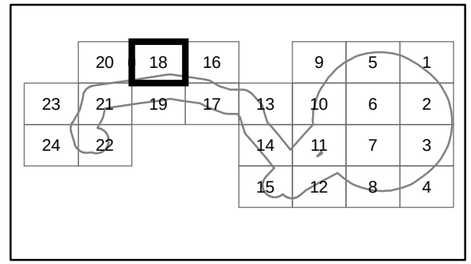
0 250 500
Feet

Figure DR23-1 (Page 17 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California

PEPPER TREE CANYON RD

28
27
26
25
24

VICINITY MAP



LEGEND

- Project Site
- Laydown Area
- Tower
- Natural Gas Pipeline Route
- Generator Tie-Line
- Process Water Supply Line
- Biology Study Area
- Agricultural
- Coastal Sagebrush Scrub
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- Santa Clara River/Riparian
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Animals

- least Bell's vireo
- American badger
- unarmored threespine stickleback
- steelhead - southern California DPS
- South Coast garter snake

Terrestrial Community

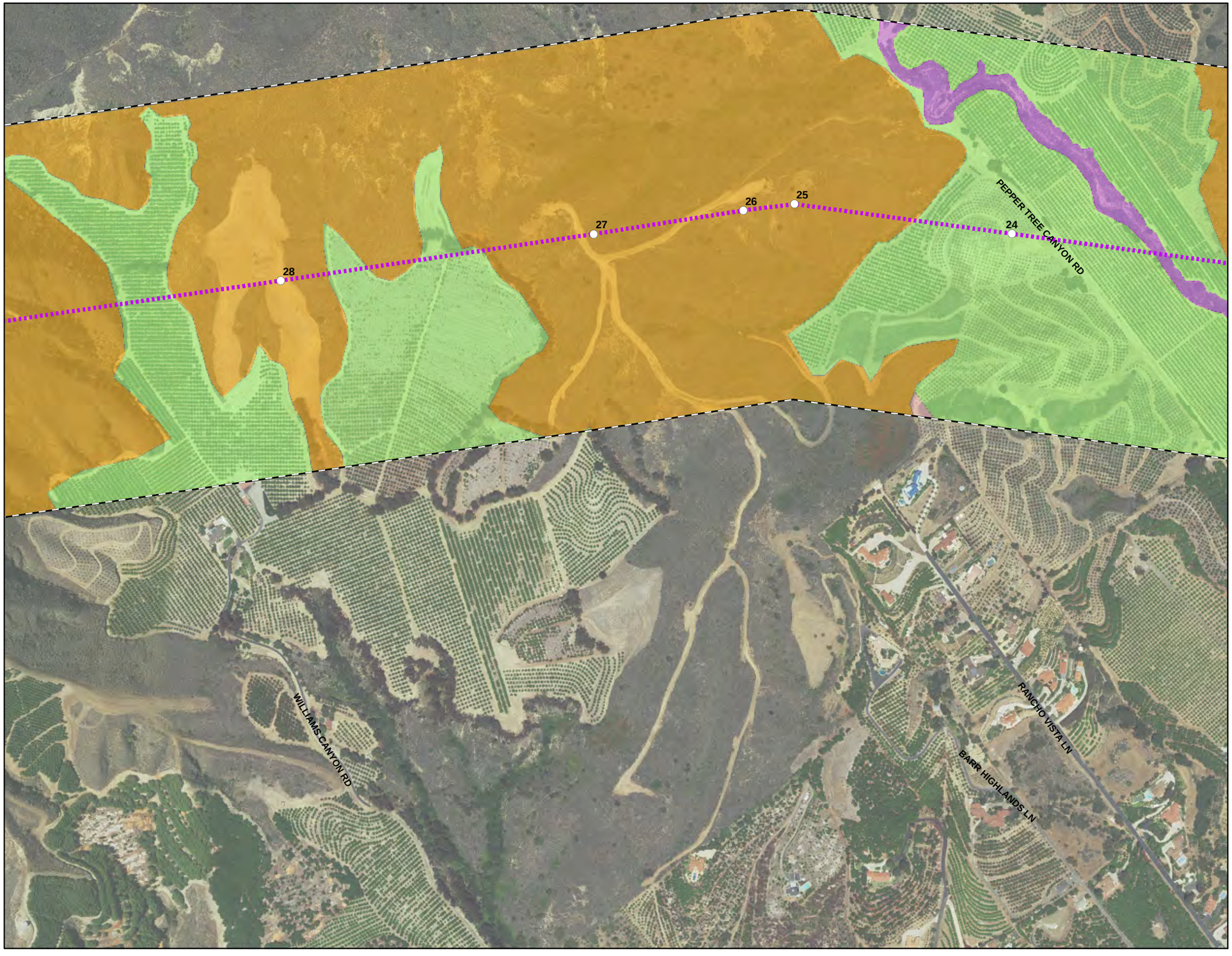
- Southern Riparian Scrub

Source:
CNDDB (2015).
CH2M (2015).

N

0 250 500
Feet

Figure DR23-1 (Page 18 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California



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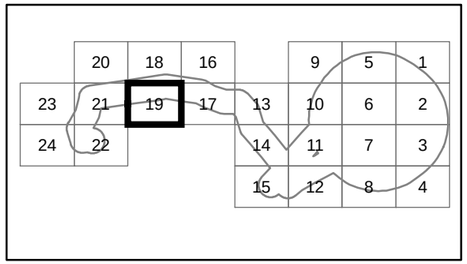

LEGEND

- Project Site
- Laydown Area
- Tower
- Natural Gas Pipeline Route
- Generator Tie-Line
- Process Water Supply Line
- Biology Study Area
- Agricultural
- Coastal Sagebrush Scrub
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- Urban/Developed

Animals

- least Bell's vireo
- American badger
- unarmored threespine stickleback
- steelhead - southern California DPS
- South Coast garter snake

Terrestrial Community

- Southern Riparian Scrub

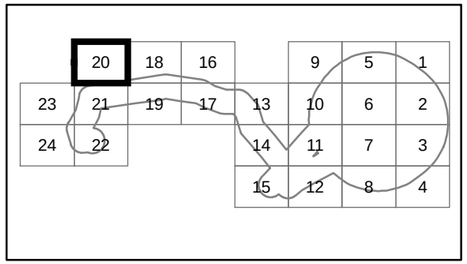
Source:
CNDDB (2015).
CH2M (2015).

N

0 250 500
Feet

Figure DR23-1 (Page 19 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California

VICINITY MAP



LEGEND

- Project Site
- Laydown Area
- Tower
- Natural Gas Pipeline Route
- Generator Tie-Line
- Process Water Supply Line
- Biology Study Area
- Agricultural
- Coastal Sagebrush Scrub
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- Urban/Developed

Animals

- least Bell's vireo
- American badger
- unarmored threespine stickleback
- steelhead - southern California DPS
- South Coast garter snake

Terrestrial Community

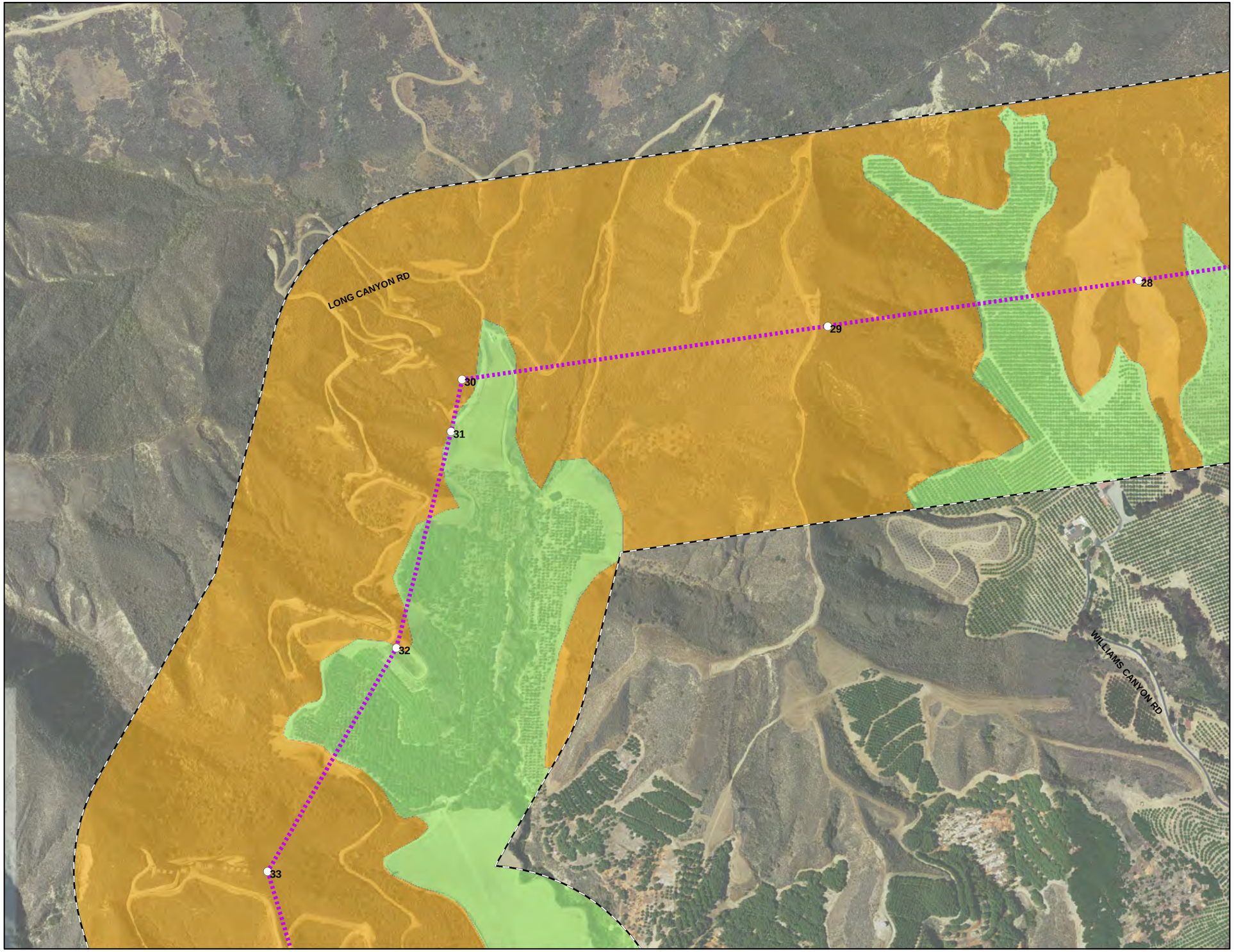
- Southern Riparian Scrub

Source:
CNDDB (2015).
CH2M (2015).

N

0 250 500
Feet

Figure DR23-1 (Page 20 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California



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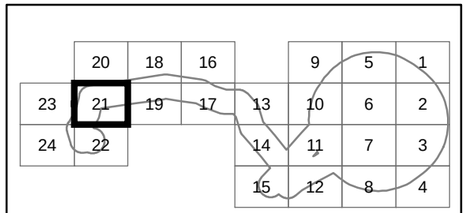

LEGEND

- Project Site
- Laydown Area
- Tower
- Natural Gas Pipeline Route
- Generator Tie-Line
- Process Water Supply Line
- Biology Study Area
- Agricultural
- Coastal Sagebrush Scrub
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Animals

- least Bell's vireo
- American badger
- unarmored threespine stickleback
- steelhead - southern California DPS
- South Coast garter snake

Terrestrial Community

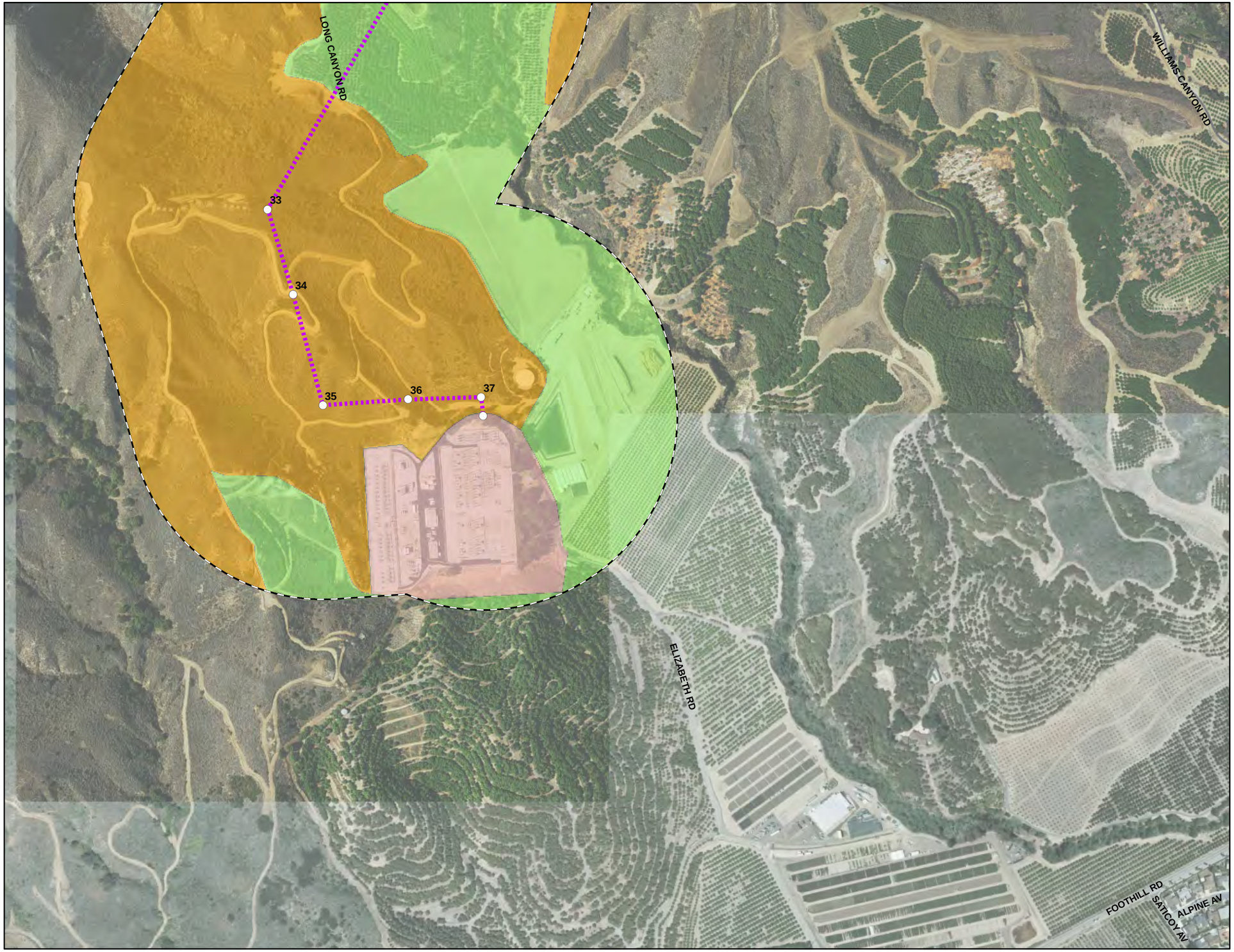
- Southern Riparian Scrub

Source:
CNDDB (2015).
CH2M (2015).

N

0 250 500
Feet

Figure DR23-1 (Page 21 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California



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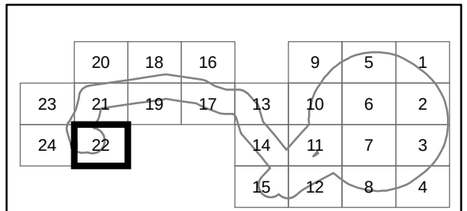

LEGEND

- Project Site
- Laydown Area
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- Agricultural
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- South Coast garter snake

Terrestrial Community

- Southern Riparian Scrub

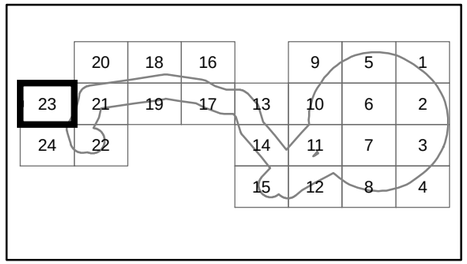
Source:
CNDDB (2015).
CH2M (2015).

N

0 250 500
Feet

Figure DR23-1 (Page 22 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California

VICINITY MAP



LEGEND

- Project Site
- Laydown Area
- Tower
- Natural Gas Pipeline Route
- Generator Tie-Line
- Process Water Supply Line
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- South Coast garter snake

Terrestrial Community

- Southern Riparian Scrub

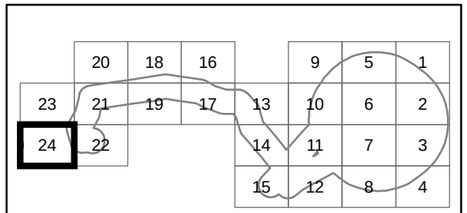
Source:
CNDDB (2015).
CH2M (2015).

N

0 250 500
Feet

Figure DR23-1 (Page 23 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California

VICINITY MAP



LEGEND

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- South Coast garter snake

Terrestrial Community

- Southern Riparian Scrub

Source:
CNDDB (2015).
CH2M (2015).

N

0 250 500
Feet

Figure DR23-1 (Page 24 of 24)
Land Cover
Mission Rock Energy Center
Ventura County, California

Attachment DR25-1
Rare Plant Survey Report

Focused Rare Plant Survey for Mission Rock Energy Center

PREPARED FOR: Calpine Corporation

PREPARED BY: CH2M

DATE: August 9, 2016

Introduction

Russell Huddleston (Technologist Professional/Biologist, CH2M) and Melissa Fowler (Biologist, CH2M) conducted a focused rare plant survey for the proposed generator tie-lie route for the Calpine Corporation (Calpine) Mission Rock Energy Project (MREC) on April 20-21, 2016. This memorandum is intended to provide supplemental information to the Application for Certification (15-AFC-02). This memorandum specifically presents the results of focused spring botanical survey for sensitive plant species that may occur in the natural vegetation communities along the western part of the electrical transmission lines.

Location and Background

Calpine plans to develop new electrical power generation in southern California and has identified a site for the proposed MREC in an unincorporated area of Ventura County, California. The proposed 275 megawatt (MW) peaking power plant consisting of five General Electric (GE) Energy LM-6000 combustion turbine generators and ancillary equipment including chillers, gas compressors, and electrical transformers. Associated linear features include:

- Generator tie-line to Southern California Edison's (SCE's) Santa Clara Substation via a new 6.6-mile, 230-kV transmission line that runs west and southwest from MREC site.
- Natural gas pipeline connection via 2.4 miles of new 16-inch-diameter pipe that will run southwest from the project site along Shell Road and the Southern Pacific Railroad right-of-way (ROW) to interconnect with Southern California Gas Company's (SCGC's) existing high-pressure natural gas transmission pipeline (Line 404/406).
- A new 1.7-mile-long pipeline to bring recycled water from the Limoneira Corporation's wastewater discharge line to the project site. The pipeline extends along the generator tie-line to the southwest.
- Potable water and industrial wastewater connections are to pipes adjacent to the site.

The project location and associated linear features are shown in Figure 1. Detailed information about the environmental setting, including land use, vegetation communities and other biological resources associated with the project are included in the Application for Certification (15-AFC-02).

Survey Methods

The proposed plant site, natural gas pipeline, recycled water pipeline and potable water pipeline are all located in existing developed or agricultural areas that were not considered to provide suitable habitat for special-status plants and were therefore not included as part of the spring botanical survey. Additionally, portions of the transmission line that are located on developed or agricultural lands were also excluded. The botanical survey focused primarily on the western part of the transmission line alignment in area generally characterized by coastal sage scrub habitat.

Reference Sites

Prior to the surveys a list of potential special-status species plants was developed based on queries from United States Fish and Wildlife Service (USFWS, 2015b; USFWS, 2015c; USFWS, 2015d), California Natural Diversity

Database (CNDDB; CDFW, 2016), and the California Native Plant Society (CNPS) Electronic Inventory of Rare and Endangered Plants (CNPS, 2016). A 10-mile query was used for CNDDB (CDFW, 2016). A list of potential special-status plants considered potentially occurring is provided in Attachment A.

Few special-status plant reference sites were available in proximity to the proposed transmission line route, however, a reference of Conejo buckwheat (*Eriogonum crocatum*; CNPS Rare Plant Rank 1B.2); CNDDB Occurrence number 10, was observed prior to the surveys. This occurrence is located on the northeast side of Highway 101, approximately 12 miles southeast of the proposed project. Plants at the location are growing on a very steep, rock cliff face that is on private property and the plants were observed using binoculars from the roadside. Plants appeared to be present and in full flower.

Field Survey

CH2M biologists Russell Huddleston and Melissa Fowler conducted botanical surveys on April 20-21 2016, in accordance with CDFW (2009) protocols for surveying special-status plants. The survey dates were selected to correspond with potential blooming period of special-status plants that were considered to have the potential to occur in the survey area (Attachment 1).

The survey was floristic in nature; all plant species encountered during the survey were identified to the taxonomic level necessary to determine rarity. The goal of the survey was to locate, map, and census any special-status plant populations within the proposed tower locations and/or along the proposed access routes. A complete list of plant taxa observed is provided in Attachment 2 and representative site photographs are provided in Attachment 3.

Surveys of the proposed tower locations and access routes were conducted by walking the access roads and all tower locations in natural habitat. In some locations, extremely dense shrub cover precluded walking the entire site and observation were limited to semi-open areas and gaps in the dense vegetation.

Nomenclature for scientific names follows Jepson Online Interchange California Floristics (University of California, 2016a).

Results

Survey Conditions

The National Weather Service Palmer Drought Severity Index indicates that much of southern California, including the botanical survey area, is experiencing extreme drought conditions (National Weather Service, 2016). Rainfall in the vicinity of the survey area between November 1, 2015 and March 31, 2106 was only 5.9 inches, or 38 percent of the long term average of 15.6 inches for this time of year (University of California, 2016b). Despite the dry conditions, both annual and perennial plants were in flower, including special-status plants observed at reference locations and during the survey.

The other limitation encountered during the survey was extremely dense shrubby vegetation that limited access in some areas. Several of the proposed tower locations were on private property and were not accessible at the time of the survey, but most of these locations were in agricultural fields, orchards or developed areas that were not included in the focused survey area.

Special-status Plants observed at the Tower Locations

One special-status plant, Catalina mariposa lily (*Calochortus catalinae*; CNPS Rare Plant Rank 4.2) was identified approximately 180 feet north of Tower 26. Numerous plants were observed along an overgrown, unused section of Peppertree Canyon Road (Figure 2). Numerous individuals were observed along the side of the road in the area north of Towers 26 and 27. The CNPS Rare Plant Rank 4 corresponds to plants with limited distribution or infrequent throughout a broader area in California and their status should be monitored regularly (CNPS, 2016). According to CNPS (2016), a Threat Rank of 0.2 is associated with moderately threatened plant species in California (20-80% occurrences threatened/moderate degree and immediacy of threat). A table showing plant species observed at each tower location is provided in Attachment 4.

Access Roads

The access roads are predominantly used for servicing utility right-of-ways (ROWs) and existing tower locations, which are adjacent to the proposed MREC tower locations. Vegetation communities along the proposed generator-tie line include coastal sage scrub and non-native annual grassland, within scattered agricultural and disturbed/developed land cover types. No special-status plant species were identified along the proposed access roads.

Summary and Conclusion

Although one special-status plant species was identified along an overgrown access road, impacts to this species are not anticipated. However, if ground disturbance and/or grading is going to initially occur during April through June, pre-construction clearance surveys are recommended to mark areas for avoidance if applicable.

References

California Department of Fish and Wildlife (CDFW). 2003. *List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database (CNDDB).* Wildlife and Habitat Data Analysis Branch, Vegetation Classification and Mapping Program. (Note the agency's name changed to California Department of Fish and Wildlife subsequent to this publication.)

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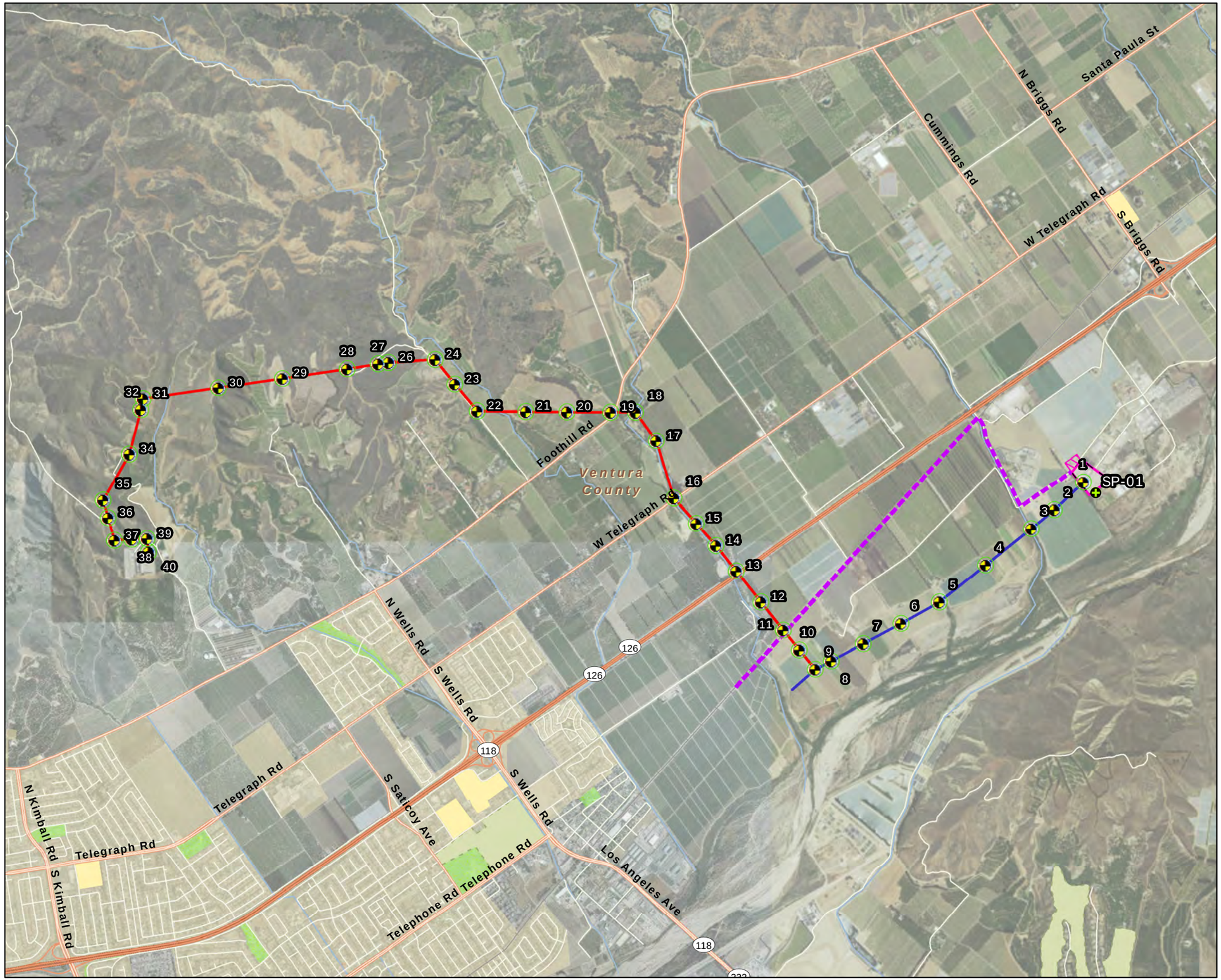
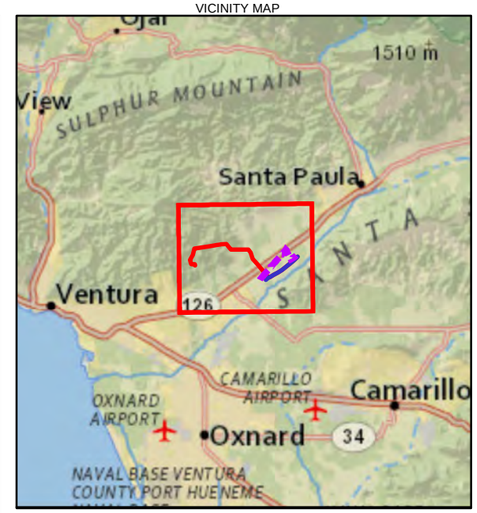
Figures



VICINITY MAP



LEGEND

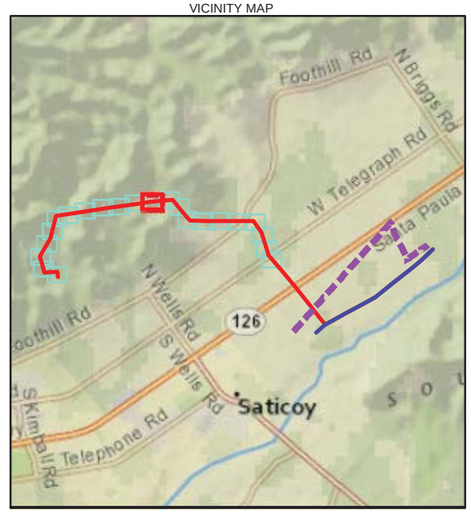
- Towers
- 200-feet from towers
- Generator Tie-Line
- Natural Gas Pipeline Route
- Process Water Supply Line
- Laydown Area
- Project Site
- Sample Point

N

0 2,500 5,000
Feet

FIGURE 1
Site Features
Mission Rock Energy Center
Ventura County, California

VICINITY MAP



LEGEND

- Towers
- 200-feet from Towers
- Generator Tie-Line
- Catalina mariposa-lily

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, DeLorme, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

N

0 100 200
Feet

FIGURE 2
Catalina mariposa-lily
***Calochortus catalinae* (RPR 4.2)**
Mission Rock Energy Center
Ventura County, California

Attachment 1
Regional Special-Status Plants

ATTACHMENT 1

Potential Special-Status Plant within the Regional Vicinity of the Mission Rock Energy Center Project

Species	Status[a] (Federal/ State/Other)	Potential for Occurrence/ Nearest Identified Occurrence[b]	Habitat Requirements
Davidson's saltscale *Atriplex serenana* var. *davidsonii*	**---/---/ CNPS 1B.2**	**Not expected**. Nearest recorded observation in disturbed habitat along Ventura Blvd., north of Ventura Freeway in El Rio, 2001.	Coastal bluff scrub and coastal scrub.
Late-flowered mariposa-lily *Calochortus fimbriatus*	**---/---/CNPS 1B.2**	**Not expected**. Nearest recorded observation on Santa Paula Peak and Santa Paula Canyon, 1998.	Dry, open coastal woodland or chaparral on serpentine soil.
Orcutt's pincushion *Chaenactis glabriuscula* var. *orcuttiana*	**---/---/ CNPS 1B.1**	**Not expected**. Nearest recorded observation on Pierpont Bay Blvd., Ventura, 1961.	Sandy coastal bluff scrub and coastal dunes.
Salt marsh bird's-beak *Chloropyron maritimum* ssp. *maritimum*	**FE/SE/CNPS 1B.2**	**Not expected**. Nearest recorded observation at the mouth of the Santa Clara River in the vicinity of McGrath State Beach, 1960.	Higher zones of coastal salt marsh and coastal dune habitat.
Umbrella larkspur *Delphinium umbraculorum*	**---/---/CNPS 1B.3**	**Low**. Nearest recorded observation in Los Padres National Forest, 1999.	Mesic, cismontane woodland habitats.
Blochman's dudleya *Dudleya blochmaniae* ssp. *blochmaniae*	**FE/---/CNPS 1B.1**	**Low**. This species is recorded at the west end of Conejo Mountain, just east of the junction of Sanitation Rd. and Howard Rd., 2010.	Rocky, often clay or serpentine coastal scrub, chaparral, or valley and foothill grassland.
Verity's dudleya *Dudleya verity*	**FT/---/CNPS 1B.1**	**Low**. Nearest recorded observation in Long Grade Canyon on Potrero Rd., east of CSU Channel Islands Campus, 2010.	Occurs on volcanic rock outcroppings in the Santa Monica Mountains in chaparral, cismontane, and coastal scrub habitats.
Conejo buckwheat *Erigonum crocatum*	**---/SR/CNPS 1B.2**	**Low**. Nearest recorded observation at Conejo Grade, west of Newbury Park, 2010.	Conejo volcanic outcrops, rocky sites.
Ojai fritillary *Fritillaria ojaiensis*	**---/---/ CNPS 1B.2**	Potential for occurrence of this species in the project area is low.	Broadleaved, mesic upland forest, chaparral, lower montane coniferous forest, or cismontane woodland, usually in loamy soil. Sometimes along roadsides or on serpentine soil.
Southern curly-leaved monardella *Monardella sinuata* ssp. *sinuata*	**---/---/CNPS 1B.2**	**Low**. Nearest recorded observation on Las Posas Rd, 0.5 miles north of Santa Rosa rd., 1976	Sandy soils in coastal dune, coastal shrub chaparral, and cismontane woodland habitats.
Ojai navarretia *Navarretia ojaiensis*	**---/---/CNPS 1B.1**	**Not expected**. Nearest recorded observation on Sulphur Mountain Rd., 8 miles south of junction with SR 150, 1963.	Opening in shrub lands or grasslands.

ATTACHMENT 1

Potential Special-Status Plant within the Regional Vicinity of the Mission Rock Energy Center Project

Species	Status[a] (Federal/ State/Other)	Potential for Occurrence/ Nearest Identified Occurrence[b]	Habitat Requirements

[a] Key to Status Designations:

Federal Designations:

(FE) Federally Endangered, (FT) Federally Threatened, (FPE) Federally Proposed Endangered, (FPT) Federally Proposed Threatened, (FSC) Species of Concern, (FC) Candidate

State Designations:

(SE) State Endangered, (ST) State Threatened, (SR) State Rare, (SSC) Species of Special Concern, (CFP) Fully Protected Species

California Native Plant Society (CNPS) Designations:

(1A) Presumed extinct in California; (1B) Rare, threatened, or endangered in California and elsewhere; (2) Rare, threatened, or endangered in California, but more common elsewhere; (3) More information is needed; (4) Limited distribution; (.1) Seriously endangered in California; (.2) Fairly endangered in California; (.3) Not very endangered in California.

Attachment 2
Plant Species Observed

ATTACHMENT 2

Vascular Plant Species Observed Mission Rock Energy Center Transmission Line Survey
April 21-22, 2016, Ventura County, California

Scientific Name	Common Name	Status
	Eudicots	
ADOXACEAE		
Sambucus nigra ssp. *caerulea*	Elderberry	Native
ANACARDIACEAE		
Malosma laurina	Laurel sumac	Native
Rhus integrifolia	Lemonade berry	Native
Schinus molle	Peruvian pepper tree	Naturalized
Toxicodendron diversilobum	Poison oak	Native
APOCYNACEAE		
Asclepias eriocarpa	Woolly milkweed	Native
Asclepias fascicularis	Narrow-leaved milkweed	Native
ASTERACEAE		
Achillea millefolium	Common yarrow	Native
Ambrosia psilostachya	Western ragweed	Native
Artemisia californica	California sagebrush	Native
Artemisia douglasiana	Douglas's mugwort	Native
Baccharis pilularis	Coyote-brush	Native
Baccharis salicifolia	Mule fat	Native
Carduus pycnocephalus	Italian thistle	Naturalized
Centaurea melitensis	Tocalote	Naturalized
Corethrogyne filaginifolia	California sand-aster	Native
Deinandra fasciculata	Fascicled tarplant	Native
Encelia californica	California bush daisy	Native
Eriophyllum confertiflorum	Golden yarrow	Native
Hazardia squarrosa	Saw-tooth goldenbush	Native
Heterotheca sessiliflora	Sessile-flower golden-aster	Native
Lactuca serriola	Common prickly lettuce	Naturalized
Logfia filaginoides	California cotton-rose	Native
Malacothrix saxatilis	Cliff desert-dandelion	Native
Matricaria discoidea	Common pineapple-weed	Native
Pseudognaphalium californicum	California everlasting	Native
Rafinesquia californica	California chicory	Native

ATTACHMENT 2

Vascular Plant Species Observed Mission Rock Energy Center Transmission Line Survey
April 21-22, 2016, Ventura County, California

Scientific Name	Common Name	Status
Silybum marianum	Blessed milkthistle	Naturalized
Sonchus asper	Spiny-leaved sow-thistle	Naturalized
Sonchus oleraceus	Common sow-thistle	Naturalized
APIACEAE		
Conium maculatum	Poison hemlock	Naturalized
Foeniculum vulgare	Fennel	Naturalized
BORAGINACEAE		
Cryptantha intermedia	Intermediate cryptantha	Native
Eucrypta chrysanthemifolia	Common eucrypta	Native
Pectocarya penicillata	Short-leaf combseed	Native
Phacelia sp.	Phacelia	Native
BRASSICACEAE		
Brassica nigra	Black mustard	Naturalized
Raphanus sativus	Radish	Naturalized
CACTACEAE		
Opuntia littoralis	Coastal prickly pear	Native
CARYOPHYLLACEAE		
Silene laciniata	Cardinal catchfly	Native
CHENOPODIACEAE		
Atriplex lentiformis	Big saltbush	Native
Atriplex semibaccata	Australian saltbush	Naturalized
Chenopodium album	White goosefoot	Naturalized
Chenopodium californicum	California goosefoot	Native
Chenopodium murale	Nettle leaved goosefoot	Naturalized
Salsola tragus	Russian thistle	Naturalized
CONVOLVULULACEAE		
Calystegia macrostegia	Southern California morning-glory	Native
Convolvulus arvensis	Bindweed	Naturalized
CUCURBITACEAE		
Cucurbita foetidissima	Coyote gourd	Native
Marah macrocarpa	Cucamonga man-root	Native

ATTACHMENT 2

Vascular Plant Species Observed Mission Rock Energy Center Transmission Line Survey
April 21-22, 2016, Ventura County, California

Scientific Name	Common Name	Status
EUPHORBIACEAE		
Croton californicus	California croton	Native
Ricinus communis	Castor bean	Naturalized
FABACEAE		
Acmispon glaber	Common deer weed	Native
Acmispon wrangelianus	Bird's-foot trefoil	Native
Astragalus (*cf*) *gambelianus*	Gambel's milkvetch	Native
Astragalus trichopodus	Southern California milkvetch	Native
Lathyrus vestitus	Common Pacific pea	Native
Lotus corniculatus	Common bird's-foot-trefoil	Naturalized
Lupinus bicolor	Miniature lupine	Native
Lupinus concinnus	Bajada lupine	Native
Lupinus succulentus	Arroyo lupine	Native
Medicago polymorpha	California burclover	Naturalized
Melilotus indicus	Sourclover	Naturalized
FAGACEAE		
Quercus agrifolia	Coast live oak	Native
FRANKENIACEAE		
Frankenia salina	Alkali heath	Native
GERANIACEAE		
Erodium cicutarium	Red-stemmed filaree	Naturalized
JUGLANDACEAE		
Juglans californica	California black walnut	Native
LAMIACEAE		
Marrubium vulgare	White horehound	Naturalized
Salvia apiana	White sage	Native
Salvia leucophylla	Coastal purple sage	Native
LAURACEAE		
Persea americana	Avocado	Cultivated
MALVACEAE		
Malva neglecta	Dwarf cheeseweed	Naturalized
Malva parviflora	Small-flowered cheeseweed	Naturalized

ATTACHMENT 2

Vascular Plant Species Observed Mission Rock Energy Center Transmission Line Survey
April 21-22, 2016, Ventura County, California

Scientific Name	Common Name	Status
MYRSINACEAE		
Lysimachia arvensis	Scarlet pimpernel	Naturalized
MYRTACEAE		
Eucalyptus globulus	Blue gum	Naturalized
NYCTAGINACEAE		
Mirabilis laevis	Desert wishbone bush	Native
ONAGRACEAE		
Camissonia strigulosa	Strigose suncup	Native
PAPAVERACEAE		
Fumaria parviflora	Small-flowered fumitory	Naturalized
PHRYMACEAE		
Mimulus aurantiacus var. *pubescens*	Pubescent bush monkeyflower	Native
PLANTAGINACEAE		
Keckiella cordifolia	Heart-leaved keckiella	Native
Nuttallanthus texanus	Wild toad flax	Native
POLYGONACEAE		
Emex spinosa	Spiny three-corner-Jack	Naturalized
Eriogonum fasciculatum	California buckwheat	Native
PORTULACACEAE		
Portulaca oleracea	Common purslane	Naturalized
ROSACEAE		
Heteromeles arbutifolia	Toyon	Native
RUBIACEAE		
Galium angustifolium	Narrow-leaved bedstraw	Native
SALICACEAE		
Salix lasiolepis	Arroyo willow	Native
SCROPHULARIACEAE		
Scrophularia californica	California figwort	Native
SOLANACEAE		
Datura wrightii	Wright's jimson-weed	Native
Nicotiana glauca	Tree tobacco	Naturalized
Solanum douglasii	Douglas's nightshade	Native
Solanum xanti	Chaparral nightshade	Native

ATTACHMENT 2

Vascular Plant Species Observed Mission Rock Energy Center Transmission Line Survey
April 21-22, 2016, Ventura County, California

Scientific Name	Common Name	Status
TROPAEOLACEAE		
Tropaeolum majus	Common garden nasturtium	Naturalized
URTICACEAE		
Urtica dioica	Stinging nettle	Native
VERBENACEAE		
Verbena lasiostachys	western verbena	Native
Monocots		
IRIDACEAE		
Sisyrinchium bellum	California blue-eye grass	Native
LILIACEAE		
Calochortus catalinae	Catalina mariposa-lily	Native (RPR 4.2)
POACEAE		
Arundo donax	Giant reed	Naturalized
Avena barbata	Slender wild oat	Naturalized
Brachypodium distachyon	Annual false-brome	Naturalized
Bromus diandrus	Ripgut grass	Naturalized
Bromus hordeaceus	Soft chess	Naturalized
Bromus madritensis ssp. *rubens*	Red brome	Naturalized
Bromus sterilis	Poverty brome	Naturalized
Cortaderia sp.	pampas-grass	Naturalized
Cynodon dactylon	Bermuda grass	Naturalized
Elymus condensatus	Giant wildrye	Native
Elymus triticoides	Creeping wildrye	Native
Festuca myuros	Rat-tailed fescue	Naturalized
Hordeum murinum	Wall barley	Naturalized
Lamarckia aurea	Golden top	Naturalized
Melica imperfecta	Coast Range melica	Native
Phalaris aquatica	Harding grass	Naturalized
Schismus barbatus	Mediterranean schismus	Naturalized
Stipa lepida	Foothill needle-grass	Native
THEMIDACEAE		
Bloomeria crocea	Golden-stars	Native

ATTACHMENT 2

Vascular Plant Species Observed Mission Rock Energy Center Transmission Line Survey
April 21-22, 2016, Ventura County, California

Scientific Name	Common Name	Status
Dichelostemma capitatum	Blue-dick	Native

Taxonomy follows The Jepson Online Interchange for California Floristics : http://ucjeps.berkeley.edu/interchange/

Attachment 3
Site Photographs

Photo 1. Overview of typical coastal sage scrub habitat along the western section of the electric transmission line route

Photo 2. Catalina mariposa-lily (*Calochortus catalinae*) observed north of Towers 26 and 27; a Rare Plant Rank 4.2 species

Photo 3. Tower 26 – Coastal Sage Scrub

Photo 4. Tower 27 - Ruderal grassland and Coastal Sage Scrub

Photo 5. Tower 28 - Ruderal grassland and Coastal Sage Scrub

Photo 6. Tower 29 - The tower will be located in the orchard area, surrounding vegetation is coastal sage scrub

Photo 7. Tower 30 – cleared weedy area at tower location

Photo 8. Towers 31 and 32 – Coastal sage scrub, weedy disturbed areas and orchards

Photo 9. Tower 34 – weedy disturbed area

Photo 10. Tower 35 – Coastal sage scrub downslope of tower location

Photo 11. Tower 36 – Coastal sage scrub

Photo 12. Tower 37 – Coastal sage scrub

Photo 13. Tower 38 – Coastal sage scrub

Photo 14. Tower 39 – Coastal sage scrub

Photo 15 – Typical, relatively open access road

Photo 16 – Typical access road with annual grasses and various forbs

Attachment 4
Plant Species Observed At Tower Locations

Attachment 4
Plant Species Observed at Tower Locations – Mission Rock Energy Center Ventura County, California

Scientific Name	Common Name	3	16	26	27	28	30	31	32	34	35	36	37	38	39	Road
ADOXACEAE																
Sambucus nigra ssp. *caerulea*	Elderberry		X	X	X	X		X	X		X		X	X		X
ANACARDIACEAE																
Malosma laurina	Laurel sumac			X	X			X	X							
Rhus integrifolia	Lemonade berry							X	X			X	X		X	
Schinus molle	Peruvian pepper tree														X	X
Toxicodendron diversilobum	Poison oak									X			X	X		X
APOCYNACEAE																
Asclepias eriocarpa	Woolly milkweed		X													
Asclepias fascicularis	Narrow-leaved milkweed		X				X			X			X			X
ASTERACEAE																
Achillea millefolium	Common yarrow															X
Ambrosia psilostachya	Western ragweed												X			X
Artemisia californica	California sagebrush			X	X		X	X	X	X	X	X	X	X	X	X
Artemisia douglasiana	Douglas's mugwort	X														
Baccharis pilularis	Coyote-brush		X	X	X	X	X			X	X		X	X	X	X
Baccharis salicifolia	Mule fat															X
Carduus pycnocephalus	Italian thistle															X
Centaurea melitensis	Tocalote			X	X	X	X	X	X	X	X	X	X	X	X	X
Corethrogyne filaginifolia	California sand-aster									X		X				X
Deinandra fasciculata	Fascicled tarplant			X	X											X
Encelia californica	California bush daisy			X	X	X			X		X	X	X	X	X	
Eriophyllum confertiflorum	Golden yarrow						X									

Attachment 4
Plant Species Observed at Tower Locations – Mission Rock Energy Center Ventura County, California

Scientific Name	Common Name	3	16	26	27	28	30	31	32	34	35	36	37	38	39	Road
Hazardia squarrosa	Saw-tooth goldenbush			X	X	X		X	X	X	X	X				X
Heterotheca sessiliflora	Sessile-flower golden-aster					X										X
Lactuca serriola	Common prickly lettuce		X													
Logfia filaginoides	California cotton-rose					X							X			X
Malacothrix saxatilis	Cliff desert-dandelion															X
Matricaria discoidea	Common pineapple-weed															X
Pseudognaphalium californicum	California everlasting					X										X
Rafinesquia californica	California chicory															X
Silybum marianum	Blessed milkthistle		X	X	X	X	X	X	X							X
Sonchus asper	Spiny-leaved sow-thistle															X
Sonchus olecerus	Commin sow thistle	X	X	X	X	X		X	X		X	X				X
APIACEAE																
Conium maculatum	Poison hemlock	X	X											X		
Foeniculum vulgare	Fennel															X
BORAGINACEAE																
Cryptantha intermedia	Intermediate cryptantha												X	X		X
Eucrypta chrysanthemifolia	Common eucrypta													X	X	X
Pectocarya penicillata	Short-leaf combseed					X										
Phacelia sp.	Phacelia													X		
BRASSICACEAE																
Brassica nigra	Black mustard	X		X	X	X	X	X	X	X	X	X	X	X	X	X
Raphanus sativus	Radish	X														
CACTACEAE																
Opuntia littoralis	Coastal prickly pear												X			

Attachment 4
Plant Species Observed at Tower Locations – Mission Rock Energy Center Ventura County, California

Scientific Name	Common Name	3	16	26	27	28	30	31	32	34	35	36	37	38	39	Road
CARYOPHYLLACEAE																
Silene laciniata	Cardinal catchfly					X										X
CHENOPODIACEAE																
Atriplex lentiformis	Big saltbush		X				X									
Atriplex semibaccata	Australian saltbush															X
Chenopodium album	White goosefoot						X									X
Chenopodium californicum	California goosefoot															X
Chenopodium murale	Nettle leaved goosefoot						X		X							
Salsola tragus	Russian thistle							X	X	X		X				X
CONVOLVULULACEAE																
Calystegia macrostegia	Southern California morning-glory			X	X	X			X		X	X		X		
Convolvulus arvensis	Bindweed									X						X
CUCURBITACEAE																
Cucurbita foetidissima	Coyote gourd						X									X
Marah macrocarpa	Cucamonga man-root			X	X	X						X	X	X	X	
EUPHORBIACEAE																
Croton californicus	California croton															X
Ricinus communis	Castor bean	X	X													
FABACEAE																
Acmispon glaber	Common deer weed			X	X	X						X		X	X	X
Acmispon wrangelianus	Bird's-foot trefoil										X		X			X
Astragalus (cf) gambelianus	Gambel's milkvetch															X
Astragalus trichopodus	Southern California milkvetch									X	X		X			X

Attachment 4
Plant Species Observed at Tower Locations – Mission Rock Energy Center Ventura County, California

Scientific Name	Common Name	3	16	26	27	28	30	31	32	34	35	36	37	38	39	Road
Lathyrus vestitus	Common Pacific pea															X
Lotus corniculatus	Common bird's-foot-trefoil															X
Lupinus bicolor	Miniature lupine			X	X											
Lupinus concinnus	Bajada lupine					X										X
Lupinus succulentus	Arroyo lupine					X	X				X					X
Medicago polymorpha	California burclover								X							X
Melilotus indicus	Sourclover		X	X	X	X	X	X	X	X	X	X	X	X	X	X
FAGACEAE																
Quercus agrifolia	Coast live oak	X	X													
FRANKENIACEAE																
Frankenia salina	Alkali heath															X
GERANIACEAE																
Erodium cicutarium	Red-stemmed filaree					X		X	X	X		X	X	X		X
JUGLANDACEAE																
Juglans californica	California black walnut	X	X													
LAMIACEAE																
Marrubium vulgare	White horehound									X			X	X		X
Salvia apiana	White sage														X	X
Salvia leucophylla	Coastal purple sage			X	X	X	X	X	X	X	X	X	X	X	X	X
LAURACEAE																
Persea americana	Avocado							X	X							
MALVACEAE																
Malva neglecta	Dwarf cheeseweed		X													X
Malva parviflora	Small-flowered cheeseweed		X	X	X	X	X	X	X	X	X			X		X

Attachment 4
Plant Species Observed at Tower Locations – Mission Rock Energy Center Ventura County, California

Scientific Name	Common Name	3	16	26	27	28	30	31	32	34	35	36	37	38	39	Road
MYRSINACEAE																
Lysimachia arvensis	Scarlet pimpernel								X				X	X	X	X
MYRTACEAE																
Eucalyptus globulus	Blue gum		X													
NYCTAGINACEAE																
Mirabilis laevis	Desert wishbone bush												X			
ONAGRACEAE																
Camissonia strigulosa	Strigose suncup															X
PAPAVERACEAE																
Fumaria parviflora	Small-flowered fumitory		X													
PHRYMACEAE																
Mimulus aurantiacus var. *pubescens*	Pubescent bush monkeyflower								X							X
PLANTAGINACEAE																
Keckiella cordifolia	Heart-leaved keckiella															X
Nuttallanthus texanus	Wild toad flax															X
POLYGONACEAE																
Emex spinosa	Spiny three-corner-Jack															X
Eriogonum fasciculatum	California buckwheat														X	
PORTULACACEAE																
Portulaca oleracea	Common purslane	X														
ROSACEAE																
Heteromeles arbutifolia	Toyon														X	X
RUBIACEAE																
Galium angustifolium	Narrow-leaved bedstraw								X							X

Attachment 4
Plant Species Observed at Tower Locations – Mission Rock Energy Center Ventura County, California

Scientific Name	Common Name	3	16	26	27	28	30	31	32	34	35	36	37	38	39	Road
SALICACEAE																
Salix lasiolepis	Arroyo willow	X														
SCROPHULARIACEAE																
Scrophularia californica	California figwort													X		X
SOLANACEAE																
Datura wrightii	Wright's jimson-weed															X
Nicotiana glauca	Tree tobacco						X									X
Solanum douglasii	Douglas's nightshade		X													X
Solanum xanti	Chaparral nightshade			X	X			X	X				X	X		
TROPAEOLACEAE																
Tropaeolum majus	Common garden nasturtium	X	X													
URTICACEAE																
Urtica dioica	Stinging nettle		X													
VERBENACEAE																
Verbena lasiostachys	western verbena															X
IRIDACEAE																
Sisyrinchium bellum	California blue-eye grass															
LILIACEAE																
Calochortus catalinae	Catalina mariposa-lily															
POACEAE																
Arundo donax	Giant reed	X														
Avena barbata	Slender wild oat			X	X		X			X						X
Brachypodium distachyon	Annual false-brome			X	X	X		X	X							

Attachment 4
Plant Species Observed at Tower Locations – Mission Rock Energy Center Ventura County, California

Scientific Name	Common Name	3	16	26	27	28	30	31	32	34	35	36	37	38	39	Road
Bromus diandrus	Ripgut grass		X	X	X		X		X	X	X	X	X	X		X
Bromus hordeaceus	Soft chess			X	X											X
Bromus madritensis ssp. *rubens*	Red brome	X		X	X		X	X	X	X	X	X	X	X	X	X
Bromus sterilis	Poverty brome															
Cortaderia sp.	pampas-grass														X	
Cynodon dactylon	Bermuda grass													X		
Elymus condensatus	Giant wildrye			X	X	X	X	X	X	X	X	X	X	X	X	X
Elymus triticoides	Creeping wildrye		X													
Festuca myuros	Rat-tailed fescue			X	X											
Festuca perennis	Italian ryegrass															X
Hordeum murinum	Wall barley									X						X
Lamarckia aurea	Golden top															X
Melica imperfecta	Coast Range melica													X		
Phalaris aquatica	Harding grass			X	X											
Schismus barbatus	Mediterranean schismus												X	X		X
Stipa lepida	Foothill needle-grass			X	X	X		X	X	X			X		X	
THEMIDACEAE																
Bloomeria crocea	Golden-stars															X
Dichelostemma capitatum	Blue-dick			X	X			X	X				X			X

5.3 Cultural Resources (29-58)

The discussion below addresses Cultural Resources Data Requests 29, 33, and 34, which were not part of the notice of objection filed by the Applicant on August 1, 2016.

Field Methods

29. Provide a Technical Memorandum that clarifies the archeological fieldwork methods used to identify cultural resources in the Mission Rock survey area

Response: A cultural resources survey of the proposed MREC area of potential effect (APE) was conducted on October 6 and 7, 2015, by Natalie Lawson, M.A., RPA, and Gloriella Cardenas, M.A., RPA. Both have previously been approved by Staff as Cultural Resources Specialists (CRS) and meet the qualifications for Principal Investigator stated in the Secretary of the Interior's standards and guidelines for archaeology and historic preservation (NPS, 1983). This field survey included the plant site, temporary laydown area, and associated linears. The areas previously unsurveyed because of the crops were completed on October 1, 2016. No previously unrecorded archaeological or cultural resources were discovered during this survey.

As per the current CEC Rules of Practice and Procedure & Power Plant Site Certification Regulations (CEC, 2007), in addition to the plant site and the construction laydown and/or parking area, a 200-foot minimum buffer was surveyed for cultural resources around the plant site. For the generator tie-line, the water line, and the gas line, a 50-foot minimum buffer was surveyed on either side of the linear corridors.

The survey used linear pedestrian transects spaced at 10 to 15 meters and opportunistic examination of exposed soils to examine the survey areas to determine whether archaeological deposits might be present. Exposed soils, consisting mainly of previously disturbed agricultural sediments and road bed material, were inspected carefully. Slopes exceeding 25 percent were opportunistically surveyed and examined for evidence of rock outcrops or anomalies which could indicate historic features.

The plant site and laydown area were not surveyed in 10 to 15 meter transects because the majority of the ground surface is paved. These areas were examined to determine if there was any open unpaved ground that could be examined for archaeological resources. There were two small areas of unpaved surface on the plant site: one measuring approximately 75 feet by 30 feet and a second measuring approximately 40 feet by 40 feet. Visibility of these areas was 100 percent; these two areas were examined closely for archaeological resources.

Survey Acres, Slopes and Visibility

33. Please provide a technical memorandum that indicates:

a) The total area of the archaeological resources study area in acres,

b) number of acres in the archaeological resources study area with slopes greater than 25 percent that the survey crew spot checked,

c) The number of acres in the archaeological resources study area that remain unsurveyed, and

d) The ground surface visibility in acres (i.e., 0-25%, 26-50%, 51-75%, 76-100%).

Response: The total area of the archaeological resources study area is approximately 193.6 acres. The area not surveyed due to inaccessibility caused by slopes greater than 25 percent was approximately

52.0 acres. For the portions of the transmission line corridor beyond Tower 22, the tower locations were accessed via fire roads using four-wheel drive vehicles; however, the corridor outside of the tower locations was not surveyed due to the prevalence of steep terrain (see Figure DR34-1). Slopes were examined from the ridge tops for any anomalies or rock outcrops which could be resources. Although binoculars were available to more closely examine anything noted from the ridgetops, no outcrops or any other anomalies were observed.

The approximate ground surface visibility breakdown was as follows: 21.7 acres had 0 to 25 percent visibility, 55.5 acres had 51 to 75 percent visibility, and 116.4 acres had 76 to 100 percent visibility (see Figure DR34-2). No areas were identified as having 26 to 50 percent visibility. Visibility was primarily limited by vegetation along the ridgetops and mulch and fallen leaves within the orchards.

Survey Area Figures

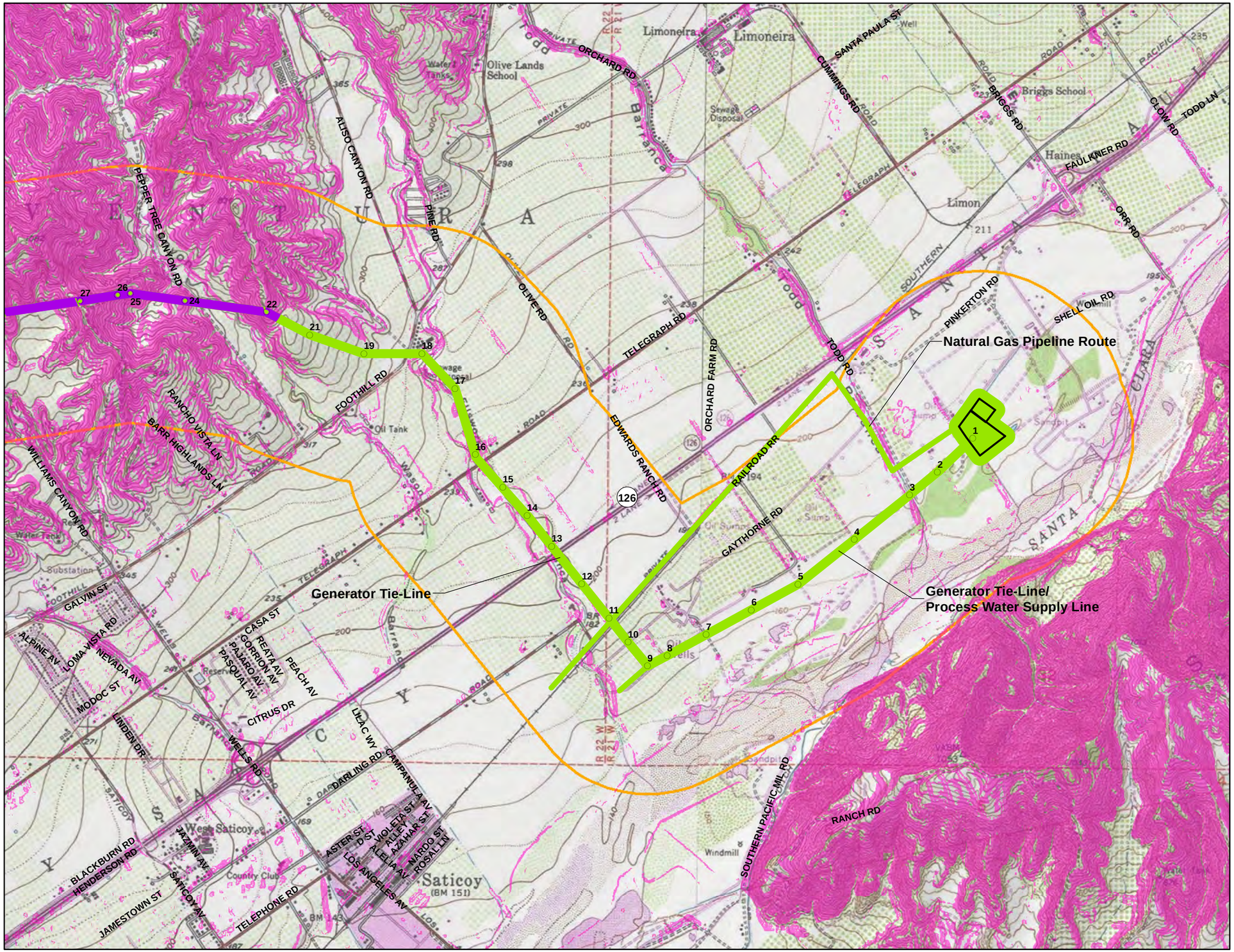
34. Please provide figures that indicate areas with slope greater than 25 percent and areas that remain unsurveyed in the archaeological resources study area. The figures shall conform to the following requirements:

a) The figures shall be based on 7.5-minute, U.S. Geological Survey (USGS) topographic quadrangles at a scale of 1:24,000.

b) The figures shall show the project elements, archaeological resources study area boundary, areas with a slope greater than 25 percent, unsurveyed areas, and locations of surface visibility by percent (0-25%, 26-50%, 51-75%, 76-100%).

Response: Figure DR34-1 shows the areas of slopes greater than 25 percent in the study area. Figure DR34-2 shows the surface visibility throughout the study area.

Attachment DR34-1
Survey Area Slopes



VICINITY MAP

LEGEND

- Project Site and Laydown Area
- Tower
- Architectural Survey Area

Archaeological Survey Area

- Area Surveyed
- Areas Not Surveyed

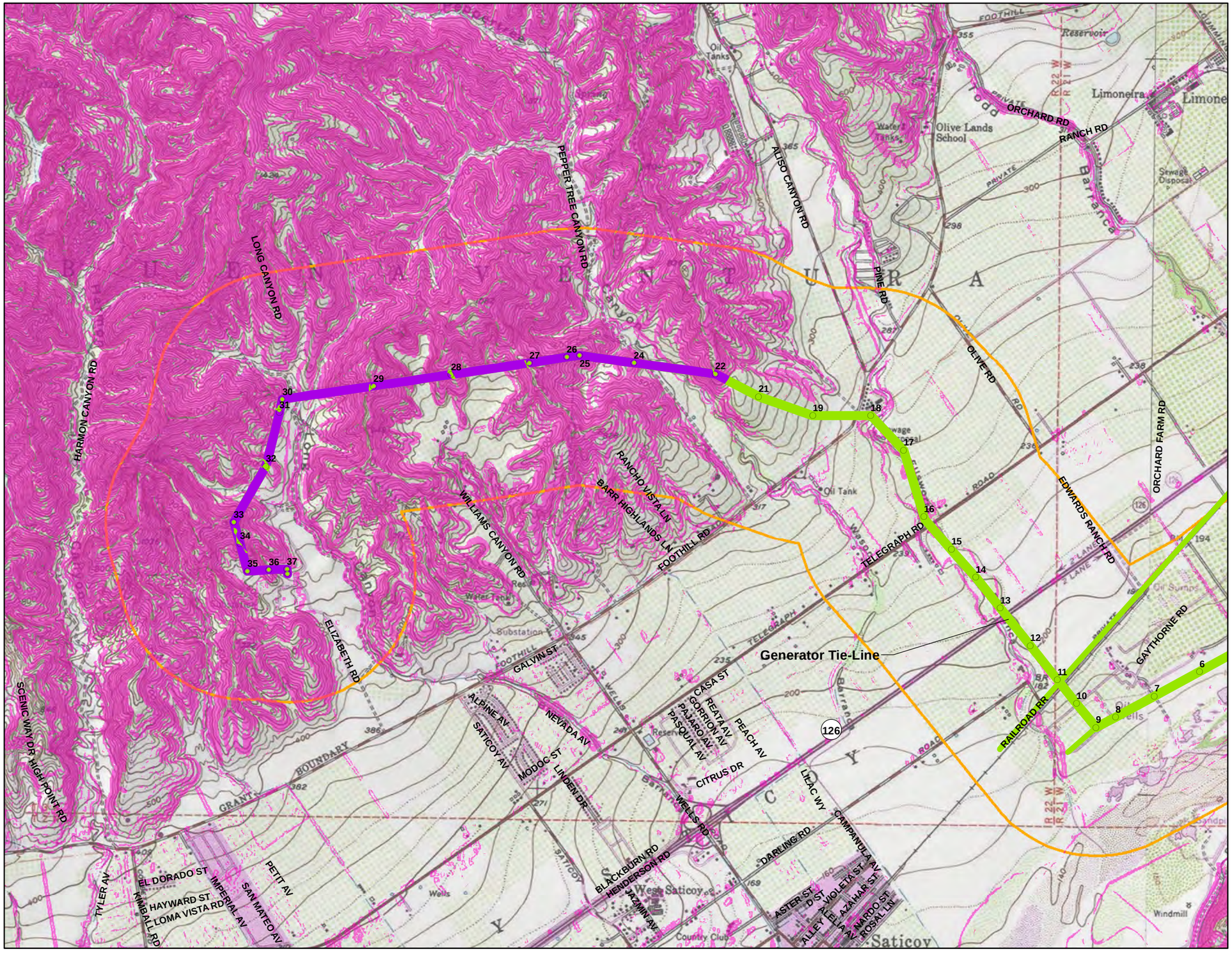
Percent Slope

- 0 - 25%
- > 25%

N

0 1,000 2,000
Feet

Figure DR34-1a
Areas With a Slope Greater Than 25 Percent and Unsurveyed Areas
Mission Rock Energy Center
Ventura County, California



VICINITY MAP

LEGEND

- Project Site and Laydown Area
- Tower
- Architectural Survey Area

Archaeological Survey Area

- Area Surveyed
- Areas Not Surveyed

Percent Slope

- 0 - 25%
- > 25%

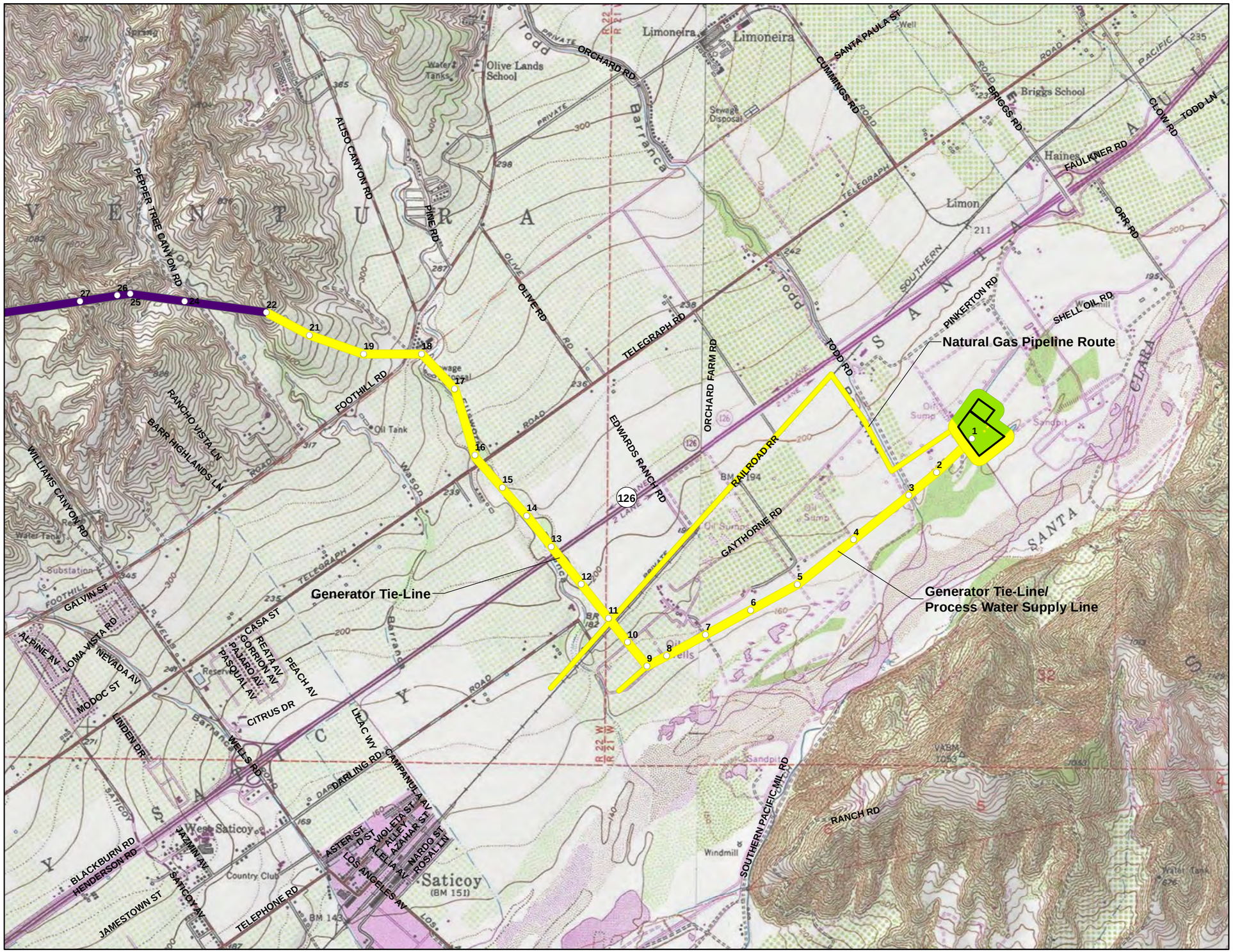
N

0 1,000 2,000

Feet

Figure DR34-1b
Areas With a Slope Greater Than 25 Percent and Unsurveyed Areas
Mission Rock Energy Center
Ventura County, California

Attachment DR34-2
Survey Area Surface Visibility



LEGEND

- Project Site/Laydown Area
- Tower
- Architectural Survey Area

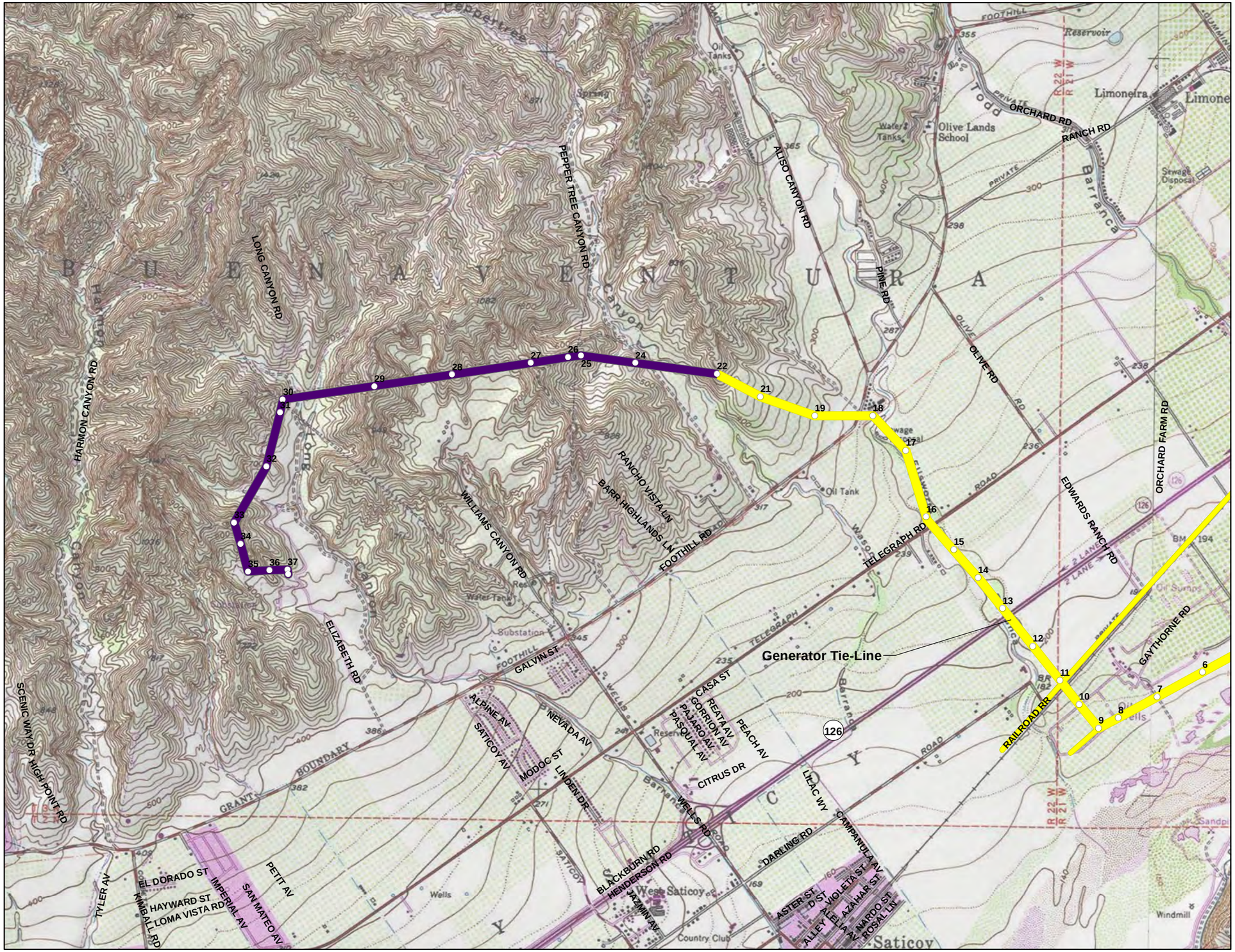
Archaeological Survey Area

- 0-25% Surface Visibility
- 26-50% Surface Visibility
- 51-75% Surface Visibility
- 76-100% Surface Visibility

N

0 1,000 2,000
Feet

Figure DR34-2a
Surface Visibility
Mission Rock Energy Center
Ventura County, California



VICINITY MAP

LEGEND

- Project Site/Laydown Area
- Tower
- Architectural Survey Area

Archaeological Survey Area

- 0-25% Surface Visibility
- 26-50% Surface Visibility
- 51-75% Surface Visibility
- 76-100% Surface Visibility

N

0 1,000 2,000
Feet

Figure DR34-2b
Surface Visibility
Mission Rock Energy Center
Ventura County, California

5.4 Geological Hazards and Resources and 5.8 Paleontological Resources (59-62)

Pole Locations and Heights

59. Please provide a map showing the location of poles, and a table showing the corresponding pole heights.

Response: AFC Figure 1.2-2 shows the locations of the poles, identified by pole number. Table DR59-1, below lists the table heights.

Table DR59-1. Generator tie-line pole heights

Pole No.	Height (ft)	Pole No.	Height (ft)
1	81.5	20	-
2	121	21	106
3	106	22	106
4	141	24	126
5	116	25	200
6	106	26	200
7	106	27	106
8	96	28	106
9	91	29	106
10	91	30	200
11	96	31	200
12	96	32	116
13	101	33	106
14	96	34	106
15	96	35	106
16	131	36	81
17	126	37	106
18	156	H-frame	79.9
19	106		

Pole Foundation Construction

60. Please provide information discussing the method of construction for transmission pole foundations. Include a discussion of depths and volume of excavations for the various pole heights and estimate the potential loss of sensitive paleontologic resources given the proposed method of construction.

Response: The 230kV transmission pole foundations will be direct-embed foundations, whereby the above-grade height of the pole will be extended by a length determined by the geotechnical engineer in order to resist the overturning moment and other groundline reactions. This will require the excavation of a cylindrical hole using a large auger, placing the base section of the pole in that hole, and backfilling

with select fill, crushed gravel, or concrete. In sandy soils, a corrugated steel casing may be used to prevent sloughing and hole collapse. The embedded section of the pole will have additional protection against corrosion, especially near the groundline. To accomplish this, a Corrocote or similar coating will be applied below grade and an additional sacrificial layer of steel will be added 2 feet below and 2 feet above grade.

The depth of the foundation will vary with soil strength and pole loading, but will typically range from 10ft to 40ft. The volume will greatly depend upon the diameter (and depth) of the hole, but could be as much as 4500 cubic feet for a 12ft diameter hole. Such a large hole would be rare and only seen on very tall dead-end poles; most tangent foundations would be much smaller (approximately 1000 cubic feet).

Uniqueness of Alluvial Deposits

61. Please provide clarification of the statement in §5.4.1.5 concerning the "uniqueness" of the alluvial deposits, and whether construction of the project impact this "uniqueness"?

Response: The statement refers to the "uniqueness" of oil and gas resources. Construction will not affect the oil and gas resources.

Slope and Foundation Conditions

62. Please provide data on the elements of the transmission tower design and the design of the fill slopes used to raise Mission Rock above BFE that address the issue of mass wasting, and creation of unstable slope or foundation conditions, resulting from a 100-year flood event.

Response: For any transmission poles that are located in the FEMA 100-yr flood zone, additional design considerations will include: flowing water, scour, and corrosion. These considerations will be over and above the standard design criteria. Further, if any transmission poles are located on a slope, the embedment depth and the corrosion protection will be adjusted to account for the worst-case of each.

5.7 Noise and Vibration (63)

Sound Level Contour Map

63. Please provide a sound level contour map that shows the expected operational noise levels from the project alone. For this contour map, please use a 2,000-foot radius from the center of the project site to ensure that any receptors potentially affected by project operation, including R1a, R1b, and R2, are included.

Response: The contour map is found in Figure DR63-1.

Attachment DR63-1
Noise Contour Map

VICINITY MAP

LEGEND

- Existing Residential Use
- Sound Monitoring Locations
- Tower
- Project Site
- Laydown Area
- Natural Gas Pipeline Route
- Generator Tie-Line
- Process Water Supply Line

Noise Contours (dB)

- 40
- 45
- 50
- 55
- 60
- 65

N

0 300 600
Feet

Figure DR63-1
Noise Contours
Mission Rock Energy Center
Ventura County, California

5.10 Socioeconomics (64-67)

Linear Components Workforce

64. *Please clarify if the construction of the linear components listed above (transmission line, natural gas pipeline, and recycled water pipeline) was included in the 23-month construction schedule, in the workforce estimates, and in the estimated fiscal benefits discussed in the Socioeconomics section of the AFC.*

Response: Construction of the linear components was not included in the schedule, workforce estimates, and the estimated fiscal benefits discussed in the Socioeconomics section of the AFC.

Schedule, Duration, Workforce, Fiscal Benefits Update

65. *If some or all the linear components listed above were not included, please update the construction schedule and duration (noting any overlap in the schedule), workforce needed by trade and month for the linear components not included in the Socioeconomics section of the AFC, and if available, update the fiscal benefits.*

Response: Updated schedule, workforce estimates, and estimated fiscal benefits analysis will be provided in a subsequent Data Response filing.

Workforce Assumptions

66. *Please clarify which local construction workforce assumptions are correct: 60 percent or 80 percent.*

Response: Eighty percent is correct.

Model Assumptions

67. *If 60 percent is the correct assumption, please re-run the model with the corrected assumptions for the local workforce.*

Response: See response to Data Request #66.

5.11 Soils and 5.15 Water Resources (68-86)

FEMA Map Update Schedule

68. Please provide a projected schedule of when the official FEMA map update will be effective and the time anticipated to obtain FEMA approval to proceed with floodplain development.

Response: The Applicant objected to this data request on August 1, 2016, as the Applicant did not have knowledge of FEMA's schedule for the release of its official map update, or to speculate regarding FEMA approval of floodplain development.

Based on the discussion at the August 26, 2016 workshop, the Applicant understands that Staff is seeking information to better understand Ventura County's floodplain development permit process. Ventura County requires a Floodplain Development Permit for development proposed within a floodplain in unincorporated Ventura County. Based on available information, it is likely that Ventura County will need 2-4 weeks to review and approve an application for floodplain development. The approved application will then be uploaded to the FEMA Letter of Map Change (LOMC) center to be reviewed and processed. Standard processing time is about 90 days. FEMA may require additional information. Generally speaking, 60-180 days is a typical length of time for FEMA review, depending on the size and complexity of the project.

Base Flood Elevation

69. Describe how the Base Flood Elevation at the site was determined for MREC preliminary design and state the elevation using Vertical Datum NAVD88. Explain how the earthwork design would not change if the official FEMA map update results in a different elevation.

Response: The Applicant objected to this data request on August 1, 2016. At the August 26, 2016 workshop, Staff and the Applicant discussed this data request. The Applicant confirmed that the Base Flood Elevation at the site was determined using FEMA's 2014 preliminary FIRM map.

Final Foundation Elevations

70. Also using NAVD88, provide elevations for the following: final elevations of the site post-earthwork, elevation(s) at the top of slabs and/or foundations supporting structures and major equipment.

Response: The project site will be raised to the elevation of the 100-year flood plain at 191.9 feet above mean sea level. The side slopes of the fill will be graded to a slope of 2:1 around all sides, except that the northwest side will have a small retaining wall approximately 4 feet tall. Ramps from the existing grade will be installed at the main entrance and emergency access at the northwest corner to gain access to the site. All top-of-equipment foundation footings will be constructed at an elevation of 192.9, which is one foot or more above the 100-year floodplain elevation of 191.9. Attachment DR70-1 shows the relevant elevations.

Earthwork Profiles

71. Provide engineering profiles of earthwork (presented at a legible scale) showing elevations of existing grades and proposed grades and foundations (elevations of bottom and top of slabs and/or foundations) using NAVD88. Also include. Cross-sections perpendicular to Shell Road at 100-foot intervals.

Response: The Applicant objected to this data request on August 1, 2016. At the August 26, 2016 workshop, Staff and the Applicant discussed this data request. The Applicant expressed several concerns with this data request, including a concern with the burden and complexity of creating cross-sections using 100-foot intervals across the entire site, particularly where the Commission's process contemplates that detailed design occurs post-certification. However, the Applicant understands that Staff would like a general understanding of the amount of fill that may be required for the site. Attachment DR70-1 provides estimated fill requirements for the site, which may change based on final design requirements. Please also see the response to Data Request 94.

Drainage Structure

72. Provide preliminary drawings that show the existing drainage structure (including culvert outfall) and the proposed drainage design. Describe what would be done to the existing drainage structure.

Response: The proposed drainage design is illustrated on the Grading Plan Exhibit (Attachment DR70-1). During detailed design post-certification, the flow line elevations of the drainage out fall structure will be determined and construction details of the outfall structure will be provided to the CPM. The existing outfall structure will be removed due to the fact that the finish grade of the site will not match the existing outfall structure elevations.

Slope Protection

73. Describe the proposed side slopes, their construction (including any temporary construction disturbance outside the property line), and how they would be protected from erosion and scour during flooding.

Response: See the response to Data Request #70, above, and Attachment DR70-1, Grading Plan Exhibit.

Floodwaters

74. Discuss the expected heights, velocity, duration, rate of rise, and sediment transport of the floodwaters. Demonstrate that final construction would not exacerbate flooding of adjacent properties.

Response: The Applicant objected to this data request on August 1, 2016. At the August 26, 2016 workshop, Staff and the Applicant discussed this data request. The Applicant understands that Staff would like to better understand whether the elevation of the site will alter floodwater flows, and if other properties will be affected. The Applicant is preparing a further response, and will submit this information within 30 days.

Cumulative Effect

75. Demonstrate that the cumulative effect of Mission Rock when combined with other property uses (that must also comply with floodplain LORS when the updated FEMA maps become effective) do not increase the water surface elevation of the base flood more than one foot at any point.

Response: The Applicant objected to this data request on August 1, 2016. At the August 26, 2016 workshop, Staff and the Applicant discussed this data request, and the Applicant has a better understanding of the information sought by Staff. The Applicant is preparing a further response, and will submit this information within 30 days.

Schedule

76. Please provide a projected schedule of the milestones listed.

Response: The requested project milestone schedule dates are provided below in Table DR76-1.

TABLE DR76-1
Milestone Schedule

Milestone	Duration (months)	Start Date (month/year)	End Date (month/year)
Limoneira approval for recycled water end use at Mission Rock	NA	March 2020	NA
Construction of new 1.7-mile recycled water pipeline	5 months	November 2018	March 2019
Recycled water available at Mission Rock via installed pipeline	NA	March 2020	NA
Mission Rock site preparation, infill, and grading	7 months	December 2018	July 2019
Mission Rock facility construction	8 months	March 2019	October 2019
Mission Rock commissioning	7 months	March 2020	October 2020
Mission Rock commercial operation	NA	October 2020	NA

Recycled Water Pipeline Owner

77. Provide information about which party would own and maintain the proposed 1.7-mile recycled water pipeline once installed.

Response: The Applicant expects that it will own and maintain the recycled water pipeline.

Recycled Water for Construction

78. Explain how recycled water would be delivered and stored at the site for construction activities.

Response: A semi-mounted tanker trailer would be delivered to the site. The tank would be mounted on supports and filled with water by water tanker truck deliveries as needed.

State and Local LORS

79. Identify local and state LORS regarding recycled water use that are applicable to Mission Rock (e.g., separate pipe system, signage).

Response: LORS governing the conveyance and use of recycled water in California are compiled by the State Water Resources Control Board, based on various sections of the California Government Code, Health and Safety Code, Public Utilities Code, Streets and Highways Code, and Water Code, and various implementing regulations contained in the California Code of Regulations (CCR). This compilation of recycled water laws and regulations is often referred to as the "Purple Book." Key provisions of the Purple Book relating to the MREC recycled water pipeline are as follows:

- Use of Recycled Water – Recycled water may only be used for the purposes listed in CCR Title 22, Section 60303 – 60307. Each of the listed purposes defines recycled water quality standards, such as disinfected tertiary-treated recycled water for industrial process uses that may come

into contact with workers, and disinfected secondary-treated recycled water for industrial uses that do not come into contact with workers.

- Cross Connection – Drinking water supplies are protected from contamination by recycled water through various cross-connection restrictions, such as air-gap separation and other backflow-prevention measures. Cross connection requirements are described in CCR Title 17, Section 7601 – 7605.
- Purple Pipe – The California Health and Safety Code, Section 116815, requires that all recycled water pipelines installed above or below the ground shall be colored purple or distinctively wrapped with purple tape.
- Signage. CCR Title 22, Section 60310(g) requires that all areas where recycled water is used that are accessible to the public shall be posted with signs including the words "Recycled Water – Do Not Drink" and related symbols.

Additionally, organizations such as the American Water Works Association publish guidelines and manuals of practice regarding recycled water system design and construction. Ventura County does not have local LORS in addition to Purple Book requirements.

LARWQCB Permit

80. Discuss the status of consultation with the LARWQCB and whether they have indicated the current permit can be revised to allow use of recycled water for project operation.

Response: The Applicant objected to this Data Request on August 1, 2016.

Permit Revision Process

81. Provide copies of any information submitted to the LARWQCB to comply with the permit revision process.

Response: The Applicant objected to this Data Request on August 1, 2016.

Groundwater

82. Discuss potential effects of the Groundwater Sustainability Act on Limoneira's use of groundwater, and any resulting impacts on recycled water supplies to Mission Rock.

Response: The Sustainable Groundwater Management Act (SGMA) (Water Code section 10720 et seq.) generally requires that groundwater basins designated as high or medium priority shall be "managed under a groundwater sustainability plan or coordinated groundwater sustainability plans." The Legislature found that certain adjudicated groundwater basins are already sustainably managed and expressly exempted them from SGMA. (Water Code section 10720.8(a).)

The project is located in the Santa Paula Basin, a subbasin within the larger Santa Clara River Valley groundwater basin. Groundwater rights in the Santa Paula Basin were adjudicated in a 1996 Stipulated Judgment in Ventura County Superior Court, and the basin is expressly exempt from the provisions of SGMA by Water Code section 10720.8(a)(19). Therefore, the SGMA does not affect groundwater use in the Santa Paula Basin, and has no impact on recycled water supplies to MREC.

Industrial Waste Water

83. Please explain the ability of Patriot WasteWater's to accept Mission Rock industrial wastewater at the treatment facility (815 Mission Rock Rd).

Response: The Applicant is continuing to develop information in response to the request and anticipates providing further response by the end of October 2016.

Alternative Wastewater Plans

84. *Please discuss any other alternative plans for wastewater disposal, and describe the schedule and approvals that would be required to utilize the alternative disposal methods.*

Response: The Applicant is continuing to develop information in response to the request and anticipates providing further response by the end of October 2016.

Energy Storage System Protection

85. *Please provide information that describes the energy storage system including the battery type(s), casing, and enclosures that protect them from the effects of flooding, if any.*

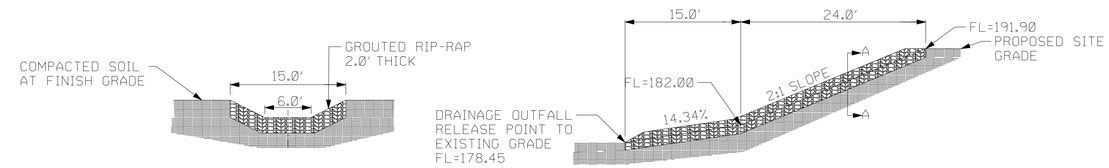
Response: As described earlier, the MREC site will meet federal, state, and local requirements to be above the base flood elevation (100-year flood). The battery arrays will be placed in standard containers as supplied by the manufacturer, and these will provide protection from flooding.

Flood Risk

86. *Discuss potential impacts due to flood damage to the batteries and battery enclosures, and the proposed measures to address these impacts.*

Response: Please see response to Data Request #85, above.

Attachment DR70-1
Grading Plan



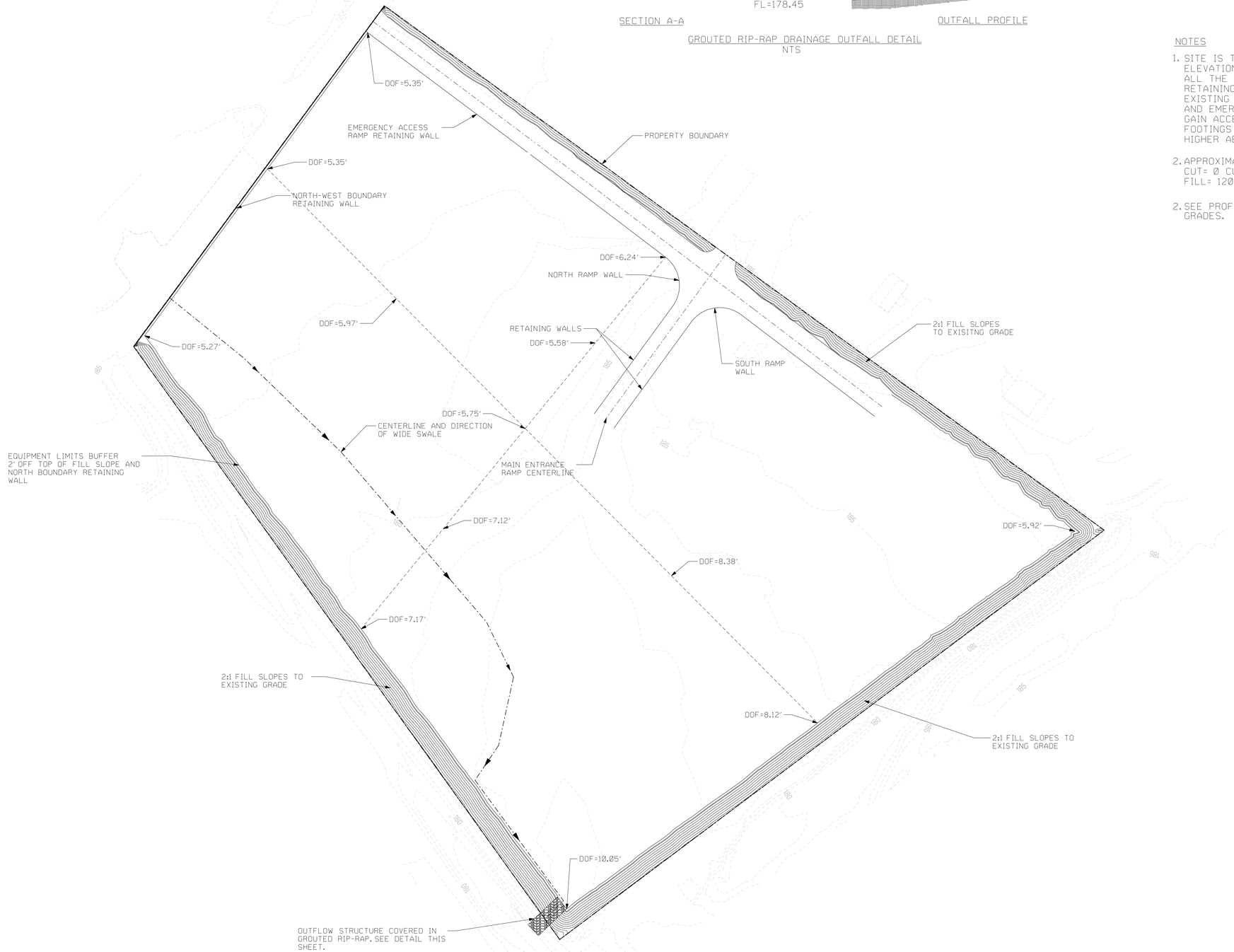
GROUTED RIP-RAP DRAINAGE OUTFALL DETAIL
NTS

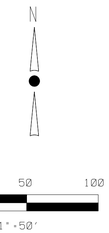
LEGEND

186	EXISTING CONTOUR
	PROPOSED CONTOUR
	PROPERTY BOUNDARY
DOF	DEPTH OF FILL

NOTES

1. SITE IS TO BE RAISED TO THE 100 YEAR FLOOD PLAIN ELEVATION OF 191.9 AND 2:1 SLOPES TO EXISTING GRADE AROUND ALL THE SIDES, EXCEPT THE NORTH-WEST SIDE WILL HAVE A SMALL RETAINING WALL AROUND 4 FEET TALL. RAMPS FROM EXISTING GRADE WILL BE INSTALLED AT THE MAIN ENTRANCE AND EMERGENCY ACCESS AT THE NORTH-WEST CORNER TO GAIN ACCESS TO THE SITE. ALL TOP OF EQUIPMENT FOUNDATION FOOTINGS WILL BE CONSTRUCTED AT ELEVATION 192.9 ONE FOOT OR HIGHER ABOVE THE 100 YEAR FLOOD PLAIN ELEVATION OF 191.9.
2. APPROXIMATE EXCAVATION QUANTITIES:
   CUT= 0 CUBIC YARDS
   FILL= 120,000 CUBIC YARDS
2. SEE PROFILE SHEET FOR RAMPS INTO SITE FROM EXISTING GRADES.





PRELIMINARY
NOT FOR CONSTRUCTION

WorleyParsons
resources & energy

CLIENT/PROJECT TITLE

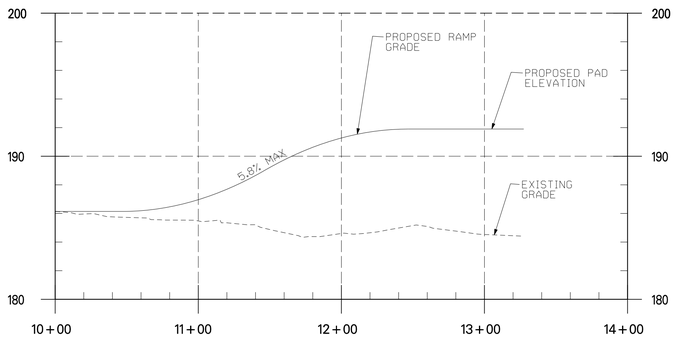
CALPINE MISSION ROCK

GRADING PLAN EXHIBIT

SCALE	DRAWING SIZE
1"=50'	24x36

WORLEYPARSONS DWG. NO. | REV

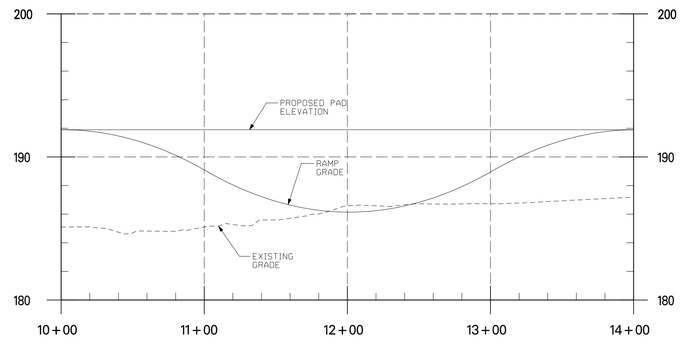
$$DESIGN-FILE-NAME$$
$$$$DATE$$$$ $$$$TIME$$$$



LINE	SURFACE	OFFSET
	Mission Rock Pad 191.3	
	Mission Rock Topo 082615	

Scaled 10.0000 Times Ver.
Scaled 1.0000 Times Hor.

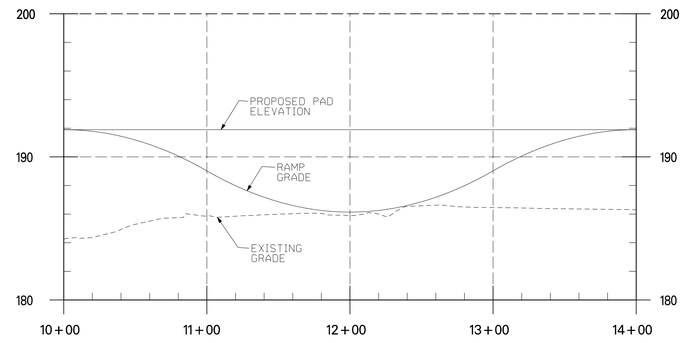
Main Entrance Ramp Profile
NOT TO SCALE



LINE	SURFACE	OFFSET
	Mission Rock Pad 191.3	
	Mission Rock Topo 082615	

Scaled 10.0000 Times Ver.
Scaled 1.0000 Times Hor.

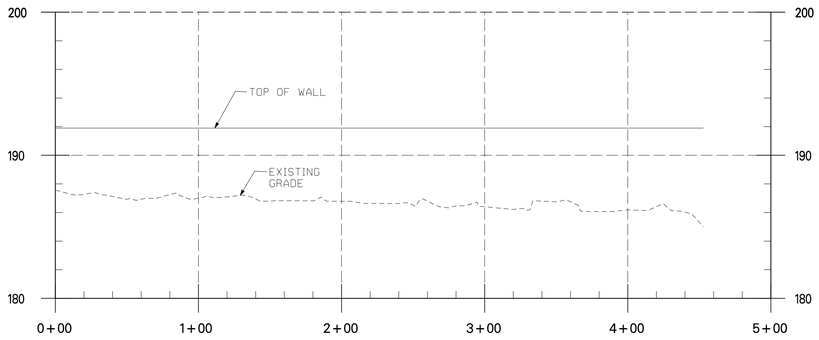
North Ramp Wall Profile
NOT TO SCALE



LINE	SURFACE	OFFSET
	Mission Rock Pad 191.3	
	Mission Rock Topo 082615	

Scaled 10.0000 Times Ver.
Scaled 1.0000 Times Hor.

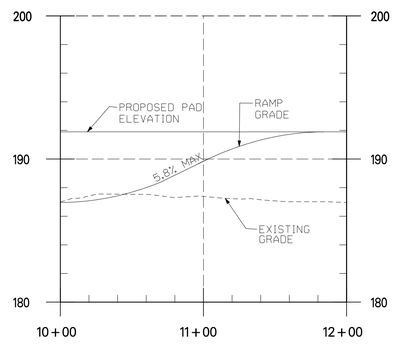
South Ramp Wall Profile
NOT TO SCALE



LINE	SURFACE	OFFSET
	Mission Rock Pad 191.3	
	Mission Rock Topo 082615	

Scaled 10.0000 Times Ver.
Scaled 1.0000 Times Hor.

North-West Boundary Wall Profile
NOT TO SCALE



LINE	SURFACE	OFFSET
	Mission Rock Pad 191.3	
	Mission Rock Topo 082615	

Scaled 10.0000 Times Ver.
Scaled 1.0000 Times Hor.

Emergency Access Wall Profile
NOT TO SCALE

WorleyParsons
resources & energy

CLIENT/PROJECT TITLE

CALPINE MISSION ROCK

GRADING PLAN EXHIBIT
RAMP PROFILES

SCALE 1"=50'
DRAWING SIZE 24x36
WORLEYPARSONS DWG. NO.
REV

$$DESIGN-FILE-NAME$$
$$$$DATE$$$$ $$$$TIME$$$$

5.12 Traffic and Transportation (87-97)

Pinkerton, Mission Rock, and Shell Roads

87. Please provide current traffic volumes, volume to capacity (V/C) ratios, and LOS data (without and with the proposed project) for Pinkerton, Mission Rock, and Shell roads.

Response: Traffic volume and LOS data is not available from the County for Pinkerton, Mission Rock, and Shell roads. However, the AFC has analyzed traffic effects on Briggs Road south of Telegraph on SR-126 eastbound and westbound near Briggs Road, and the intersections of Briggs Road and SR-126. Briggs Road, south of Telegraph Road, is currently operating at LOS A. This road is a suitable proxy for Pinkerton, Mission Rock, and Shell Roads. These are rural roadways with access to only a few businesses. Traffic volumes on these roads are estimated to be fairly low given the rural nature of the area. Please note that the route to the project site is on Briggs Road to Pinkerton Road, and then to Mission Rock Road or Shell Road.

Carpooling

88. Please provide further explanation for the conclusion that 16 percent of the workforce would carpool.

Response: The carpooling rate of 16 percent is a conservative estimate, based on previous construction projects of this type.

Haul Truck Delivery Time Frame

89. Please identify the timeframe for the 308 delivery/haul truck deliveries (beginning and end dates).

Response: The import fill hauling will be performed over a 5-month period, from December 2018 through April 2019. The truck trips will average 62 trips per day, with a peak of 100 trips per day. Fill hauling will occur 10 hours per day and 22 days per month of the 5-month period.

Borrow Site

90. Please verify the borrow site located at 3500 Grimes Canyon Road would be used for Mission Rock.

Response: The borrow site at 3500 Grimes Canyon Road would be used for this purpose. They have verified their ability to supply the needed quantity of fill (120,000 cubic yards).

Imported Fill Delivery Route

91. Please provide the full imported fill soil delivery route from source to site, including respective roadway segment/ intersection LOS analysis for any roadway segment or intersection not previously addressed in the AFC

Response: During the first five months of construction, trucks will be importing fill from the borrow site in Fillmore, located on SR 23 (Grimes Canyon Road), approximately 18 miles northeast of the site. To access the quarry, trucks will travel on SR 126 and SR 23, which are both designated trucks routes within the City of Fillmore.

Trucks will leave quarry and travel northeast on SR 23 (Grimes Canyon Road), turn left (westbound) onto SR 126 and exit SR 126 at Briggs Road. Truck will turn left onto Briggs Road (southbound); turn right onto Pinkerton Road (westbound), turn left (southbound) onto Mission Rock Road and then right (westbound) onto Shell Road. Trucks will use the project driveway on Shell Road. The truck route is illustrated on Figure DR91-1.

The applicant is in the process of preparing an updated construction traffic analysis to account for the revised import fill truck trip schedule and updated linear construction workforce estimates; this revised analysis will be provided in a subsequent Data Response filing.

Haul Truck Trips

92. Would the aforementioned 308 daily delivery/haul truck trips include trips attributed to fill deliveries?

Response: As noted above, the Applicant will provide an updated construction traffic analysis clarifying and updating the truck trips.

Daily Delivery/Haul Truck Trips

93. How many daily (please also include total) delivery/haul truck trips would be required to raise the base flood elevation of the project site 10-feet and out of the 100-year flood plain?

Response: Approximately 120,000 cubic yards of import fill will be required to elevate the site. Using 18 cubic yard capacity trucks, approximately 6,667 truck trips will be required. The import fill hauling will be performed over a 5-month period, from December 2018 through April 2019. The truck trips will average 62 trips per day, with a peak of 100 trips per day. Fill hauling will occur 10 hours per day and 22 days per month of the 5-month period.

Cubic Yards of Fill

94. Approximately how many cubic yards of fill soil would be required to raise the base flood elevation of the project site 10-feet and out of the 100-year flood plain?

Response: To raise the site to the 191.9 finish grade elevation, approximately 120,000 cubic yards of soil will be imported, placed and compacted.

Truck Capacity

95. Please identify the haul capacity of the trucks that would be used to transport fill soil to the project site.

Response: To reduce the total truck trips required, eighteen cubic-yard capacity trucks will be used to transport fill to the project site.

Rail Transport

96. Please identify any large components or required materials for the project that would be transported via rail to the project site.

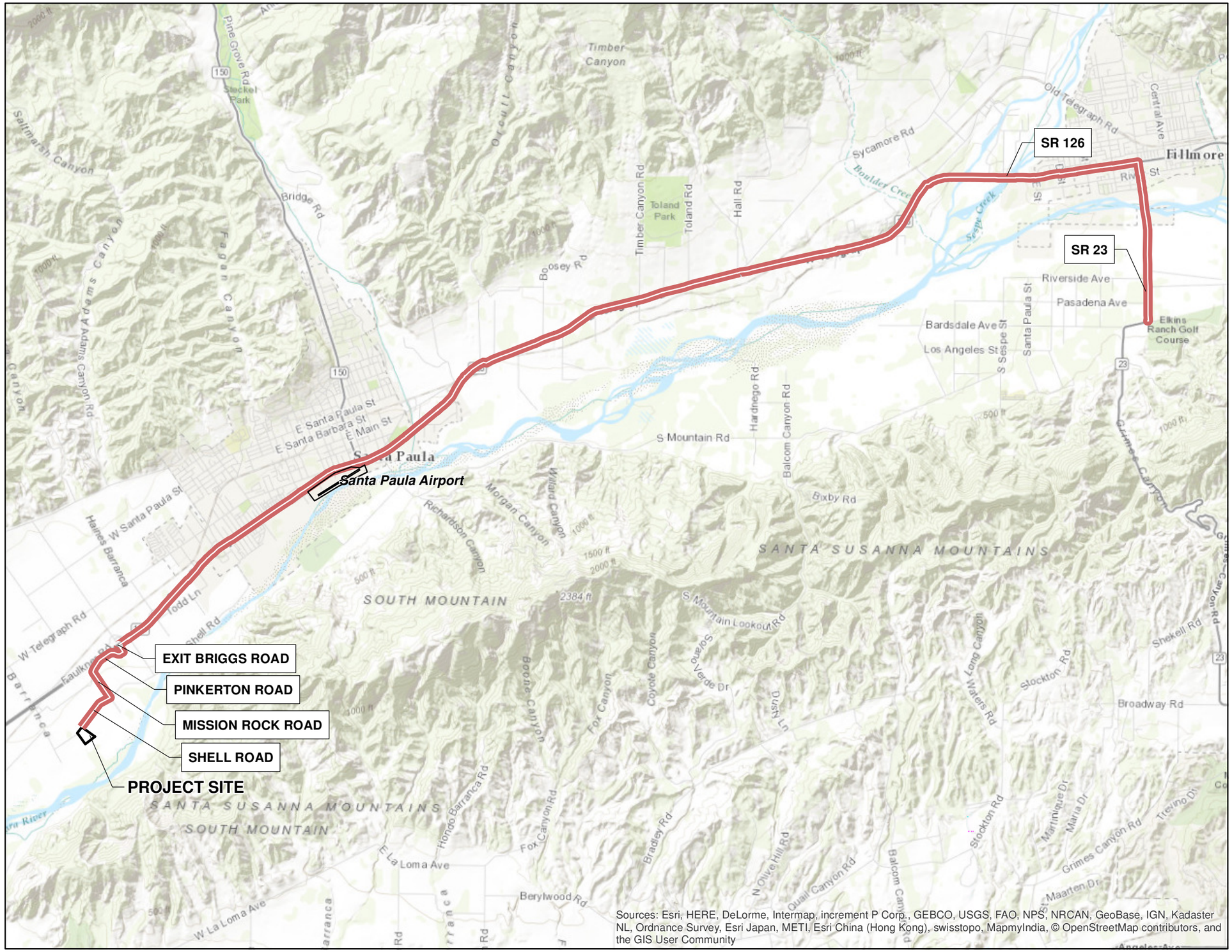
Response: No large components or materials will be transported via rail to the project site.

Peak Trips for Water Line and Gen-tie Line

97. Please identify the number of peak construction workforce trips related to the construction of the recycled water pipeline and the generator tie-line linear facilities.

Response: The applicant is in the process of preparing an updated construction traffic analysis to account for the revised import fill truck trip schedule and updated linear construction workforce estimates; this revised analysis will be provided in a subsequent Data Response filing.

Attachment DR91-1
Import Fill Delivery Route



VICINITY MAP

LEGEND

- Project Site
- Import Fill Delivery Route

N

0 1 2

Miles

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Figure DR91-1
Import Fill Delivery Route
Mission Rock Energy Center
Ventura County, California

ch2m

11 3.0 Transmission System Engineering (98-105)

Change in Design

98. Provide a detailed description of the change in design, construction, and operation of any electric transmission facilities, such as generators, transformers, interconnection power lines, substations, switchyards, or other transmission equipment, which will be constructed or modified to transmit electrical power from Mission Rock to the SCE Santa Clara Substation.

Response: Required upgrades or changes to SCE's existing transmission infrastructure as a result of the MREC interconnection will be determined by California Independent System Operator (CAISO) during the Phase 1 and Phase 2 interconnection studies.

Updated One-Line

99. Staff received an updated electrical one line diagram (DWG.NO. MR-GEN-DE-E1-0002) via e-mail on May 4, 2016 and understood that the one line diagram would be updated. Provide an updated of the above one line diagram. Show all equipment ratings on the diagram including generators output (both in MVA and MW), transformers, isolated phase bus duct, circuit breakers, disconnect switches, and etc. which are required for the project. Clarify the generator MW output if it is different from the Application for Certification.

Response: Attachment DR99-1 is the updated electrical one-line.

Switchyard One-Line

100. Provide the Mission Rock switchyard one-line diagram. Show all equipment ratings including bay arrangement of the breakers, disconnect switches, buses, and etc.

Response: The switchyard one-line diagram is included in Attachment DR99-1.

Santa Clara Substation One-Line

101. Provide a one-line diagram of the existing Santa Clara Substation before the interconnection of Mission Rock.

Response: Applicant objected to this data request on August 1, 2016.

Post-project One-Line

102. Provide a one-line diagram of the Santa Clara Substation after the addition of Mission Rock. Show all equipment ratings including bay arrangement of the breakers, disconnect switches, buses, and etc. which are required for the addition of Mission Rock.

Response: Applicant objected to this data request on August 1, 2016.

Conductor

103. Clarify the generator tie-line conductor type, current carrying capacity, and conductor size.

Response: The conductor used will be non-bundled 795 ACSR "Drake", a very common type. This conductor will allow for a maximum steady-state ampacity of 1060 amps, which is equivalent to 422 MW at 230 kV.

Auxiliary Load

104. Clarify the auxiliary load.

Response: The auxiliary load will include the following project components:

- Gas Turbine Auxiliaries
    - Generator/gearbox enclosure ventilation fan
    - Turbine enclosure ventilation fan breaker
    - Generator/gearbox lube oil AC pump
    - Generator/gearbox lube oil air/oil separator fan
    - Turbine air/oil separator heat exchanger fan
    - Lighting and distribution panel
    - Turbine NOx water injection pump breaker
    - Sprint water supply pump
    - Turbine/mineral lube oil cooler fan
    - Auxiliary skid enclosure ventilation fan
- Balance of Plant Auxiliaries
    - HTIC fin-fan power
    - Gas Compressors
    - SCR/air temp
    - Chiller
    - Service water pump
    - Water treatment
    - HVAC
    - UPS
    - Battery
    - Motor valves

Interconnection Study

105. Provide a completed California ISO Phase I and/or Phase II Interconnection Study. The Study should analyze the system impacts with and without the project during peak and off-peak system conditions, and demonstrate conformance or non-conformance with the utility reliability and planning criteria with the following provisions:

a. Identify major assumptions in the base cases including imports to the system, major generation and load changes in the system and queue generation.

b. Analyze the system for N-0, important N-1 and critical N-2 contingency conditions and provide a list of criteria violations in a table showing the loadings before and after adding the new generation.

c. Analyze Short circuit duties.

d. Analyze system for Transient Stability and Post-transient voltage conditions under critical N-1 and N-2 contingencies, and provide related plots, switching data and a list for voltage violations in the studies.

e. Provide a list of contingencies evaluated for each study.

f. List mitigation measures considered and those selected for all criteria violations.

g. Provide power flow diagrams (MW, % loading & P. U. voltage) for base cases with and without the project. Power flow diagrams must also be provided for all N-0, N-1 and N-2 studies where overloads or voltage violations appear. Provide the pre and post project diagrams only for an element's largest overload.

Response: Applicant objected to this data request on August 1, 2016.

Attachment DR99-1
One-Line Diagram

NOTES
1. EO: ELECTRICALLY OPERATED
2. MO: MANUALLY OPERATED
3. NO: NORMALLY OPEN
4. NC: NORMALLY CLOSED

230KV
230KV
TO SANTA CLARA SUBSTATION
(3)
TO SYNC CIRCUIT FOR UNIT 5 & SWITCHYARD PR

230KV BREAKER 1
230KV BREAKER 2
230KV BREAKER 3
230KV BREAKER 4
METERING STATION
METERING STATION
METERING STATION
METERING STATION

GSU XFMR 1
230,000 GrdY/132,790V - 13,000V - 13,800V
H= 91.2/121.6/152MVA @65°C
X= 45.6/60.8/76MVA, Y= 45.6/60.8/76MVA
ONAN/ONAF/ONAF
YNd1d1

GSU XFMR 2
230,000 GrdY/132,790V - 13,000V - 13,800V
H= 91.2/121.6/152MVA @65°C
X= 45.6/60.8/76MVA, Y= 45.6/60.8/76MVA
ONAN/ONAF/ONAF
YNd1d1

GSU XFMR 3
230,000 GrdY/132,790V - 13,000V - 13,800V
H= 91.2/121.6/152MVA @65°C
X= 45.6/60.8/76MVA, Y= 45.6/60.8/76MVA
ONAN/ONAF/ONAF
YNd1d1

BATTERY XFMR
230,000 GrdY/132,790V - 13,800V/7,957V
20/26.7/33.3MVA @ 65°C
Z=8%
ONAN
YNyn0

FOR CONTINUATION SEE DWG. MR-GEN-DE-E1-0002 SH 2

NON-SEGREGATED BUS DUCT
GENERATOR CIRCUIT BREAKER 1 3000A 50KAIC
GENERATOR CIRCUIT BREAKER 2 3000A 50KAIC
GENERATOR CIRCUIT BREAKER 3 3000A 50KAIC
GENERATOR CIRCUIT BREAKER 4 3000A 50KAIC
REMOVABLE LINK
AUX XFMR 1 13,800V - 4160V 15/20/25MVA @ 65°C ONAN/ONAF/ONAF Dy1
AUX XFMR 2 13,800V - 4160V 15/20/25MVA @ 65°C ONAN/ONAF/ONAF Dy1
GAS TURBINE GENERATOR 1 76MVA 13.8KV, 0.85PF, 3PH, 60HZ X"D=14.4%
GAS TURBINE GENERATOR 2 76MVA 13.8KV, 0.85PF, 3PH, 60HZ X"D=14.4%
GAS TURBINE GENERATOR 3 76MVA 13.8KV, 0.85PF, 3PH, 60HZ X"D=14.4%
GAS TURBINE GENERATOR 4 76MVA 13.8KV, 0.85PF, 3PH, 60HZ X"D=14.4%
GAS TURBINE GENERATOR 5 76MVA 13.8KV, 0.85PF, 3PH, 60HZ X"D=14.4%

MAIN BREAKER 1 3000A
4.16KV AUX SWGR TIE BREAKER 3000A (NO)
MAIN BREAKER 2 3000A

4.16KV FUEL GAS COMPRESSOR MCC 1 1200A, 50KAIC, 3PH, 3W, 60Hz
TRANSITION SECTION
4.16KV AUX SWGR 1 3000A, 50KAIC, 3PH, 3W, 60Hz
4.16KV AUX SWGR 2 3000A, 50KAIC, 3PH, 3W, 60Hz
TRANSITION SECTION
4.16KV FUEL GAS COMPRESSOR MCC 2 1200A, 50KAIC, 3PH, 3W, 60Hz

STATION SERVICE XFMR 1 FEEDER BREAKER 1200A
STATION SERVICE XFMR 2 FEEDER BREAKER 1200A
STATION SERVICE XFMR 3 FEEDER BREAKER 1200A
CHILLER FEEDER BREAKER 1200A
STATION SERVICE XFMR 4 FEEDER BREAKER 1200A

STATION SERVICE XFMR 1 4160V - 480/277V 2500/3500KVA @ 55°C/@ 65°C KNAN/KNAF Dy1
STATION SERVICE XFMR 2 4160V - 480/277V 2500/3500KVA @ 55°C/@ 65°C KNAN/KNAF Dy1
STATION SERVICE XFMR 3 4160V - 480/277V 2500/3500KVA @ 55°C/@ 65°C KNAN/KNAF Dy1
CHILLER
STATION SERVICE XFMR 4 4160V - 480/277V 2500/3500KVA @ 55°C/@ 65°C KNAN/KNAF Dy1

2800 HP FUEL GAS COMPRESSOR 1
2800 HP FUEL GAS COMPRESSOR 2
2800 HP FUEL GAS COMPRESSOR 3

480V STATION SERVICE SWGR 1 4000A, 65KAIC, 3PH, 3W, 60Hz
480V STATION SERVICE SWGR 2 4000A, 65KAIC, 3PH, 3W, 60Hz
480V STATION SERVICE SWGR 3 4000A, 65KAIC, 3PH, 3W, 60Hz
480V STATION SERVICE SWGR 4 4000A, 65KAIC, 3PH, 3W, 60Hz

EO 4000AF
EO 1200AF EO 1200AF EO 1200AF EO 3200AF
EO 1200AF EO 1200AF EO
EO 3200AF
EO 1200AF EO 1200AF EO 1200AF
EO 1200AF EO 1200AF EO 1600AF

480V GTG 1 MCC A
480V GTG 2 MCC A
480V GTG 3 MCC A
480V GTG 4 MCC A
480V GTG 5 MCC A
480V GTG 1 MCC B
480V GTG 2 MCC B
480V GTG 3 MCC B
480V GTG 4 MCC B
480V GTG 5 MCC B
CHILLER (480V AUX LOAD)

REV	DATE	DESCRIPTION	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/ TECH SPEC	LEAD ELEC ENGINEER	PROJECT MANAGER	PROJECT MANAGER
D	04/22/16	ISSUED FOR REVIEW	JP	PS	AB	DW			KS
C	03/09/16	ISSUED FOR REVIEW	JP	DW	OV	DW			KS
B	07/01/14	ISSUED FOR REVIEW	AG						KS
A	04/29/14	ISSUED FOR REVIEW	AG						KS

PRELIMINARY STATUS — DATE — REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.
LDE D. WEBER 04/29/14
APPROVED STATUS — DATE — REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.
LDE

ORIGINATING PERSONNEL	PROFESSIONAL ENGINEER
DRAWN BY: A. GUERRERO	ORIGINALLY PREPARED UNDER THE RESPONSIBLE SUPERVISION OF
CHECKED BY:	PE: STATE:
LEAD DESIGNER:	LIC. NO.: DATE:
ENGINEER/TECH SPECIALIST:	
PROJECT ENGINEERING MANAGER:	
PROJECT MANAGER: K. STUCKI	

Zero Harm — Leadership No Incidents Safe Behavior

WorleyParsons
resources & energy
2675 Morgantown Road
Reading, Pennsylvania 19607
COA No. 24GA27911900

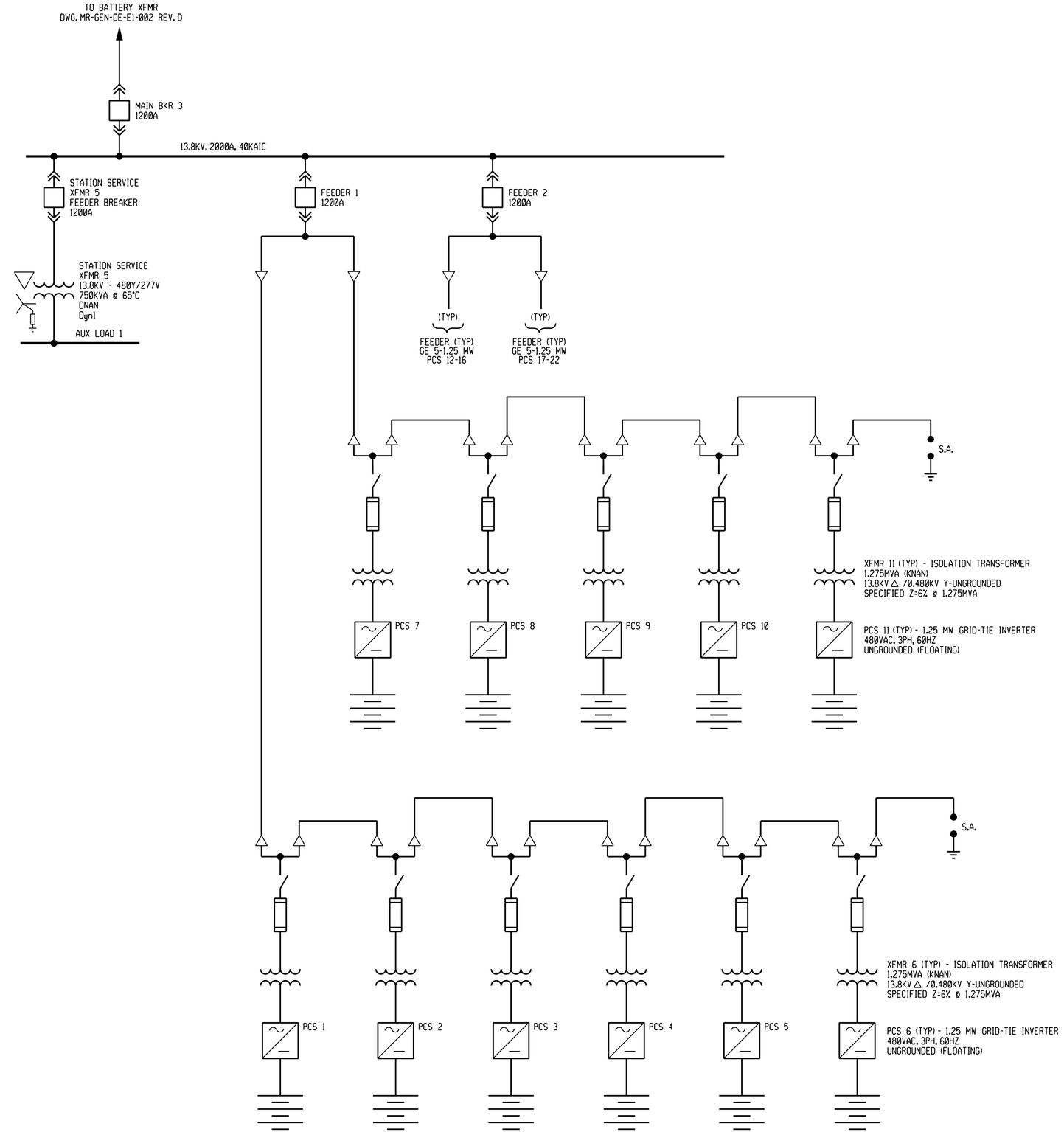
CALPINE

MISSION ROCK ENERGY CENTER PROJECT

ELECTRICAL - ONE LINE
GE LM6000 - 5 UNITS
KEY ONE LINE DIAGRAM
SHEET 1

SCALE: NONE
DRAWING SIZE: ARCH D (36" x 24")
WORLEYPARSONS DWG. NO.: MR-GEN-DE-E1-0002
REV: D

$$DESIGN-FILE-NAME$$
$$$$DATE$$$$ $$$$TIME$$$$



REV	DATE	DESCRIPTION	DRAWN	CHECKED	LEAD ENGINEER	ENGINEER/ TECH SPEC	LEAD ELECTRICAL ENGINEER	PROJECT ENGINEER	PROJECT MANAGER
B	05/20/16	ISSUED FOR REVIEW	CM	PS	AB	DW			KS
A	04/22/16	ISSUED FOR REVIEW	JP	PS	AB	DW			KS

PRELIMINARY STATUS — DATE — REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.
LDE D. WEBER 04/21/16

APPROVED STATUS — DATE — REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.
LDE

ORIGINATING PERSONNEL	PROFESSIONAL ENGINEER
DRAWN BY: J. PORTIN	
CHECKED BY: P. SARNSEN	
LEAD DESIGNER: A. BOLSTAD	
ENGINEER/TECH SPECIALIST: D. WEBER	
PROJECT ENGINEERING MANAGER:	
PROJECT MANAGER: K. STUCKI	

Zero Harm — Leadership No Incidents Safe Behavior

ORIGINALLY PREPARED UNDER THE RESPONSIBLE SUPERVISION OF
PE: _____ STATE: _____
LIC. NO.: _____ DATE: _____

WorleyParsons
resources & energy
2675 Morgantown Road
Reading, Pennsylvania 19607
COA No. 24GA27911900

CALPINE

MISSION ROCK ENERGY CENTER PROJECT

ELECTRICAL - ONE LINE
GE LM6000 - 5 UNITS
KEY ONE LINE DIAGRAM
SHEET 2

SCALE: NONE
DRAWING SIZE: ARCH D (36" x 24")
WORLEYPARSONS DWG. NO.: MR-GEN-DE-E1-0002 SH 2
REV: B

...\MR-GEN-DE-E1-0002 SHEET 2.dgn
5/19/2016 7:34:56 AM

12 5.14 Waste Management (106-107)

Waste Volumes

106. Please provide an estimate on the volume of demolition, construction and operations nonhazardous and hazardous waste, separately, in cubic yards.

Response:

Demolition: It is estimated that 5.75 cubic yards of nonhazardous demolition waste will be generated by the project, including 1 cubic yard of concrete and 4.75 cubic yards of scrap metal. These materials will most likely be recycled at a construction and demolition facility, but it is possible they could be landfilled, if recycling is not an option for some unforeseen reason. No hazardous waste will be generated by demolition.

Construction: Approximately 771.4 cubic yards of nonhazardous waste will be generated by construction activities on the project. This includes packaging materials, including plastic, wood, glass, paper and metal, as well as excess concrete, wood, plastic and metal materials used for construction. Applicant currently intends that all of this material that is recyclable will be appropriately handled by a construction and demolition facility, but those materials that cannot be recycled or returned to the manufacturer may be disposed of by landfill.

With respect to hazardous waste that will be generated by construction, only 11.5 cubic yards are expected to be landfilled. Of that amount, 9.2 cubic yards of spent welding material will be disposed of at a Class I landfill and 2.3 cubic yards of oily rags and sorbent from oil changes for construction equipment and spill cleanup will be recycled, and will only disposed of by landfill if the option to recycle them becomes unavailable. The remaining hazardous wastes, including used oil and filters, used lead acid and alkaline batteries, paints, adhesives, and solvents are expected to be recycled or returned to the manufacturer.

Operation: Nonhazardous waste from operations will consist of approximately 39 tons per year or 180 cubic yards, and will include mainly general refuse/office waste that will be taken to a local transfer station for recycling and/or disposal. In addition, the nonhazardous waste includes resins and metals from up to 173 deionization trailer units per year that will be returned to the manufacturer for recycling.

In addition, the facility will have the potential to generate approximately 683 cubic yards of hazardous waste, but, of that amount, 678 cubic yards are associated with changing out the SCR catalyst units, which only occurs once every 15 years. In a normal year, only 5 cubic yards of hazardous waste will be generated that could potentially be disposed of by landfill, although most of that waste will be recycled. In addition, about 50 gallons per year of oily waste water from an oil-separator will be disposed of offsite via a privately owned industrial waste water processor.

Operation Waste

107. Please update Table 5.14-2 on page 5.14-4 of the AFC to reflect the origin and estimated quantities not in the table or provide updated numbers estimating the amount of waste associated with operation that the project would generate.

Response: The AFC over-estimated the tons of waste to be generated annually by operation of the facility. Approximately 39 tons of nonhazardous solid waste or about 180 cubic yards, plus 5 cubic yards of hazardous waste, will be generated per year during operation of the plant. In peak years when the

SCR catalyst units are replaced, approximately 683 cubic yards of hazardous waste will be generated, but the catalyst will most likely be returned to the manufacturer for regeneration.

135.5 Hazardous Materials Management (108-112)

Cleaning Detergents

108. Please list the various chemicals that comprise the "Cleaning chemicals/detergents, 3000 gallons" that would be used for the periodic cleaning of combustion turbines. Include chemical name, CAS number, physical state, amount, type of storage (drum or tote), and exact location on site where it will be stored.

Response: The turbine cleaning detergents are P/N 4074 PowerBack, ZOK MX, and Conntect 6000. The Material Safety Data Sheets for these products are included as Attachment DR108-1. These materials area stored in the Garage/Warehouse (General Arrangement #31). Specifications are as follows:

Name	CAS Number	Physical State	Amount	Type of Storage	Location
ECT P/N 4074 PowerBack	Not assigned	liquid	<600 pounds	Drum	Garage/warehouse
ZOK MX	102-71-6	liquid	<600 pounds	Drum	Garage/warehouse
Conntect 6000	liquid	liquid	<600 pounds	Drum	Garage/warehouse

Off-site Consequences Analysis

109. Please conduct the OCA described in Appendix 5.5A and provide the input variables, the model used, and the results to staff. Please note that staff has difficulty understanding the rationale for using the SLAB air dispersion model (and the use of a separate model to generate the source term) and much prefers the use of the ALOHA air dispersion model (which generates its own source term).

Response: The applicant is finalizing the OCA and will provide it shortly.

Lithium-Ion Battery Units

110. Please provide a revised AFC section 5.5.3.5 Fire and Explosion Risks and include a discussion of the potential for fire, explosion, and leaks involving the twenty Lithium-ion battery units proposed to be placed on the site. Please also revise Tables 5.5-1, 5.5-2, and 5.5-3 and section 5.5.5.2 (Operation Phase Mitigation Measures) to include the Lithium-ion battery units.

Response: Additional text has been provided regarding lithium-ion batteries in sections 5.5.3.5 Fire and Explosion Risks and 5.5.5.2 Operation Phase Mitigation Measures are included as Attachment DR110-1. Additions to Tables 5.5-1, 5.5-2, and 5.5-3 are also included in the attachment.

Ammonia Detectors

111. Please provide a description of all on-site ammonia leak detectors and their proposed locations.

Response: The onsite ammonia leak detectors may consist of fixed ammonia gas sensors to monitor the levels of ammonia gas around areas and equipment that could be potential leak sources. Potential leak sources would be rotating equipment, such as the ammonia forwarding pumps, flanges, and may be installed in the vicinity of the ammonia storage tank, the ammonia forwarding pumps, and the ammonia flow control units at each of the turbines. The ammonia detection system will provide visible and audible warning locally and in the control room. The specific locations of ammonia detectors will be determined during detailed design post-certification.

Hazardous Materials Security

112. Please describe in greater detail how the aqueous ammonia storage tank, any other hazardous materials tanks, totes, and drums, and the Lithium-ion battery units will be protected and secured from flood waters of the Santa Clara River so that no hazardous material or battery will be swept away downriver or moved from its location on-site during a flood or massive rain event.

Response: As described earlier, the MREC site will meet federal, state, and local requirements to be above the base flood elevation (100-year flood). The battery arrays will be placed in standard containers as supplied by the manufacturer, and these will provide protection from flooding. Similarly, hazardous materials will be maintained in suitable containers and stored in areas with containment and protection from flooding.

Attachment DR108-1
Material Safety Data Sheets

SAFETY DATA SHEET

POWERBACK CONCENTRATE WITH ANTI-FOAM AGENT

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS, Australian WorkSafe, Japanese Industrial Standard JIS Z 7250:2000, and European Union REACH Regulations

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	**POWERBACK CONCENTRATE WITH ANTI-FOAM AGENT**
PRODUCT NUMBER:	P/N 4074
U.N. NUMBER:	Not Applicable
U.N. DANGEROUS GOODS CLASS:	Non-Regulated Material
SUPPLIER/MANUFACTURER'S NAME:	ECT Incorporated
ADDRESS:	401 E. Fourth Street, Bldg. 20, Bridgeport, PA 19405 USA
EMERGENCY PHONE:	**Chemtrec** 800-424-9300
BUSINESS PHONE:	610-239-5120
DATE OF PREPARATION:	October 26, 2011
DATE OF LAST REVISION:	April 10, 2016

SECTION 2 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:
PRODUCT DESCRIPTION: This product is a green liquid with a slight sweet odor.
HEALTH HAZARDS: The product contains organic surface active agents which may cause mild skin irritation with prolonged exposure. Inhalation of atomized spray mist may cause irritation to lungs and mucous membrane.
FLAMMABILITY: It is a non-flammable liquid.
ENVIRONMENTAL HAZARDS: The Environmental effects of this product have not been investigated, however it is not expected to have any adverse environmental effects.

US DOT SYMBOLS

Non-Regulated Material

CANADA (WHMIS) SYMBOLS

Complies with WHMIS 2015

GHS HAZARD SYMBOLS

Signal Word: **Warning!**

CLASSIFICATION OF SUBSTANCE OR MIXTURE IN ACCORDANCE WITH 29 CFR 1910.1200 (OSHA HCS) AND THE EUROPEAN UNION DIRECTIVES:

This product does meet the definition of a hazardous substance or preparation as defined by OSHA in 29 CFR 1910.1200 or the European Union Council Directives 67/548/EEC, 1999/45/EC, 1272/2008/EC and subsequent Directives.

GHS Hazard Classification(s):
Skin Irritant Category 3
STOT SE Category 3

Hazard Statement(s):
H316: Causes mild skin irritation
H335: May cause respiratory irritation

Precautionary Statement(s):
P260: Do not breath dust/fume/gas/mist/vapors/spray
P264: Wash hands thoroughly after handling
P280: Wear protective gloves/protective clothing/eye protection/face protection/

HEALTH HAZARDS OR RISKS FROM EXPOSURE:

ACUTE: The product contains organic surface active agents which may cause mild skin irritation with prolonged exposure. Inhalation of atomized spray mist may cause irritation to lungs and mucous membrane.
CHRONIC: None Known
TARGET ORGANS: ACUTE: Respiratory System, Skin CHRONIC: None Known

SECTION 3 - COMPOSITION and INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS:	CAS #	EINECS #	ICSC #	WT %	GHS HAZARD CLASSIFICATION;
Proprietary Blend of surface active agents	Not Assigned	Not Listed	Not Listed	30 - 40%	Skin Irritant Cat. 3, Respiratory Irritant Cat 3
Balance of other ingredients are non-hazardous or less than 1% in concentration (or 0.1% for carcinogens, reproductive toxins, or respiratory sensitizers).					

NOTE: This product has been classified in accordance with the hazard criteria of the OSHA 29CFR1910.1200 and the SDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard *JIS Z 7250: 2000*.

SECTION 4 - FIRST-AID MEASURES

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and SDS to health professional with contaminated individual.

EYE CONTACT: If product enters the eyes, open eyes while under gentle running water for at least 15 minutes. Seek medical attention if irritation persists.

SKIN CONTACT: Wash skin thoroughly after handling. Seek medical attention if irritation develops and persists. Remove contaminated clothing. Launder before re-use.

INHALATION: If breathing becomes difficult, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if breathing dificulty continues.

INGESTION: If product is swallowed, call physician or poison control center for most current information. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice. Take a copy of the label and/or SDS with the victim to the health professional.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing skin, or respiratory problems may be aggravated by prolonged contact or exposure.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and reduce over-exposure.

SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT: >450°F (232°C)

AUTOIGNITION TEMPERATURE: Not Applicable

FLAMMABLE LIMITS (in air by volume, %): Lower (LEL): NA Upper (UEL): NA

FIRE EXTINGUISHING MATERIALS: As appropriate for surrounding fire. Carbon dioxide, foam, dry chemical, halon, or water spray.

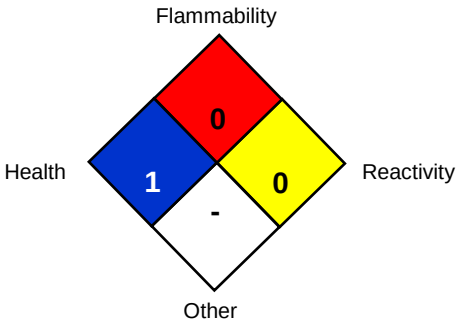
UNUSUAL FIRE AND EXPLOSION HAZARDS: This product has no known explosion hazards.

Explosion Sensitivity to Mechanical Impact: Not Sensitive.

Explosion Sensitivity to Static Discharge: Not Sensitive

SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

NFPA RATING SYSTEM



HMIS RATING SYSTEM

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD (BLUE)	1
FLAMMABILITY HAZARD (RED)	0
PHYSICAL HAZARD (YELLOW)	0

PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	See Sect 8		See Sect 8

For Routine Industrial Use and Handling Applications

Hazard Scale: **0** = Minimal **1** = Slight **2** = Moderate **3** = Serious **4** = Severe * = Chronic hazard

SECTION 6 - ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Personnel should be trained for spill response operations.

SPILLS: Contain spill if safe to do so. Prevent entry into drains, sewers, and other waterways. Cover with absorbent material, pickup and place in an appropriate container for re-use or disposal. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations).

SAFETY DATA SHEET

POWERBACK CONCENTRATE WITH ANTI-FOAM AGENT

SECTION 7 - HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing mists generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: Containers of this product must be properly labeled. Store containers in a cool, dry location. Keep container tightly closed when not in use.

SECTION 8 - EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE LIMITS/GUIDELINES:

Chemical Name	CAS#	ACGIH TWA	OSHA TWA	SWA
Proprietary Blend of surface active agents	Not Assigned	Not Listed	Not Listed	Not Listed

Currently, International exposure limits are not established for the components of this product.

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below. Use local exhaust ventilation to control airborne dust. Ensure eyewash/safety shower stations are available near areas where this product is used.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below guidelines listed above. Please check with competent authority in each country for the most recent limits in place. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states.

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Use chemical resistant gloves to prevent skin contact. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate to prevent contact (e.g. lab coat, overalls). If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards.

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

PHYSICAL STATE:	Liquid
APPEARANCE & ODOR:	Green liquid with a slight sweet odor.
ODOR THRESHOLD (PPM):	Not Available
VAPOR PRESSURE (mmHg):	23.7 (water vapor)
VAPOR DENSITY (AIR=1):	0.7
EVAPORATION RATE (nBuAc = 1):	1 (Water)
BOILING POINT (F°):	Approx. 215°F (101.6°C)
FREEZING POINT (F°):	Not Available
FLASH POINT:	>450°F (232°C)
pH:	Approx. 7.5
SPECIFIC GRAVITY 20°C: (WATER =1)	1.05
SOLUBILITY IN WATER (%)	Soluble
WEIGHT PER GALLON:	Not Available
VISCOSITY:	Not Available

SECTION 10 - STABILITY and REACTIVITY

STABILITY: Product is stable

DECOMPOSITION PRODUCTS: Thermal decomposition this product produces Oxides of carbon.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: None known

POSSIBLITY OF HAZARDOUS REACTIONS: None known

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: None known

SECTION 11 - TOXICOLOGICAL INFORMATION

TOXICITY DATA: Toxicity data is available for mixture:

No LD/LC50 Data Available

SUSPECTED CANCER AGENT: None of the ingredients are found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC and therefore is not considered to be, nor suspected to be a cancer-causing agent by these agencies.

IRRITANCY OF PRODUCT: Contact with this product can be irritating to exposed skin, eyes and respiratory system.

SENSITIZATION OF PRODUCT: This product is not considered a sensitizer.

REPRODUCTIVE TOXICITY INFORMATION: No information concerning the effects of this product and its components on the human reproductive system.

SECTION 12 - ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: No Data available at this time.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No evidence is currently available on this product's effects on plants or animals.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on this product's effects on aquatic life.

SECTION 13 - DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations, those of Canada, Australia, EU Member States and Japan.

SECTION 14 - TRANSPORTATION INFORMATION

US DOT; IATA; IMO; ADR:

THIS PRODUCT IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Non-Regulated Material

HAZARD CLASS NUMBER and DESCRIPTION: Not Applicable

UN IDENTIFICATION NUMBER: Not Applicable

PACKING GROUP: Not Applicable.

DOT LABEL(S) REQUIRED: Not Applicable

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2012): Not Applicable

MARINE POLLUTANT: None of the ingredients are classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B)

U.S. DEPARTMENT OF TRANSPORTATION (DOT) SHIPPING REGULATIONS:

This product is not classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:

This product is not classified as Dangerous Goods, per regulations of Transport Canada.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA):

This product is not classified as Dangerous Goods, by rules of IATA:

INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION:

This product is not classified as Dangerous Goods by the International Maritime Organization.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):

This product is not classified by the United Nations Economic Commission for Europe to be dangerous goods.

SECTION 15 - REGULATORY INFORMATION

UNITED STATES REGULATIONS

SARA REPORTING REQUIREMENTS: This product is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act., as follows: None

TSCA: All components in this product are listed on the US Toxic Substances Control Act (TSCA) inventory of chemicals.

SARA 311/312:

Acute Health: Yes Chronic Health: No Fire: No Reactivity: No

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): None

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): None of the ingredients are on the California Proposition 65 Chemical lists.

CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: All of the components of this product are on the DSL Inventory or exempt from listing.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: No component of this product is on the CEPA First Priorities Substance Lists.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: Complies with WHMIS 2015

EUROPEAN ECONOMIC COMMUNITY INFORMATION:

EU LABELING AND CLASSIFICATION:

Classification of the mixture according to Regulation (EC) No1272/2008. See section 2 for details.

AUSTRALIAN INFORMATION FOR PRODUCT:

AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS: All components of this product are listed on the AICS.

STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS: Not applicable.

JAPANESE INFORMATION FOR PRODUCT:

JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS: The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:

Asia-Pac:	Listed
Australian Inventory of Chemical Substances (AICS):	Listed
Korean Existing Chemicals List (ECL):	Listed
Japanese Existing National Inventory of Chemical Substances (ENCS):	Listed
Philippines Inventory if Chemicals and Chemical Substances (PICCS):	Listed
Swiss Giftliste List of Toxic Substances:	Listed
U.S. TSCA:	Listed

SECTION 16 - OTHER INFORMATION

PREPARED BY: Paul Eigbrett GHS MSDS Compliance PLUS

End of SDS Sheet

Safety Data Sheet
(CONNTECT 6000)

1 – PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:..... CONNTECT 6000
CHEMICAL NAME/
CLASS/SYNONYMS: None
PRODUCT NUMBER: ..... CONNTECT 6000
UN/NA NUMBER: ..... None
CHEMICAL FAMILY: ..... Compounds, Cleaning Liquid
CAS NUMBER: ..... Blend
FORMULA: ..... Proprietary

COMPANY: ..... CONNTECT, Inc.
304 Federal Road , Suite 206 – Brookfield, CT, 06804
Phone (203) 775-8445, Fax (203) 775-9339
www.conntect.com
EMERGENCY PHONE: ..... (800) 255-3924, Outside USA +01-813-248-0585 (CHEMTEL). Contract #: MIS0002833.
DATE PREPARED:..... January 15, 2016

2 – HAZARDS IDENTIFICATION

GHS HAZARD CLASSIFICATION:

Physical Hazards
Flammable Liquids: ..... . No hazard statement
Health Hazards
Acute Toxicity (Oral): ..... . Category 4 - Harmful if swallowed, in contact with skin, inhaled
Skin Corrosion/Irritation:..... . Catagory 2 - Causes skin irritation
Serious Eye Damage/Irritation: Catagory 2A - Causes eye irritation
Aspiration Hazard: ..... . Not classified

WARNING LABEL ITEMS INCLUDING PRECAUTIONARY STATEMENTS:

Pictograms:

SIGNAL WORD: ..... WARNING!

GHS HAZARD AND PRECAUTIONARY STATEMENTS:

H303 H313 H333: May be harmful if swallowed, in contact with skin or if inhaled

P101+102+103: If medical advice is needed, have product container or label at hand. Keep out of the reach of children. Read label before use.
P202+270+280+281: Do not handle until all safety precautions have been read and understood. Do not eat, drink or smoke when using this product.. Wear protective gloves/protective clothing/eye protection/face protection. Use personal protective equipment as required.

TOTAL VOC's: < 10%

3 – COMPOSITION / INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENT	PERCENT	CAS NUMBER
Ethylene Glycol Monobutyl Ether	10 - 20	111-76-2
Ethoxylated Alcohols C_9 - C_{11}	20 - 40	68439-46-3
Deionized Water	60 - 70	7732-18-5

4 – FIRST-AID MEASURES

BREATHING (INHALATION): Remove from exposure area to fresh air immediately. If breathing has stopped, perform artificial resuscitation. Keep person warm and at rest. Treat symptomatically and supportively. Seek medical attention immediately. Qualified medical personnel should consider administering oxygen.

SWALLOWING (INGESTION): Give large amounts of fresh water or milk immediately. Do not give anything by mouth if person is unconscious or otherwise unable to swallow. If vomiting occurs, keep head below hips to prevent aspiration. Treat symptomatically and supportively. Seek medical attention immediately.

EYES: ..... Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.

SKIN (DERMAL): ..... Remove contaminated clothing and wash affected skin with soap and water. If persistent irritation occurs, obtain medical attention. When using high pressure equipment, injection of product under the skin can occur. If high pressure injuries occur, the casualty should be sent immediately to a hospital. Do not wait for symptoms to develop.

NOTE TO PHYSICIAN: ..... All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

5 – FIRE-FIGHTING MEASURES

GENERAL FIRE HAZARDS:.... Water based blend - Non Flammable

AUTOIGNITION TEMP: None - Water based material

EXTINGUISHING MEDIA: Determined by surrounding material. In case of fire, use water fog, dry chemical, CO_2, or "alcohol" foam.

SPECIAL FIRE FIGHTING PROCEDURES: Spilled product on ground may be slippery.

UNUSUAL FIRE AND EXPLOSION HAZARDS: ..... Containers may explode from internal pressure if confined to fire. Cool with water spray.

6 – ACCIDENTAL RELEASE MEASURES

SPILL PROCEDURES: ..... Wear appropriate personal protective equipment before approaching spill site. For small spills, dilute with water to sewer if allowed by local and state

regulations. If unable to wash product with water, absorb with inert material (sand or other approved material) and dispose of in accordance with applicable regulations.

WASTE DISPOSAL: ..... Treatment, storage, transportation and disposal must be in accordance with Federal, State/Provincial and Local Regulations. Regulations may vary in different locations. Characterization and compliance with applicable laws are the responsibility solely of the generator. Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

RCRA STATUS: If discarded in its purchased form, it is not a RCRA hazardous waste. It is the responsibility of the product user to determine at the time of disposal, whether a material containing the product should be classified as a hazardous waste. (40CFR261.20-24).

7 – HANDLING and STORAGE

STORAGE: Keep in a tightly closed container, stored in a cool, dry, ventilated area below 44°C (110°F). Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Drum must not be washed out or used for other purposes.

HANDLING: ..... Avoid contact with eyes, skin and clothing. Do not inhale vapors and fumes. Wash thoroughly after handling. Use only with adequate ventilation. Do not take internally. For industrial use only.

8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS

HAZARDOUS INGREDIENT	PEL	TLV-TWA	NOTES
Ethylene Glycol Monobutyl Ether	25 ppm	50 ppm	
Ethoxylated Alcohols C_9 - C_{11}	None Established	None Established	
Deionized Water	None Established	None Established	

EXPOSURE CONTROLS: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Please refer to

the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

RESPIRATORY PROTECTION: If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Respirator type: Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.

PROTECTIVE CLOTHING: **Eye/face protection:** Wear chemical goggles; face shield (if splashing is possible). **Skin protection:** Chemical resistant, impermeable gloves. Gloves should be tested to determine suitability for prolonged contact. Use of impervious apron and boots are recommended.

ADDITIONAL MEASURES: Handle in accordance with good industrial hygiene and safety practice. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco. Safety shower and eye wash should be available close to work areas.

9 – PHYSICAL / CHEMICAL PROPERITES

BOILING POINT: ..... 212°F
FREEZING POINT: ..... 32°F
FLASHPOINT: ..... Non-flammable material
UPPER FLAME LIMIT (%):..... NA
LOWER FLAME LIMIT (%):... NA
VAPOR PRESSURE: ..... ND
VAPOR DENSITY (AIR=1): ..... > 1
SPECIFIC GRAVITY: ..... 0.98 - 1.01
pH: ..... 7.2 - 7.8
SOLUBILITY IN WATER: ..... Complete
VOLATILITY
INCLUDING WATER: 8.3 pounds per gallon
MOLECULAR WEIGHT: ..... NA
EVAPORATION RATE: ..... Similar to Water
PHYSICAL STATE: ..... Liquid
COLOR: ..... Blue
ODOR: ..... Mild Detergent

10 – STABILITY and REACTIVITY

STABILITY: ..... Stable
HAZARDOUS DECOMP.: ..... Will not occur
INCOMPATIBILITY: ..... Oxidizers or Oxidizing Materials.
HAZARDOUS REACTIONS: None known.

11 – TOXICOLOGICAL INFORMATION

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC. **ACGIH**: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH. **NTP**: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP. **OSHA**: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

THRESHOLD LIMIT VALUE: . None Established for this Product
OSHA PEL: ..... None Established for this Product
LISTED CARCINOGEN: This product IS NOT listed in the National Toxicology Program (NTP) Report on Carcinogens (latest edition) or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest editions) or found to be a potential carcinogen by OSHA.
MEDICAL CONDITION AGGRAVATED: Existing dermatitis.

INFORMATION ON ACUTE TOXICOLOGICAL EFFECTS

ORAL
Product: ..... No Data Available
DERMAL
Product: ..... Skin contact may aggravate existing dermatitis.
INHALATION
Product: ..... No Data Available
REPEATED DOSE TOXICITY
Product: ..... No Data Available
SKIN CORROSION / IRRITATION
Product: ..... Repeated and prolonged exposure to concentrated material may cause dermatitis.
SERIOUS EYE DAMAGE / IRRITATION
Product: ..... May cause mild to severe eye irritation
RESPIRATORY OR SKIN SENSITIZATION
Product: ..... No Data Available

MUTAGENCITY

IN VITRO
Product: ..... No Data Available
IN VIVO
Product: ..... No Data Available

Specified Substance(s)	**Information as provided by manufacturer**
Ethylene Glycol Monobutyl Ether	No Data Available

CARCINOGENICITY
Product: ..... Based on available data the classification criteria are not met. Not classified as hazardous.

REPODUCTIVE TOXICITY

Product: ..... Based on available data the classification criteria are not met. Not classified as hazardous.

SPECIFIC TARGET ORGAN TOXICITY – SINGLE EXPOSURE

Product: ..... Not classified

SPECIFIC TARGET ORGAN TOXICITY – REPEATED EXPOSURE

Product: ..... Not classified

ASPIRATION HAZARD

Product: ..... Droplets of the product aspirated into the lungs through ingestion or vomiting may cause chemical pneumonia.

OTHER ADVERSE EFFECTS

Product: ..... No data available

12 – ECOLOGICAL INFORMATION

ACUTE TOXICITY

FISH

Product: ..... No data available

AQUATIC INVERTEBRATES

Product: ..... No data available

CHRONIC TOXICITY

FISH

Product: ..... No data available

AQUATIC INVERTEBRATES

Product: ..... No data available

TOXICITY TO AQUATIC PLANTS

Product: ..... No data available

PERSISTENCE AND DEGRADABILITY

BIODEGRADATION

Product: ..... Biodegradability under aerobic static laboratory conditions is high (BOD20 or BOD28 / THOD greater than 80%).

BIOLOGICAL OXYGEN DEMAND

Product: .....

CHEMICAL OXYGEN DEMAND

Product: ..... No data available

BOD / COD RATIO

Product: ..... No data available

BIOACCUMULATIVE POTENTIAL

Product: ..... Potential to bioaccumate is low.

MOBILITY IN SOIL

Product: ..... Expected to partition to water.

RESULTS OF PBT AND mPvB ASSESSMENT

Product: ..... Not fulfilling PBT (persistent/bioaccumulative/toxic) criteria. Not fulfilling vPvB (very persistent, very bioaccumulative) criteria.

OTHER ADVERSE EFFECTS

Product: ..... No data available

13 –DISPOSAL CONSIDERATIONS

WASTE DISPOSAL: ..... Treatment, storage, transportation and disposal must be in accordance with Federal, State/Provincial and Local Regulations. Regulations may vary in different locations. Characterization and compliance with applicable laws are the responsibility solely of the generator. Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

RCRA STATUS: If discarded in its purchased form, it is not a RCRA hazardous waste. It is the responsibility of the product user to determine at the time of disposal, whether a material containing the product should be classified as a hazardous waste. (40CFR261.20-24).

14 – TRANSPORTATION INFORMATION

Important Note: Shipping descriptions may vary based on mode of transport, quantities, package size, and/or origin and destination. Consult your company's Hazardous Materials/Dangerous Goods expert for information specific to your situation.

PROPER SHIPPING NAME: Non-Regulated
UN/NA NUMBER: ..... None
HAZARD CLASS: ..... None
LETTER:..... None
PACKAGING GROUP :..... None
ENVIRONMENTAL HAZARD: Because of modern treatment methods or method of use of this product, only an insignificant amount of the ingredients reaches the environment. That amount is at such levels as to typically not cause any adverse effects.
REPORTABLE QUANTITY: .... None

15 - REGULATIONS

This Safety Data Sheet conforms to ANSI Z400.5, and to the format requirements and the International Chemical Safety Cards of the Global Harmonizing System. This SDS complies with 29 CFR 1910.1200 (HAZARD COMMUNICATION STANDARD). **IMPORTANT:** Read this SDS before handling & disposing of this product. Pass this information on to employees, customers, & users of this product.

EPA SRA Title III Chemical Listings:

TSCA STATUS: ..... This product is listed on the TSCA inventory. If this product is a blend, all ingredients in the product are listed on the TSCA Inventory List. Any impurities present in this product are exempt from listing.
SECTION 302: ..... None
SECTION 304: ..... None
SECTION 312: ..... None

ACUTE:..... Yes (Eyes)
CHRONIC:..... No

FIRE: ..... No
PRESSURE: ..... No
REACTIVE: ..... No
SARA SECTION 313: ..... None
CLEAN WATER ACT: ..... None

IMDG – International Marine Dangerous Goods Code
Class Non Regulated - Possible Shipping Description(s): Non Regulated
IATA
Class Non Regulated - Possible Shipping Description(s): Non Regulated

DEA Chemical Trafficking Act: . No

16 – OTHER INFORMATION

HMIS*

HEALTH	1
FLAMMABILITY	0
REACTIVITY	0
PERSONAL PROTECTION	B

***HMIS®HAZARD INDEX: 0=Minimal Hazard, 1=Slight Hazard, 2=Moderate Hazard, 3=Serious Hazard, 4=Severe Hazard.** HMIS® rating involves data interpretations that may vary from company to company. They are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this SDS and product label must be considered.*

ND = No Data, NA = Not Applicable/Not Available, ≤ = Less than or equal to, ≥ = Greater than or equal to

REVISION STATEMENT: Changes have been made throughout this Safety Data Sheet (SDS). Please read the entire document. Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and The Globally Harmonized System of Classification and Labeling of Chemicals (GHS) by the Company Health and Risk Assessment Unit.

DISCLAIMER:
Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, the Company makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving this Safety Data Sheet (SDS) will make their own determination as to its suitability for their intended purposes prior to use. Since the product is within the exclusive control of the user, it is the user's obligation to determine the conditions of safe use of this product. Such conditions should comply with all Federal and State Regulations concerning the Product. It must be recognized that the physical and chemical properties of any product may not be fully understood and that new, possibly hazardous products may arise from reactions between chemicals. The information given in this data sheet is based on our present knowledge and shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship. **NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.**

*****This is the last page of this SDS*****

SAFETY DATA SHEET
ZOK MX

1. Identification

Product identifier

Product name ZOK MX

Recommended use of the chemical and restrictions on use

Application Detergent.

Details of the supplier of the safety data sheet

Supplier

Zokman Products Inc.
1220 E. Gump Road
Fort Wayne
IN 46845
USA
zzokman@aol.com
+1 800 727 6027
+1 800 844 3227
+1 260 637 4038
+1 260 637 5031

Manufacturer

ZOK International Group
Airworthy House
Elsted Marsh
Midhurst
West Sussex
GU29 0JT
+44 (0) 333 700 2727
+44 (0) 333 700 2728
zok@zok.com

Emergency telephone number

Emergency telephone CHEMTREC; 24 Hours. (800) 424-9300

2. Hazard(s) identification

Classification of the substance or mixture

Physical hazards Not Classified

Health hazards Eye Irrit. 2A - H319

Environmental hazards Not Classified

Label elements

Pictogram

Signal word Warning

ZOK MX

Hazard statements H319 Causes serious eye irritation.

Precautionary statements P264 Wash contaminated skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313 If eye irritation persists: Get medical advice/attention.

Contains Isotridecylalcohol, ethoxylated

Other hazards

This product does not contain any substances classified as PBT or vPvB.

3. Composition/information on ingredients

Mixtures

Isotridecylalcohol, ethoxylated **10-30%**

CAS number: 9043-30-5

Classification
Eye Dam. 1 - H318

3-butoxypropan-2-ol **1-5%**

CAS number: 5131-66-8 REACH registration number: 01-2119475527-28-XXXX

Classification
Skin Irrit. 2 - H315
Eye Irrit. 2 - H319

The Full Text for all Hazard Statements are Displayed in Section 16.

4. First-aid measures

Description of first aid measures

Inhalation Move affected person to fresh air at once. Rinse nose and mouth with water. Get medical attention if any discomfort continues.

Ingestion Do not induce vomiting. Rinse mouth thoroughly with water. Get medical attention if any discomfort continues.

Skin Contact Remove affected person from source of contamination. Take off immediately all contaminated clothing and wash it before reuse. Wash skin thoroughly with soap and water. Get medical attention if irritation persists after washing.

Eye contact Remove affected person from source of contamination. Rinse immediately with plenty of water. Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 15 minutes. Get medical attention if irritation persists after washing. Show this Safety Data Sheet to the medical personnel.

Most important symptoms and effects, both acute and delayed

Inhalation Vapors may irritate throat/respiratory system. Symptoms following overexposure to vapor may include the following: Coughing, chest tightness, feeling of chest pressure.

Ingestion May cause stomach pain or vomiting.

Skin contact Prolonged contact may cause redness, irritation and dry skin.

ZOK MX

Eye contact Irritating to eyes. Symptoms following overexposure may include the following: Redness. Pain.

Indication of immediate medical attention and special treatment needed

Specific treatments Treat symptomatically.

5.Fire-fighting measures

Extinguishing media

Suitable extinguishing media The product is not flammable. Use fire-extinguishing media suitable for the surrounding fire. Extinguish with alcohol-resistant foam, carbon dioxide, dry powder or water fog.

Special hazards arising from the substance or mixture

Specific hazards None known.

Hazardous combustion products Carbon monoxide (CO). Carbon dioxide (CO_2).

Advice for firefighters

Protective actions during firefighting No specific firefighting precautions known.

Special protective equipment for firefighters Use air-supplied respirator, gloves and protective goggles.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal precautions Wear protective clothing as described in Section 8 of this safety data sheet.

Environmental precautions

Environmental precautions Avoid discharge to the aquatic environment. Avoid the spillage or runoff entering drains, sewers or watercourses.

Methods and material for containment and cleaning up

Methods for cleaning up Stop leak if safe to do so. Small Spillages: Absorb spillage with non-combustible, absorbent material. Collect and place in suitable waste disposal containers and seal securely. Flush contaminated area with plenty of water. Collect and dispose of spillage as indicated in Section 13. Large Spillages: Contain and absorb spillage with sand, earth or other non-combustible material. Collect and place in suitable waste disposal containers and seal securely. Flush contaminated area with plenty of water. Collect and dispose of spillage as indicated in Section 13.

Reference to other sections For personal protection, see Section 8. For waste disposal, see Section 13.

7. Handling and storage

Precautions for safe handling

Usage precautions Avoid contact with eyes. Avoid spilling.

Conditions for safe storage, including any incompatibilities

Storage precautions Store at temperatures between 4°C and 50°C. Store in tightly-closed, original container. Store in a dry place.

Storage class Chemical storage.

Specific end uses(s)

ZOK MX

Specific end use(s) The identified uses for this product are detailed in Section 1.2.

8. Exposure Controls/personal protection

Triethanolamine (CAS: 102-71-6)

Ingredient comments No exposure limits known for ingredient(s).

Exposure controls

Protective equipment

Appropriate engineering controls Provide adequate ventilation. Observe any occupational exposure limits for the product or ingredients. Avoid inhalation of vapors and spray/mists.

Eye/face protection Wear chemical splash goggles.

Hand protection Wear protective gloves made of the following material: Nitrile rubber.

Other skin and body protection Wear appropriate clothing to prevent any possibility of skin contact.

Hygiene measures Do not smoke in work area. Wash at the end of each work shift and before eating, smoking and using the toilet. Wash promptly with soap and water if skin becomes contaminated. Promptly remove any clothing that becomes contaminated. Use appropriate hand lotion to prevent defatting and cracking of skin. When using do not eat, drink or smoke.

Respiratory protection No specific recommendations. Respiratory protection may be required if excessive airborne contamination occurs.

9. Physical and Chemical Properties

Information on basic physical and chemical properties

Appearance Colorless liquid.

Color Colorless.

Odor Characteristic.

Odor threshold Not available.

pH pH (concentrated solution): 8.2-8.5

Melting point >0°C

Initial boiling point and range 100°C @ 760 mm Hg

Flash point > 100°C PMCC (Pensky-Martens closed cup).

Evaporation rate Not available.

Flammability (solid, gas) Not applicable.

Upper/lower flammability or explosive limits Not known.

Vapour pressure Not applicable.

Vapour density Not applicable.

Relative density 1.01 @ 20°C

ZOK MX

Solubility(ies)	Soluble in water.
Partition coefficient	log Pow: < 3
Auto-ignition temperature	Not applicable.
Decomposition Temperature	Not applicable.
Viscosity	15.66 cSt @ 20°C
Explosive properties	Not considered to be explosive.
Oxidising properties	The mixture itself has not been tested but none of the ingredient substances meet the criteria for classification as oxidizing.
Volatile organic compound	This product contains a maximum VOC content of <50 g/l.

10. Stability and reactivity

Reactivity	There are no known reactivity hazards associated with this product.
Stability	Stable at normal ambient temperatures and when used as recommended.
Possibility of hazardous reactions	No potentially hazardous reactions known.
Conditions to avoid	Avoid excessive heat for prolonged periods of time.
Materials to avoid	Strong oxidizing agents. Strong reducing agents.
Hazardous decomposition products	Heating may generate the following products: Carbon monoxide (CO). Carbon dioxide (CO2).

11. Toxicological information

Information on toxicological effects

Serious eye damage/irritation

Serious eye damage/irritation	Slightly irritating.

Germ cell mutagenicity

Genotoxicity - in vitro	Does not contain any substances known to be mutagenic.
Genotoxicity - in vivo	Does not contain any substances known to be mutagenic.

Carcinogenicity

Carcinogenicity	Does not contain any substances known to be carcinogenic.

Reproductive toxicity

Reproductive toxicity - fertility	Does not contain any substances known to be toxic to reproduction.
Reproductive toxicity - development	Does not contain any substances known to be toxic to reproduction.

Specific target organ toxicity - single exposure

Target organs	No specific target organs known.

Specific target organ toxicity - repeated exposure

Target organs	No specific target organs known.

ZOK MX

Inhalation	May cause sensitisation by inhalation.
Ingestion	May cause stomach pain or vomiting.
Skin Contact	May be slightly irritating to skin.
Eye contact	May cause eye irritation.
Target Organs	No specific target organs known.

Toxicological information on ingredients.

Isotridecylalcohol, ethoxylated

Serious eye damage/irritation

Serious eye damage/irritation	Irritation of eyes is assumed.

Respiratory sensitisation

Respiratory sensitisation	Not known.

Skin sensitisation

Skin sensitisation	Not known.

3-butoxypropan-2-ol

Acute toxicity - oral

Acute toxicity oral (LD_{50} mg/kg)	2,100.0
Species	Rat
ATE oral (mg/kg)	2,100.0

12. Ecological Information

Toxicity

Ecological information on ingredients.

Isotridecylalcohol, ethoxylated

Acute toxicity - fish	LC_{50}, 96 hours: >0.20 mg/l, Marinewater fish
Acute toxicity - microorganisms	LC_{50}, 10 days: 140.3 mg/kg, Activated sludge

Persistance and degradability

Ecological information on ingredients.

Isotridecylalcohol, ethoxylated

Biodegradation	Water - Degradation 60%: > 28 days

Bioaccumulative potential

Partition coefficient	log Pow: < 3

Mobility in soil

Mobility	The product is miscible with water and may spread in water systems.

ZOK MX

Results of PBT and vPvB assessment

Results of PBT and vPvB assessment This product does not contain any substances classified as PBT or vPvB.

Other adverse effects

Other adverse effects None known.

13. Disposal considerations

Waste treatment methods

General information Waste should be treated as controlled waste. Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

Disposal methods Collect and place in suitable waste disposal containers and seal securely. Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

14. Transport information

General The product is not covered by international regulations on the transport of dangerous goods (IMDG, IATA, DoT).

UN Number

Not applicable.

UN proper shipping name

Not applicable.

Transport hazard class(es)

No transport warning sign required.

Packing group

Not applicable.

Environmental hazards

Environmentally Hazardous Substance

No.

Special precautions for user

Not applicable.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

US Federal Regulations

SARA Section 302 Extremely Hazardous Substances Tier II Threshold Planning Quantities
Not listed.

SARA 313 Emission Reporting
Not listed.

CAA Accidental Release Prevention

ZOK MX

Not listed.

US State Regulations

California Proposition 65 Carcinogens and Reproductive Toxins
Not listed.

California Air Toxics "Hot Spots" (A-I)
Not listed.

California Air Toxics "Hot Spots" (A-II)
Not listed.

Rhode Island "Right To Know" List
Not listed.

New Jersey "Right To Know" List
Not listed.

Inventories

EU - EINECS/ELINCS
All the ingredients are listed or exempt.

Canada - DSL/NDSL
All the ingredients are listed or exempt.

US - TSCA
All the ingredients are listed or exempt.

Australia - AICS
All the ingredients are listed or exempt.

Japan - MITI
All the ingredients are listed or exempt.

Korea - KECI
All the ingredients are listed or exempt.

China - IECSC
All the ingredients are listed or exempt.

Philippines - PICCS
All the ingredients are listed or exempt.

New Zealand - NZIOC
All the ingredients are listed or exempt.

16. Other information

General information	Only trained personnel should use this material.
Issued by	Mike Hale Chemist
Revision date	6/12/2015
Revision	2016
Supersedes date	9/23/2013
SDS No.	4526

ZOK MX

SDS status	Approved.
Signature	Mike Hale
Hazard statements in full	H315 Causes skin irritation. H318 Causes serious eye damage. H319 Causes serious eye irritation.
NFPA - flammability hazard	Will not burn. (0)
NFPA - health hazard	Irritation, minor residual injury. (1)
NFPA - instability hazard	Normally stable. (0)
ACA HMIS Health rating.	Slight hazard. (1)
ACA HMIS Physical hazard rating.	Normally stable. (0)
ACA HMIS Personal protection rating.	A
ACA HMIS Flammability rating.	Will not burn. (0)

ECT INCORPORATED

M A T E R I A L S A F E T Y D A T A S H E E T

= =

Product Name: **P/N 4074 POWERBACK CONCENTRATE WITH ANTI-FOAM AGENT**
Manufacturer's Name: **ECT Incorporated**
Address: **Bridgeport Business Park, 401 E. Fourth Street, Bldg. 20, Bridgeport, PA 19405**
Emergency Telephone #: Chemtrec (800) 424-9300; ECT Inc. Telephone # (610) 239-5120
Proper Shipping Name: N/A
Hazard Rating (DOT Class): N/A
MSDS Issue Date: January 1, 2015
Prepared By: Wallace Pippin, Sr. Chemist

= =

SECTION 1 - INGREDIENTS

INGREDIENT	CAS #	WT%	TWA/TLV/PEL	LD_{50} LC_{50}	SEC 313
Proprietary blend of surface active agents	N/A	30-40	unknown	>15,000mg/Kg (rat)	NO

NONHAZARDOUS INGREDIENTS WITHHELD AS A TRADE SECRET.

TOXIC SUBSTANCES CONTROL ACT (TSCA): The ingredient of this product are all on the TSCA Inventory List.

SECTION 313 SUPPLIER NOTIFICATION

HAZARDOUS INGREDIENTS IDENTIFIED IN THE SEC 313 COLUMN OF SECTION 1 ARE TOXIC CHEMICALS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF THE EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT OF 1986 AND OF 40CFR372. THIS INFORMATION MUST BE INCLUDED IN ALL MSDS'S THAT ARE COPIED AND DISTRIBUTED FOR THIS MATERIAL.

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SECTION 2 - PHYSICAL DATA

Vapor Pressure (MM Hg): 23.7 (water vapor)
Vapor Density (Air=1): 0.7
Evaporation Rate (H_20=1): 1(water)
Appearance/Odor: green liquid, slight sweet odor
Solubility In Water: soluble
Specific Gravity: approx. 1.05
% Volatile: MIXED: 100
VOC Content: 0.0 lbs./gal. less water and exempt solvent
ph: approx 7.5
Boiling Point: approx.215°F

==

SECTION 3 - FIRE/EXPLOSION HAZARD INFORMATION

Flash Point: approx. >450°F (232°C)
Flammable Limits: unk LEL: unk UEL: unk
Autoignition Temp: N/A
Extinguishing Media: Carbon dioxide, sand, dry chemical

Special Fire Fighting Procedures: Wear appropriate protective clothing including self contained breathing apparatus.

Unusual Fire and Explosion Hazards: N/A

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SECTION 4 - REACTIVITY DATA

Stability: Stable
Incompatibility (Materials to Avoid): N/A
Hazardous Decomposition Products: None known
Hazardous Polymerization (Conditions to Avoid): Will not occur

==========

SECTION 5 - HEALTH HAZARD INFORMATION

TLV/PEL: Unknown, threshold value would be based on surface active agent ingredient.
Principal Routes Of Absorption: 1. Inhalation of spray mist
2. Skin contact with product

Effects Of Overexposure: The product contains organic surface active agents which may cause mild skin irritation with prolonged exposure. Inhalation of atomized spray mist may cause irritation to lungs and mucous membrane.

Emergency and First Aid Procedures:

1. Skin...
   Rinse affected area with excess water, always wash contaminated clothing before reuse.
2. Eyes...
   Irrigate with running water for at least 15 minutes. For severe contact obtain medical attention.
3. Ingestion...
   Give milk or milk of magnesia. Do not induce vomiting.
4. Inhalation...
   (atomized mist) remove to fresh air; obtain medical attention for severe exposure.

Toxicological Properties: This product contains **no** ingredients considered carcinogenic by OSHA, ACGIH, IARC, NTP

==========

SECTION 6 - ENVIRONMENTAL INFORMATION

Steps To Be Taken If Material Is Released or Spilled: Absorb onto inert material. Rinse spill area with water.
Waste Disposal Method: The product is considered nonhazardous; always dispose according to all applicable local, state, and federal regulations.

==========

SECTION 7 - SPECIAL PROTECTION INFORMATION

Respiratory Protection: If there is potential for inhalation of spray mist wear NIOSH approved respirator.
Ventilation: Always apply in well ventilated area.
Protective Equipment/Clothing: Wear rubber gloves and appropriate eyewear..
Other: Avoid unnecessary skin contact.

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SECTION 8 - STORAGE AND HANDLING

Shelf Life: N/A
Storage temp.: N/A
Storage Equipment: Store in original containers.

==========

SECTION 9 - MISCELLANEOUS INFORMATION

HMIS RATINGS:	Health	Flammability	Reactivity
	1	1	0

0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

"PROPOSITION 65: This product contains no chemicals known to the State of California to cause cancer or reproductive toxicity."
This information is furnished without warranty, expressed or implied; except that it is accurate to the best knowledge of ECT Inc. The above data relates only to the product listed.

==========

SECTION 10 - WHMIS HAZARD DESIGNATION (CANADA)

None

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):
All ingredients of this product are on the domestic substance list (DSL) and acceptable for use under the provisions of CEPA.

==========

Attachment DR110-1
Additions to AFC Section 5.5

145.16 Worker Safety and Fire Protection (113-114)

Hazard Analysis

113. *Please provide a Hazard Analysis of the potential for fire, explosion, and leaks involving any or all of the twenty Lithium-ion battery units. Please include a brief history of known fires, explosions, and leaks involving these specific Lithium-ion batteries and those that are very similar. Please provide the manufacturer's product sheet and MSDS for the batteries.*

Response: Statistically, lithium-ion batteries are very reliable. According to a February 2013 article in *Chemical and Engineering News*, failure rates for rechargeable lithium-ion batteries are on the order of 1 in 10 million cells. Rechargeable lithium-ion batteries are increasingly prevalent in today's society, due to the large quantity of batteries manufactured (on the order of 4 billion in 2012) and the steady increase in use of the batteries for items ranging from personal electronic devices, such as cell phones, laptops, and tablets, to vehicles and aircraft. While the probability of an incident is low, an incident related to the batteries can be serious. Highly publicized incidents have included fires in airplane cabins, in automotive batteries, including electric vehicle batteries, and most recently, concerns with cell phone batteries such as the ones included in Samsung's Galaxy Note 7 that prompted a massive recall of the new product from store shelves.

One cause of safety issues is the flammable electrolyte (typically a flammable solvent) used in the batteries. Scientists and battery manufacturers are looking into the use of less flammable electrolytes. Some batteries include safety devices such as fuses; others have monitoring systems built in to assess performance parameters and provides early warning of issues. New battery technologies are constantly being developed, and improvements made. The current lithium-ion batteries are an improvement over the original lithium batteries. New batteries are designed to use less lithium metal, which can catch fire. Under some circumstances, generally related to battery short circuiting, batteries have built up enough internal heat to cause fires or a buildup of internal pressure that resulted in the battery bursting.

A car fire involving a Chevy Volt battery in 2011 was determined by the National Highway Traffic Safety Administration to have been caused by leaking electrolyte released by a previous impact to the battery that occurred during crash testing performed on the vehicle by General Motors. However, the Administration determined that electric cars do not pose a greater risk of fire than gasoline-powered vehicles. General Motors subsequently changed the vehicle design to provide structural reinforcement to better protect the battery pack from impact.

The Training and Safety Program discussed below, in combination with project features to protect the batteries and regular maintenance will aid in minimizing the potential occurrence of an incident from the batteries.

A manufacturer's product sheet and MSDS for the batteries are provided in Attachment DR113-1.

Training and Safety Program

114. *Please provide an outline of a revised Training and Safety Program discussed in AFC section 5.16.2.3 that would include how to address the potential for fire, explosion, and leaks involving any or all of the twenty Lithium-ion battery units.*

Response: The following are additions to AFC Section 5.16, Worker Health and Safety that include the safety program elements for lithium-ion batteries. Added text is indicated in bold and underline type.

Table DR114-1 (additions to AFC Table 5.16-2, Operation Hazard Analysis for the MREC)

Activity	Hazard	Control
Lithium-ion battery storage	**Employee injury and property damage from fire**	**Emergency Action Program/Plan** **Hazard Communication Program**
Lithium-ion battery storage	**Employee injury due to ingestion, inhalation, dermal contact**	**Hazard Communication Program**
Lithium-ion battery storage	**Employee injury from physical and chemical hazards**	**Housekeeping and Material Handling and Storage Program** **Electrical Safety Program**

Fire Protection and Prevention Program

- **Use and storage of lithium-ion batteries**

Plant Operation Safety Program

Electrical Safety Program

- **Battery storage system**

Table DR114-2 (additions to AFC Table 5.16-4 Operations Training Program)

Training Course	Target Employees
Fire Protection and Prevention Training	Employees responsible for the handling and storage of **batteries or** flammable or combustible liquids or gasses

Attachment DR110-1

Revisions to Section 5.5

This attachment contains additions to AFC sections 5.5.3.5 Fire and Explosion Risks and 5.5.5.2 Operation Phase Mitigation Measures. AFC Tables 5.5-1, 5.5-2, and 5.5-3 have also been revised and are included in this attachment. In this document added text is indicated by bold and underlined text.

Table 5.5-1 Use and Location of Hazardous Materials

Chemical	Use	Quantity (gallons, lbs, cu ft)	Storage Location (General Arrangement Location Code)	State	Type of Storage
Aqueous NH_3 (19.5 percent)	Control NO_x emissions through SCR	12,000 gallons	Onsite storage tank west of the chillers (21)	Liquid	Continuously onsite
R 134A (1-1-1-2-Tetrafluoroethane)	Refrigerant in the inlet air chiller system	26,960 pounds	Inlet air chiller system (57)	Liquid	Continuously onsite
Cleaning chemicals/detergents	Periodic cleaning of combustion turbine	3,000 gallons	Chemical storage tote or drums at a protected temporary storage location onsite.	Liquid	Continuously onsite
Diesel No. 2	Fuel for fire pump	200 gallons	Permanent onsite storage in above ground storage tank with secondary containment (17)	Liquid	Continuously onsite
Hydraulic oil	High-pressure combustion turbine starting system, turbine control valve actuators	150 gallons	Onsite 55-gallon drums (31)	Liquid	Continuously onsite
Laboratory reagents	Water/wastewater laboratory analysis	10 gallons	Laboratory chemical storage cabinets (stored in original chemical storage containers/bags) (31)	Liquid and granular solid	Continuously onsite
Lubrication oil	Lubricate rotating equipment (e.g., gas turbine and steam turbine bearings)	400 gallons	Onsite 55-gallon drums (31)	Liquid	Continuously onsite
Mineral insulating oil	Transformers	28,800 gallons	Inside the transformers; no mineral actually stored onsite (10, 26, 28, 43, 60, 61)	Liquid	Continuously onsite
Sodium bisulfite	Biocide/biofilm control for potable, fire, and service water systems	500 gallons	Water treatment chemical feed storage	Liquid	Continuously onsite; 250-gallon stackable totes inside secondary containment
Acetylene	Welding gas	185 lbs	Maintenance/Warehouse Building (31)	Gas	Continuously onsite
Oxygen	Welding gas	250 lbs	Maintenance/Warehouse Building (31)	Gas	Continuously onsite
Propane	Torch gas	300 lbs	Maintenance/Warehouse Building (31)	Gas	Continuously onsite
EPA Protocol gases	Calibration gases	25 lbs	CEMS Enclosures (11)	Gas	Continuously onsite
Cleaning chemicals	Cleaning	Varies (less than 25 gallons liquids or 100 lbs solids for each chemical)	Admin/Control Building, Maintenance/ Warehouse Building (31)	Liquid or solid	Continuously onsite

Table 5.5-1 Use and Location of Hazardous Materials

Chemical	Use	Quantity (gallons, lbs, cu ft)	Storage Location (General Arrangement Location Code)	State	Type of Storage
Paint	Touchup of painted surfaces	Varies (less than 25 gallons liquids or 100 lbs solids for each type)	Maintenance/Warehouse Building (31)	Liquid	Continuously onsite
Lead-Acid Batteries	24 volt DC battery supply	12,000 lbs	Power Distribution Center	Solid	Continuously onsite
Lithium Ion Batteries	**Energy storage/integration**	**252 tons**	**Battery energy storage system (58)**	**Solid**	**Continuously onsite**
CO_2	Fire extinguishing of turbine package	6000 cu ft	Outside of Turbine Package	Gas	Continuously onsite

cu ft = cubic feet

Table 5.5-2 Chemical Inventory, Description of Hazardous Materials Stored Onsite, and Reportable Quantities

Trade Name	Chemical Name	CAS Number	Maximum Quantity Onsite (gallons, lbs, cu ft)	CERCLA SARA RQ[a]	RQ of Material as Used Onsite[b]	EHS TPQ[c]	Regulated Substance TQ[d]	Prop 65
Aqueous NH_3 (19.5 percent NH_3 by weight)	Aqueous NH_3	7664-41-7	10,200 gallons[g]	100 lbs	526 lbs	500 lbs	500 lbs	No
R134A	1-1-1-2-Tetrafluoroethane	811-97-2	26,960 gallons	e	e	e	e	No
Cleaning chemicals/detergents	Various	None	3,000 gallons	e	e	e	e	No
Diesel No. 2	Diesel No. 2	68476-34-6	200 gallons	e	e	e	e	No
Hydraulic oil	Oil	None	150 gallons	42 gallons[f]	42 gallons[f]	e	e	No
Laboratory reagents	Various	Various	10 gallons	e	e	e	e	No
Lubrication oil	Oil	None	400 gallons	42 gallons[f]	42 gallons[f]			No
Mineral insulating oil	Oil	8012-95-1	28,800 gallons	42 gallons[f]	42 gallons[f]			No
Sodium bisulfite	Sodium bisulfite	7631-90-5	500 gallons	5,000 lbs	5,000 lbs	e	e	No
Acetylene	Acetylene	47-86-2	185 lbs	e	e	e	e	No
Oxygen	Oxygen	7782-44-7	250 lbs	e	e	e	e	No
Propane	Propane	74-98-6	300 lbs	e	e	e	e	No
EPA Protocol gases	Various	Various	25 lbs	e	e	e	e	No

Table 5.5-2 Chemical Inventory, Description of Hazardous Materials Stored Onsite, and Reportable Quantities

Trade Name	Chemical Name	CAS Number	Maximum Quantity Onsite (gallons, lbs, cu ft)	CERCLA SARA RQ[a]	RQ of Material as Used Onsite[b]	EHS TPQ[c]	Regulated Substance TQ[d]	Prop 65
Cleaning chemicals	Various	Various	Varies (less than 25 gallons liquids or 100 lbs solids for each chemical)	[e]	[e]	[e]	[e]	No
Lead-Acid Battery	Lead-Acid Battery	Various	12,000 lbs	1,000	1,000	1,000	1,000	Yes
Lithium Ion Batteries	**Lithium Ion Batteries**	**96-49-1 105-58-8**	**252 tons**	**e**	**e**	**e**	**e**	**No**
CO_2	CO_2	53569-62-3	6000 cu ft					No
Paint	Various	Various	Varies (less than 25 gal liquids or 100 lbs solids for each type)	[e]	[e]	[e]	[e]	No

[a] RQs for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Superfund Amendments and Reauthorization Act (SARA) (Ref. 40 CFR 302, Table 302.4). Release equal to or greater than RQ must be reported. Under California law, any amount that has a realistic potential to adversely affect the environment or human health or safety must be reported.

[b] RQ for materials as used onsite. Since some of the hazardous materials are mixtures that contain only a percentage of an RQ, the RQ of the mixture can be different than for a pure chemical. For example, if a material only contains 10 percent of a reportable chemical and the RQ is 100 lbs., the RQ for that material would be (100 lb)/(10 percent) = 1,000 lb.

[c] Extremely Hazardous Substance (EHS) TPQ (Ref. 40 CFR Part 355, Appendix A). If quantities of extremely hazardous materials equal to or greater than the TPQ are handled or stored, they must be registered with the local Administering Agency.

[d] TQ is from 19 CCCR 2770.5 (state) or 40 CFR 68.130 (federal)

[e] No reporting requirement. Chemical has no listed threshold under this requirement.

[f] State RQ for oil spills that will reach California state waters [Ref. CA Water Code Section 13272(f)]

[g] The NH_3 tank capacity is 12,000 gallons; however, the tank is only filled to 85 percent of its capacity, or 10,200 gallons.

SARA = Superfund Amendments and Reauthorization Act

TQ = Threshold quantity

Table 5.5-3 Toxicity, Reactivity, and Flammability of Hazardous Substances Stored Onsite

Hazardous Materials	Physical Description	Health Hazard	Reactive and Incompatibles	Flammability*
Aqueous NH_3	Colorless liquid with pungent odor	Corrosive; irritation to permanent damage from inhalation, ingestion, and skin contact	Acids, halogens (e.g., chlorine), strong oxidizers, salts of silver and zinc	Liquid is incombustible; vapor is combustible, but difficult to burn

Table 5.5-3 Toxicity, Reactivity, and Flammability of Hazardous Substances Stored Onsite

Hazardous Materials	Physical Description	Health Hazard	Reactive and Incompatibles	Flammability*
R 134A	Colorless liquid gas, slight ether-like odor	Inhalation in high concentrations is harmful, may cause heart irregularities, unconsciousness or death	Alkali, alkaline earth metals, and molten salts	Flammable
Cleaning chemicals/ detergents	Liquid	Refer to individual chemical labels	Refer to individual chemical labels	Refer to individual chemical labels
Diesel No. 2	Oily, light liquid	May be carcinogenic	Oxidizers	Flammable
Hydraulic oil	Oily, dark liquid	Hazardous if ingested	Oxidizers	Combustible
Laboratory reagents	Liquid and solid	Refer to individual chemical labels	Refer to individual chemical labels	Refer to individual chemical labels
Lubrication oil	Oily, dark liquid	Hazardous if ingested	Oxidizers	Flammable
Mineral insulating oil	Oily, clear liquid	Minor health hazard	Oxidizers	Can be combustible, depending on manufacturer
Sodium bisulfite	Yellow liquid	Irritant	Incompatible with strong acids and oxidizers	Not flammable
Acetylene	Colorless gas	Asphyxiant gas	Oxygen and other oxidizers including all halogens and halogen compounds; forms explosive acetylide compounds with copper, mercury, silver, brasses containing >66 percent copper and brazing materials containing silver or copper	Flammable
Oxygen	Colorless, odorless, tasteless gas	Therapeutic overdoses can cause convulsions; liquid oxygen is an irritant to skin	Hydrocarbons, organic materials	Oxidizing agent; actively supports combustion
Propane	Propane gas (odorant added to provide odor)	Asphyxiant gas; causes frostbite to area of contact.	Strong oxidizing agents and high heat	Flammable
EPA Protocol gases	Gas	Refer to individual chemical labels	Refer to individual chemical labels	Refer to individual chemical labels
Cleaning chemicals	Liquid	Refer to individual chemical labels	Refer to individual chemical labels	Refer to individual chemical labels
Lead-Acid Battery	Battery	Refer to individual container labels	Refer to individual container labels	Refer to individual container labels
Lithium Ion Batteries	**Battery**	**Irritant**	**Not reactive under normal conditions**	**Flammable**
CO_2	Gas	Refer to individual container labels	Refer to individual container labels	Refer to individual container labels
Paint	Various colored liquid	Refer to individual container labels	Refer to individual container labels	Refer to individual container labels

Table 5.5-3 Toxicity, Reactivity, and Flammability of Hazardous Substances Stored Onsite

Hazardous Materials	Physical Description	Health Hazard	Reactive and Incompatibles	Flammability*

Data were obtained from Material Safety Data Sheets (MSDS) and Lewis, 1991.

Per Caltrans regulations, under 49 CFR 173: “Flammable” liquids have a flash point less than or equal to 141 degrees Fahrenheit; “Combustible” liquids have a flash point greater than 141°F.

5.5.3.5 Fire and Explosion Hazards

Table 5.5-3 describes the flammability for the hazardous materials that will be onsite. Article 80 of the California Fire Code requires all hazardous material storage areas to be equipped with a fire extinguishing system and also requires ventilation for all enclosed hazardous material storage areas.

Aqueous NH_3, which constitutes the largest quantity of hazardous materials to be stored onsite, is incombustible in its liquid state. Under normal storage conditions, NH_3 would not evaporate to the atmosphere because it is contained in a sealed tank that maintains the NH_3 in a state that precludes evaporation. In the unlikely event that a release were to occur, NH_3 could evaporate directly to the atmosphere. NH_3 vapor is combustible only within a narrow range of concentrations in air. The evaporation rate of aqueous NH_3 is similar to water, which is sufficiently low that the lower explosive limit of 15 percent (or 15,000 ppm) will not be reached.

The plant machinery lubrication oil is flammable. In accordance with Article 80 of the California Fire Code, the storage area for the lubrication oil would be equipped with a fire extinguishing system and the lubrication oil would be handled in accordance with an HMBP approved by the Ventura County Environmental Health – Certified Unified Program Agency (CUPA)/Hazardous Materials Program, Ventura County Fire Department (VCFD), and the CEC. With proper storage and handling of flammable materials in accordance with the California Fire Code and the site-specific HMBP, the risk of fire and explosion at the generating facility would be minimal.

The natural gas fuel the facility will use is flammable and could leak from the high-pressure pipeline that brings the gas from the main SoCalGas transmission pipeline (Line 404/406). Natural gas is composed mostly of methane, but also may contain ethane, propane, nitrogen, butane, isobutene, and isopentane. It is colorless, odorless, tasteless, and is lighter than air. Methane is flammable when mixed in air at concentrations of 5 to 14 percent, which is also the detonation range. Natural gas, therefore, poses a risk of fire and explosion if an accidental release were to occur. However, the risk of a fire and/or explosion would be reduced through compliance with applicable codes, regulations, and industry design/construction standards.

The federal safety and operating requirements for natural gas pipelines are contained in Title 49 of the CFR, Parts 190 through 192. These requirements vary according to population density and land use; the pipeline classes are defined as follows:

- Class 1 includes pipelines in locations with 10 or fewer buildings intended for human occupancy.
- Class 2 includes pipelines in locations with more than 10, but fewer than 46 buildings intended for human occupancy.
- Class 3 includes pipelines in locations with more than 46 buildings intended for human occupancy, or where the pipeline is within 100 yards of any building or small well-defined outside area occupied by 20 or more people on at least 5 days per week for 10 weeks in any 12-month period.
- Class 4 includes pipelines in locations where buildings with four or more stories aboveground are prevalent.

The MREC's pipeline will be designed to meet Class 1 service and will meet CPUC GO-112-D and 58-A standards, in addition to the federal requirements for gas pipeline construction and safety.

The battery energy storage component of the MREC will be configured in multi-packs containing lithium ion batteries plus battery protection circuits sealed in a container. The containers will be located south of the power block, away from the chemical storage building and facility maintenance building. The principal hazard associated with the batteries is fire or explosion, which could occur if a battery casing was opened, punctured or crushed, or if the battery short circuit or overheat. Contact with the internal contents of the batteries can cause skin and eye irritation. Electrolyte inside the

batteries is flammable and may vent, ignite, or produce sparks when heated to a high temperature. Burning batteries may release toxic gases, including hydrogen fluoride gas (U.S. DOT, 2016). To minimize potential risks, battery containers will be arranged in battery storage racks away from heat sources. The facility's health and safety training program will include a component on safe battery handling.

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5.5.5.2 Operation Phase

During facility operation, various hazardous materials and one regulated substance will be stored onsite as shown in Table 5.5-1. Table 5.5-2 presents information about these materials, including trade names, chemical names, CAS numbers, maximum quantities onsite, RQs, CalARP TPQs, and status as Proposition 65 chemicals (chemicals known to be carcinogenic or cause reproductive problems in humans). Health hazards and flammability data are summarized for these materials in Table 5.5-3, which also contains information on incompatible chemicals. Table 5.5-4 describes the toxicity of the regulated substance and hazardous materials. The following sections list mitigation measures for minimizing the public health risks associated with hazardous material and regulated substance handling during facility operation.

Hazardous Materials

All hazardous materials will be handled and stored in accordance with applicable codes and regulations specified in Section 5.5.6. Specific requirements of the California Fire Code that reduce the risk of fire or the potential for a release of hazardous materials that could affect public health or the environment include:

- Provision of an automatic sprinkler **or other fire suppression** system for indoor hazardous material storage areas.
- Provision of an exhaust system for indoor hazardous material storage areas.
- Separation of incompatible materials by isolating them from each other with a noncombustible partition.
- Spill control in all storage, handling, and dispensing areas, **including the battery containers.**
- Separate secondary containment for each chemical storage system. The secondary containment is required to hold the entire contents of the tank plus the volume of water for the fire suppression system that could be used for fire protection for a period of 20 minutes in the event of a catastrophic spill.

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Lithium-ion Batteries

Lithium-ion batteries will be configured in groups inside protective containers which will help prevent crushing, opening or puncturing of the batteries. Battery containers will be arranged in battery storage racks away from heat sources to protect the batteries from being knocked over and from falling debris. The facility's health and safety training program will include a component on safe battery handling.

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5.5.5 References

CH2M HILL Engineers, Inc. (CH2M). 2015a. Telephone Conversation Record – Captain Fallat, Ventura County Fire Department, Station 25, Saticoy, September 24, 2015.

CH2M HILL Engineers, Inc. (CH2M). 2015b. Telephone Conversation Record – Brandi Starjack, CUPA Supervisor, Ventura County Environmental Health – CUPA/Hazardous Materials Program, September 28, 2015.

CH2M HILL Engineers, Inc. (CH2M). 2015c. Telephone Conversation Record – Mike LoMonaco, Fire Specialist, Public Information Office for the Ventura County Fire Department, September 29, 2015.

Ventura County Ordinance Code. Accessed September 2015 at http://www.ventura.org/rma/envhealth/cupa/pdf/VCORDINANCECODE.pdf

Ventura County. 2015a. Ventura County Environmental Health – CUPA/Hazardous Materials Program and Underground Tanks Online Records website, accessed October 2015 at http://www.vcenvhealth.org/hazmat/

Ventura County. 2015b. Ventura County Environmental Health – CUPA/Hazardous Materials Program website, accessed September 2015 at http://www.ventura.org/rma/envhealth/cupa/index.html.Lewis, Richard J., Sr. 1991. *Hazardous Chemical Desk Reference*. 2nd Edition.

Smyth H. F., Jr. 1956. "Improved Communication: Hygienic Standards for Daily Inhalation." *Am. Ind. Hyg. Assoc. Q*. 17 (2): 129-185.

U.S. DOT, 2016. *Emergency Response Guidebook. A Guidebook for First Responders During the Initial Phase of a Dangerous Goods/ Hazardous Materials Transportation Incident.*

Attachment DR113-1
Material Safety Data Sheets for Batteries

Product Information Sheet

Panasonic Batteries

Panasonic Industrial Company
A Division of Panasonic Corporation of North America
5201 Tollview Drive, 1F-3
Rolling Meadows, IL 60008
Toll Free: 877-726-2228
Fax: 847-468-5750
Internet: www.panasonic.com/industrial/batteries-oem
e-mail: oembatteries@us.panasonic.com
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Product: Lithium-ion Batteries (Li-ion)

Applicable models/sizes: All Cylindrical and Prismatic Lithium-ion batteries

Revision: – January 1, 2015

The batteries referenced herein are exempt articles and are not subject to the OSHA Hazard Communication Standard requirement. This sheet is provided as a service to our customers.

MSDS

Material Safety Data Sheets (MSDS) are a sub-requirement of the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, 29 CFR Subpart 1910.1200. This Hazard Communication Standard does not apply to various subcategories including anything defined by OSHA as an "article". OSHA has defined "article" as a manufactured item other than a fluid or particle; (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g. minute or trace amounts of a hazardous chemical, and does not pose a physical hazard or health risk to employees.

Because all of our batteries are defined as "articles", they are exempt from the requirements of the Hazard Communication Standard, hence a MSDS is not required.

The following components are found in a Panasonic Lithium Ion battery:

Nickel Manganese Cobalt Type

Component	Material	Formula / CAS
Positive Electrode	Lithium Nickel Manganese Cobalt Oxide	$LiNMnCoO_2$ 346417-97-8
Negative Electrode	Graphite	C 7440-44-0
Electrolyte	Ethylene Carbonate – Solvent	$C_3H_4O_3$ 96-49-1
	Diethyl Carbonate – Solvent	$C_5H_{10}O_3$ 105-58-8
	Lithium Hexaflurophosphate – Salt	$LiPF_6$ 21324-40-3

Cobalt Type

Component	Material	Formula / CAS
Positive Electrode	Lithium Cobalt Oxide	$LiCoO_2$ 12190-79-3
Negative Electrode	Graphite	C 7440-44-0
Electrolyte	Ethylene Carbonate – Solvent	$C_3H_4O_3$ 96-49-1
	Diethyl Carbonate – Solvent	$C_5H_{10}O_3$ 105-58-8
	Lithium Hexaflurophosphate – Salt	$LiPF_6$ 21324-40-3

Nickel Cobalt Aluminum Type

Component	Material	Formula / CAS
Positive Electrode	Lithium Cobalt Nickel Aluminum Oxide	$LiCoNiAlO_2$ 193214-24-3
Negative Electrode	Graphite	C 7440-44-0
Electrolyte	Ethylene Carbonate – Solvent	$C_3H_4O_3$ 96-49-1
	Diethyl Carbonate – Solvent	$C_5H_{10}O_3$ 105-58-8
	Lithium Hexaflurophosphate – Salt	$LiPF_6$ 21324-40-3

DISPOSAL

All Panasonic Lithium ion batteries are classified by the federal government as non-hazardous waste and are safe for disposal in the normal municipal waste stream. These batteries, however, do contain recyclable materials. Panasonic is a Licensee of the Call2Recycle Battery Recycling Program. If you build our cells into a battery pack, please call 1-800-8-BATTERY or go to the Call2Recycle website at www.call2recycle.org for additional information on how your branded product can also participate in the program.

TRANSPORTATION

All Panasonic lithium ion batteries are not subject to the other requirements of the US Department of Transportation (DOT) Subchapter C, Hazardous Materials Regulations if shipped in compliance with 49 CFR 173.185.

Effective January 1, 2015 all Panasonic lithium ion batteries can be shipped by air in accordance with International Civil Aviation Organization (ICAO) 2015-2016 edition, Section II or Section 1B or International Air Transport Association (IATA), 56th edition, Section II or 1B, Packing Instructions (PI) 965 (Batteries), PI 966 (Batteries, packed with equipment) and PI 967 (Batteries, contained in equipment) as appropriate.

Currently all Panasonic lithium ion batteries are regulated by the International Maritime Organization (IMO), 2012 edition, 36th amendment, under Special Provisions 188 and 230.

All Panasonic lithium ion cells are tested and comply with the UN Model Regulations, Manual of Test and Criteria, Part III, subsection 38.3.

If you build any of our lithium ion cells into a battery pack, you must also assure that they are tested in accordance with the UN Model Regulations, Manual of Test and Criteria. Part III, subsection 38.3, 5th revised edition, Amendment 1.

If you plan on transporting any untested prototype battery packs contact your Panasonic Sales Representative for regulatory information.

FIRST AID

If you get electrolyte in your eyes, flush with water for 15 minutes without rubbing and immediately contact a physician. If you get electrolyte on your skin wash the area immediately with soap and water. If irritation continues, contact a physician. If the battery is ingested, call the National Capital Poison Center (NCPC) at 202-625-3333 (Collect) or your local poison center immediately.

GENERAL RECOMMENDATIONS

CAUTION: Risk of fire, explosion and burns. Do not short-circuit, crush, incinerate or disassemble battery.

FIRE SAFETY

In case of fire, you can use dry chemical, alcohol resistant foam or carbon dioxide fire extinguishers. Cooling the exterior of the batteries will help prevent rupturing. Burning of these batteries will generate toxic fumes. Fire fighters should use self-contained breathing apparatus. Detailed information on fighting a lithium ion battery fire can be found in Guide 147 (Lithium Ion Batteries) of the US DOT Emergency Response Guide.

Date:2015.03.09
Reference Number: MSDS_ L08J87001

SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT IDENTIFICATION

Product Name: Lithium-ion Battery

Product Model #: ATS Lithium Ion Battery

COMPANY NAME:

Palladium Energy Inc.
1200 Internationale Parkway
Woodridge IL 60517

Telephone number: 630-410-7900
Fax number: 630-410-7990
Emergency telephone number: [Weekday] 630-410-7900

2. CHEMICAL HAZARD ID:

If shipped as class 9 hazardous goods, shipping number is UN3480 (for lithium ion batteries) or UN3481 (For battery is packed with equipment or contained in equipment)

3. COMPOSITION INFORMATION

A. Lithium-Ion Single Cell Matrix

Manufacturer of Cell	Cell Model	Type (lithium Ion or polymer)	Capacity (Ah)	Lithium Content (gm)	Cd/Hg/Pb (Yes/No)
Panasonic	CRG18650CG	Li Ion	2.15	0.645	No

B. Battery Product Matrix

Trademark	PE Part Number	Customer P/N	Pack Configuration	Pack Nominal Voltage V	Pack Nominal Capacity (Ah)	Pack Energy (Wh)	Cd/Hg/Pb
Zimmer	L08J87001	62240000600	4S2P	14.4	4.3	61.9	No

C. Chemical Composition:

Component	Material	Formula	CAS Number
Positive Electrode	Lithium Manganese Cobaltate	Li-Mn-CoO_2	12190-79-3
Negative Electrode	Graphite	C	7440-44-0/7782-42-5
Electrolyte	Organic Carbonate – Solvent	$C_3H_4O_3$ or similar	
	Lithium Hexaflurophosphate – Salt	$LiPF_6$	
Copper		Cu	7440-50-8
Iron		Fe	7439-89-6
Aluminum		Al	7429-90-5
Plastic/Electronics			

3. HAZARD IDENTIFICATION

Under normal usage, there is no contact with electrolyte and no hazard exists.
If exposed to high temperature or fire, cell may leak electrolyte and in extreme cases explode. The vented gas may contain among others Hydrogen Fluoride

4. FIRST AID

Under normal operating condition, contents of the cells are in sealed (polymer pouch/metal can or cylinder) condition and pose no threat to the user.

Exposure to the cell internal content happens under abusive conditions

Inhalation: Contents of open battery may cause respiratory irritation. Move to fresh air immediately and seek medical attention

Skin: Contents of open battery may cause skin irritation. Wash skin with copious amount of soap and water
Eye: Contents of open battery may cause eye irritation. Flush eyes immediately with water for at least 15 minutes and seek medical attention
Ingestion: Seek medical attention immediately. Induce vomiting.

5. FIRE FIGHTING

In case of Fire use CO_2 or CLASS D fire extinguisher

In case battery burns with other combustible, use corresponding fire extinguisher. Corrosive fumes may be present during fire. Use protective equipment (gloves, breathing apparatus, goggles etc.)
Gases from the burning fire will include Hydrogen Fluoride, Carbon oxides, Hydrocarbons among others.

6. ACCIDENTAL RELEASE:

Battery material is enclosed in either metal casing or in laminate and does not release easily under normal usage. Under abuse condition such as puncture, high heat exposure, electrical abuse electrolyte containing vinyl chloride salt in organic solvent may leak out. See section 4 for first aid measure. Seek medical attention.

7. INSTRUCTIONS ON SAFE HANDLING and USE

Storage: Store within the recommended temperature limit of the battery (read instruction manual for specific limits). Do not expose to high temperature (60 ^{o}C/140 ^{o}F). Avoid short circuit of the battery. Short circuit of the battery may cause release of gas and may pose burn hazard.

Handling: Do not disassemble, crush or otherwise abuse the battery. Do not open the battery.

Charge: Charge only with dedicated/specific chargers designed for this battery

Discharge: Discharge within the temperature limits of the battery detailed in the specification.

Disposal: Dispose/Recycle according to the applicable municipal, state and federal regulations. Do not dispose in household or commercial waste bin.

Caution: This battery when abused may pose fire, explosion and severe burn hazard. Handle with caution.

8. EXPOSURE CONTROL and SPECIAL PROTECTION INFORMATION:

• Control parameters

Common chemical name / General name	ACGIH (2009)	
	TLV-TWA	BEI
Lithium transition metal oxidate	0.02mg/m^3 (as cobalt) * 0.2mg/m^3 (as manganese) * 0.2 mg/m^3 (as nickel) *	-
Aluminum	10mg/m^3 (metal coarse particulate) 5mg/m^3 (inflammable powder) 5mg/m^3 (weld fume)	-
Carbon (Natural graphite) (Artificial graphite)	2mg/m^3 (inhalant coarse particulate)	-
Copper	0.2mg/m^3 (fume) 1.0mg/m^3 (a coarse particulate, Mist)	-
Organic electrolyte	-	-

ACGIH: American Conference of Governmental Industrial Hygienists, Inc.
TLV-TWA: Threshold Limit Value-Time Weighted Average concentration
BEI: Biological Exposure Indices

Eye Protection, gloves, ventilation, are not needed under normal usage

Use safety goggles, acid resistant safety gloves, air mask if exposed to internal content of the cell/battery.

9. PHYSICAL and CHEMICAL PROPERTIES:

Appearance: Solid
Form Factor: Mostly cylindrical
Odor: N/A

pH: N/A
Flash Point: N/A
Density: N/A
Solubility: Insoluble in Water

10. STABILITY and REACTIVITY:

Not reactive under normal condition of usage
Note safe handling procedure
Avoid high temperature and mechanical abuse.
Read label and manufacturer instruction before usage.

11. TOXICOLOGICAL EFFECT:

Acute Toxicity:
Not known for Lithium Cobaltate, Aluminum, and Graphite.
Copper causes gastrointestinal disturbance in 60-100mg sized coarse particulate. TDLo- Rabbit 375mg/kg
Organic electrolyte LD50, oral - -Rat 2000mg/kg or more

Local Effects:
Not known for Lithium Cobaltate, Graphite and Organic Electrolyte.
Aluminum has no known local effects.
Copper in coarse particulate is eye irritant
No known carcinogen in this product.

12. ECOLOGICAL INFORMATION

Battery is not biodegradable. Do not dispose in landfill.

13. DISPOSAL INFORMATION

Dispose/Recycle according to the applicable municipal, state and federal regulations. Do not dispose in household or commercial waste bin.

14. TRANSPORTATION INFORMATION:

UN Number: 3480 is used when shipped via air as option a) (UN3481 when battery is packed with equipment or contained in equipment)

Proper Shipping Name: Lithium ion batteries ("Lithium ion batteries packed with equipment" or "Lithium ion batteries contained in equipment")

This battery is <100 Wh and is shipped according to the regulations detailed in US Department of Transportation 49 Code of Federal Regulations for domestic shipping and Packaging instruction of IATA DGR 56th ed for international air shipping following either
a) PI965, Section 1B as CLASS 9, for lithium ion batteries
Or
b) PI965, Section II in excepted quantities which is then over packed, for lithium ion batteries,
Or
c) PI966, Section II, for lithium ion batteries packed with equipment,
Or
d) PI967, Section II, for lithium ion batteries contained in equipment.

15. REGULATORY INFORMATION:

- IATA (International Air Transport Association) Dangerous Goods Regulations 56th ed
- IMDG (International Maritime Dangerous Goods) Regulations under Special Provision 188 (nondangerous goods)
- US Department of Transportation 49 Code of Federal Regulations

16. OTHER INFORMATION:

-The information contained in this Safety data sheet is based on the present state of knowledge and current legislation.

-This safety data sheet provides guidance on health, safety and environmental aspects of the product and should not be construed as any guarantee of technical performance or suitability for particular applications.