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SECTION ACRONYMS/ABBREVIATIONS

ACRONYM/ ABBREVIATION	DEFINITION
AFC	Application for Certification
CAISO	California Independent System Operator
CEC	California Energy Commission
CPUC	California Public Utilities Commission
CCR	California Code of Regulations
CTG	Combustion Turbine Generator
DPLU	San Diego County Department of Planning and Land Use
EMFs	Electromagnetic Fields
GSU	Generator Unit Step Up Transformers
HDD	Horizontal Directional Drilling
IEEE	Institute of Electrical and Electronic Engineers
kcmil	Kilo Circular Mils
kV	Kilovolt
LORS	Laws, Ordinances, Regulations and Standards
Orange Grove Energy	Orange Grove Energy, L.P.
Project	Subject of this AFC, Orange Grove Project
Project Site	Approximately 8.5 acre parcel to be leased for the power plant Site (a.k.a. "Site")
RFO	Request for Offers
RI/TVI	Radio & Television Interference Criteria
SDG&E	San Diego Gas and Electric
SIS	System Impact Study
Site	Approximately 8.5 acre parcel to be leased for the power plant Site (a.k.a. "Site")

3.0 TRANSMISSION SYSTEM DESIGN, SAFETY AND NUISANCE

3.1 TRANSMISSION LINE DESCRIPTION, DESIGN AND OPERATION

The Project will interconnect to the existing Pala substation that occurs on a contiguous San Diego Gas and Electric (SDG&E) parcel, via an approximately 0.3-mile long, 69 kilovolt (kV), single circuit, underground transmission line. The location of the interconnection is provided in Drawing Y100 in Appendix 2-A. A 1:24,000 scale drawing of the transmission line route is provided in Figure 3.1-1. There are no parks, recreational areas, scenic areas within 1 mile of the transmission line. A full-page color photographic reproduction of the transmission line is not provided in this Application for Certification (AFC) because the transmission line will be underground.

The transmission line will be installed in an underground raceway system, encased with concrete for added protection. A spare conduit is to be provided in the event of any one cable failure, a new cable can be installed with minimum downtime. A communications conduit is also to be installed between the Site and the Pala substation for protective relaying and metering requirements by SDG&E. Burial depth of the circuit will be in compliance with industry standards and in accordance with good engineering practice. In-ground pull-boxes will be provided as needed to stay within design standards including bending radii and pulling tensions. For most of its length, the interconnection will be installed in Pala Del Norte Road in a common trench with the gas pipeline as shown in Detail 6 in Drawing C850 in Appendix 2-A. Where the transmission line initially leaves the Site it crosses three small normally dry drainages where horizontal directional drilling (HDD) will be used to install the transmission line conduits instead of trenching, so that the installation will not impact Waters of the US.

The specified conductor cables will carry the full output of the power plant. The interconnection will be located within an approximately 20-foot-wide right-of-way that will be provided by SDG&E between the Site and the Pala substation. The point of ownership will be at a new vault provided by SDG&E just outside the Pala substation as described in the System Impact Study (SIS). At the plant, the underground transmission circuit will transition to overhead 69-kV rigid International Plumbing Standard-aluminum buswork. Revenue metering will occur at the plant 69-kV bus. Each generating unit and generator unit step transformers (GSU) is protected by a 69-kV circuit breaker, and disconnect switches will be provided for isolation. The protection and control scheme will be designed to protect the equipment and as required by the California Independent System Operator (CAISO) to operate in accordance with their standards. A one-line diagram of the plant is provided in Drawing E100 in Appendix 2-A, and a one-line diagram and general arrangement of the 60-kV system are provided in Drawings ORG-E-1 and ORG-E-10 in Appendix 2-A.

The Orange Grove Project site was offered by SDG&E for development as part of their Request for Offers (RFO) primarily to support reliability within the SDG&E service territory. SDG&E worked with the Orange Grove Project on a fast track in order to address reliability concerns that

arose out of the summer 2006 heat storm. With normal load growth a repeat heat event could pose reliability issues for the SDG&E system.

Orange Grove Energy, L.P (Orange Grove Energy) submitted its interconnection request to the CAISO on April 19, 2007. The request identified the Pala substation as the primary interconnection point. The SIS and Facilities Study have been completed and are provided on compact disk in Appendix 3-A and 3-B, respectively. Updated information was provided to CAISO by the Applicant through this process that clarifies the SIS Transient Stability analysis and results. Updated information and one line diagrams for the Pala substation are included in the Facilities Study. The Applicant is currently negotiating a Large Generator Interconnection Agreement with CAISO/SDG&E and upon execution of that agreement will be accepting the mitigation measures selected by CAISO/SDG&E.

At each combustion turbine generator (CTG) unit, approximately 150 feet route length of 15kV underground cable will connect the generator 13.8 kV switchgears and the GSU. The size and type of cable are: cable size - 7 sets (3-1/c-750 kilo circular mils (kcmil) copper; Type - 15kV single conductor, 133 percent ethylene propylene rubber insulation, chlorinated polyethylene or chlorosulfonated polyethylene jacket. The correct 13.8/69 kV GSU rating is 45/60/75, as shown in Drawing E100 in Appendix 2-A.

The 69 kV cable is approximately 1,500 feet in route length from the Pala substation vault to the plant switchyard structure. The type is 1750 kcmil, aluminum, high voltage solid dielectric cable (Appendix 3-C). The cable is approved by SDG&E.

The single-circuit Project design and the presence of an open bay at the substation will facilitate interconnection. The interconnection facilities will include all system reinforcement required by CAISO. The Applicant requested pre- and post-project physical layout drawings of the Pala substation from SDG&E, but to date drawings have not been obtained. SDG&E has notified the Applicant that SDG&E has classified the physical layouts of its facilities as “Confidential – Internal Documents” in accordance with Federal Energy Regulatory Commission Order 706 and North American Electric Reliability Corporation Critical Infrastructure Protection-002 through -009. This classification prohibits releasing these documents to any party not signing a Non-Disclosure Agreement. Because SDG&E does not have a Non-Disclosure Agreement with the California Energy Commission (CEC), they cannot provide the requested documents (Dusi, 2008). A conceptual arrangement is provided in Appendix L of the Interconnection System Impact Study included in Appendix 3-A and in Appendix A of the Interconnection Facilities Study in Appendix 3-B.

The 69 kV system was selected over the 230 kV system for interconnection due to the relatively minor upgrades that will be required. An open bay is available at the 69 kV substation to accommodate the interconnection. Interconnection to the 230 kV system would require more infrastructure improvements. A 230 kV circuit passes approximately 0.25-mile east of the Site, but it does not enter the Pala substation. Connection with the 230 kV circuit would require aboveground lines and a new substation.

The transmission interconnection route was selected to provide the most practical route to the substation. The interconnection will be constructed in a manner that will minimize environmental impacts, including stabilizing construction disturbance, as described in Chapter 6.0 of this AFC. The underground design will reduce visual impacts of the Project as opposed to a more conventional pole or tower line design. The interconnection will be installed by HDD beneath the drainage that occurs to the west of the Site in order to avoid impacts to the drainage. The interconnection will be buried in Pala Del Norte Road for most of its length.

Work expected to be required at the existing Pala substation includes:

- Install one 69 kV circuit breaker;
- Install underground cable terminations and bus support stands, two 2,000-amp disconnects, and associated line position bus work;
- Install associated control and protection panels for the new line position and additional RTU points for control, monitoring and alarming;
- Interconnection vault;
- Trench and install conduit and cable from termination stands to the interconnection vault;
- The 69 kV Main Bus at the substation may have to be extended if not already done by another higher-queued project.

Most of this work will be inside the existing Pala substation walls. The interconnection vault and trenching and cable pulling will occur outside of the substation walls in paved area. SDG&E will perform all work inside the substation.

Transmission system upgrades will be required beyond the Pala substation, including reconductoring, changing relay settings, and other work. Transmission system upgrades will be performed by SDG&E and will be finalized in conjunction with the Large Generator Interconnecting Agreement. Once the Large Generator Interconnection Agreement is executed, transmission system upgrade design work will be completed by SDG&E, to provide a basis for impact assessment.

3.2 SAFETY AND NUISANCE

The transmission line interconnection will be constructed to meet applicable laws, ordinances, regulations and standards (LORS) for safety. The Site and transmission line interconnection are located in a rural region with no nearby receptors. The closest population center is located approximately 2.0 miles to the east, i.e., the community of Pala. The closest residence is located approximately 0.4 mile from Project transmission system. The interconnection is within a contiguous SDG&E-owned parcel, and is approximately 200 feet or more from the closest property boundary.

Underground cabling is designed with insulated conductors and grounded shielding around the conductors such that electromagnetic fields (EMFs) outside of the cable are negligible. Furthermore, the underground cable design prevents the formation of a corona that can lead to audible noise. The transmission line interconnection will be constructed in accordance with applicable electric codes and standards. Considering the underground design, the transmission line interconnection will not generate audible noise, radio television interference, nuisance shocks, or other EMF-related impacts.

3.3 LAWS, ORDINANCES, REGULATIONS AND STANDARDS

A summary of applicable LORS related to transmission system design, safety and nuisance is provided in Table 3.3-1. The Project will be constructed and operated in accordance with applicable LORS.

No permits are required specific to the transmission line interconnection to the substation, or work in the substation. Interconnection construction to the substation will be accounted for in the County grading permit. The need for additional permits for transmission system upgrades that may come out of the Large Generator Interconnection Agreement will be assessed when SDG&E has designed the upgrades and construction needs are defined. Agency contacts are provided in Table 3.3-2.

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Table 3.3-1 – Transmission System Design, Safety and Nuisance LORS

JURIS-DICTION	AUTHORITY ¹	AGENCY	REQUIREMENTS	COMPLIANCE	AFC SECTIONS AND PAGES
Federal	Federal Communications Commission Regulations, 47 CFR §15.25, Operating Requirements, Incidental Radiation.	Federal Aviation Administration	Mitigation for any device that causes communications interference.	The Project will not cause communications interference.	3.2 Pages 3.3-3 to 3.3-4
State	California Public Utilities Commission (CPUC), General Order 52 Construction and Operation of Power and Communication Lines.	CPUC	Prevent or mitigate inductive interference.	The Project electrical interconnection will conform to requirements of this order.	3.2 Pages 3.3-3 to 3.3-4
	8 California Code of Regulations (CCR) §2700 et seq., High Voltage Electric Safety Orders.	CPUC	Compliance with standards for installation, operation and maintenance of electrical equipment.	The Project electrical interconnection will conform to requirements of this regulation.	3.1 Pages 3.3-1 to 3.3-3
	Radio & Television Interference (RI/TVI) Criteria.	CEC	RI/TVI mitigation requirements, if applicable.	No RI/TVI is expected.	3.2 Pages 3.3-3 to 3.3-4
	CPUC, General Order 128 Rules for Construction of Underground Electric Supply and Communication Systems	CPUC	Ensure adequate service and secure safety to all persons engaged in the construction, maintenance, operation, or use of underground systems and to the public.	Project will be constructed to conform to the requirements of this order.	3.1 Pages 3.3-1 to 3.3-3

¹ Pursuant to 20 CCR Chapter 5 Appendix B Section (i)(1)(B): Each agency with jurisdiction to issue applicable permits and approvals or to enforce identified LORS and adopted local, regional and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the CEC to certify sites and related facilities.

JURIS-DICTION	AUTHORITY ¹	AGENCY	REQUIREMENTS	COMPLIANCE	AFC SECTIONS AND PAGES
Local	County Electrical Code (Regulatory Ordinances Title 5, Division 2.)	San Diego County Department of Planning and Land Use (DPLU)	Requires a permit and compliance with codes for electrical work.	Project will satisfy through Major Use Permit process.	Sections 2.11, 2.13.2, 2.14 and 3.1 Pages 2.2-32, 2.2-35 to 2.2-36, Pages 2.2-38 to 2.2-44, 3.3-1 to 3.3-3
Industry	CAISO	CAISO as reviewer.	Review interconnection study.	CAISO issued an SIS in October 2007 and a Facilities Study in April 2008.	3.1 and Appendices 3-A and 3-B Pages 3.3-1 to 3.3-3, Vol. II
	Institute of Electrical and Electronic Engineers (IEEE) 693, Recommended Practices for Seismic Design of Substations	None applicable.	Recommends design and construction practices	Substation work will implement appropriate practices in accordance with these standards.	2.14 Pages 2.2-38 to 2.22-44
	IEEE 80 Guide for Safety in AC Substation Grounding	None applicable.	Provides guidelines for assuring safety through proper grounding of outdoor substations.	Project will be constructed to conform to this guideline.	2.14 Pages 2.2-38 to 2.22-44
	National Electric Safety Code, American National Standards Institute C2	None applicable.	Recommends provisions for safety in installation and operation of electric supply stations and overhead and underground supply lines.	Project will be constructed to conform to this guideline.	2.14 Pages 2.2-38 to 2.22-44
	IEEE 525 Guide for the Design and Installation of Cable Systems on Substations	None applicable	Recommends design and construction practices.	Project will be constructed to conform to this guideline.	2.14 Pages 2.2-38 to 2.22-44

JURIS-DICTION	AUTHORITY ¹	AGENCY	REQUIREMENTS	COMPLIANCE	AFC SECTIONS AND PAGES
	IEEE 605 Guide for Design of Rigid Bus Structures in Substations	None applicable	Recommends design and construction practices.	Project will be constructed to conform to this guideline.	2.14 Pages 2.2-38 to 2.22-44
	IEEE 980 Guide for Containment and Control of Oil Spills in Substations	None applicable	Recommends design and construction practices.	Project will be constructed to conform to this guideline.	2.14 Pages 2.2-38 to 2.22-44
	IEEE 998 Guide for Direct Lightning Strokes Shielding of Substations	None applicable	Recommends design and construction practices.	Project will be constructed to conform to this guideline.	2.14 Pages 2.2-38 to 2.22-44

Table 3.3-2 – Administrative Agency Contacts and Permit Approval Authorities

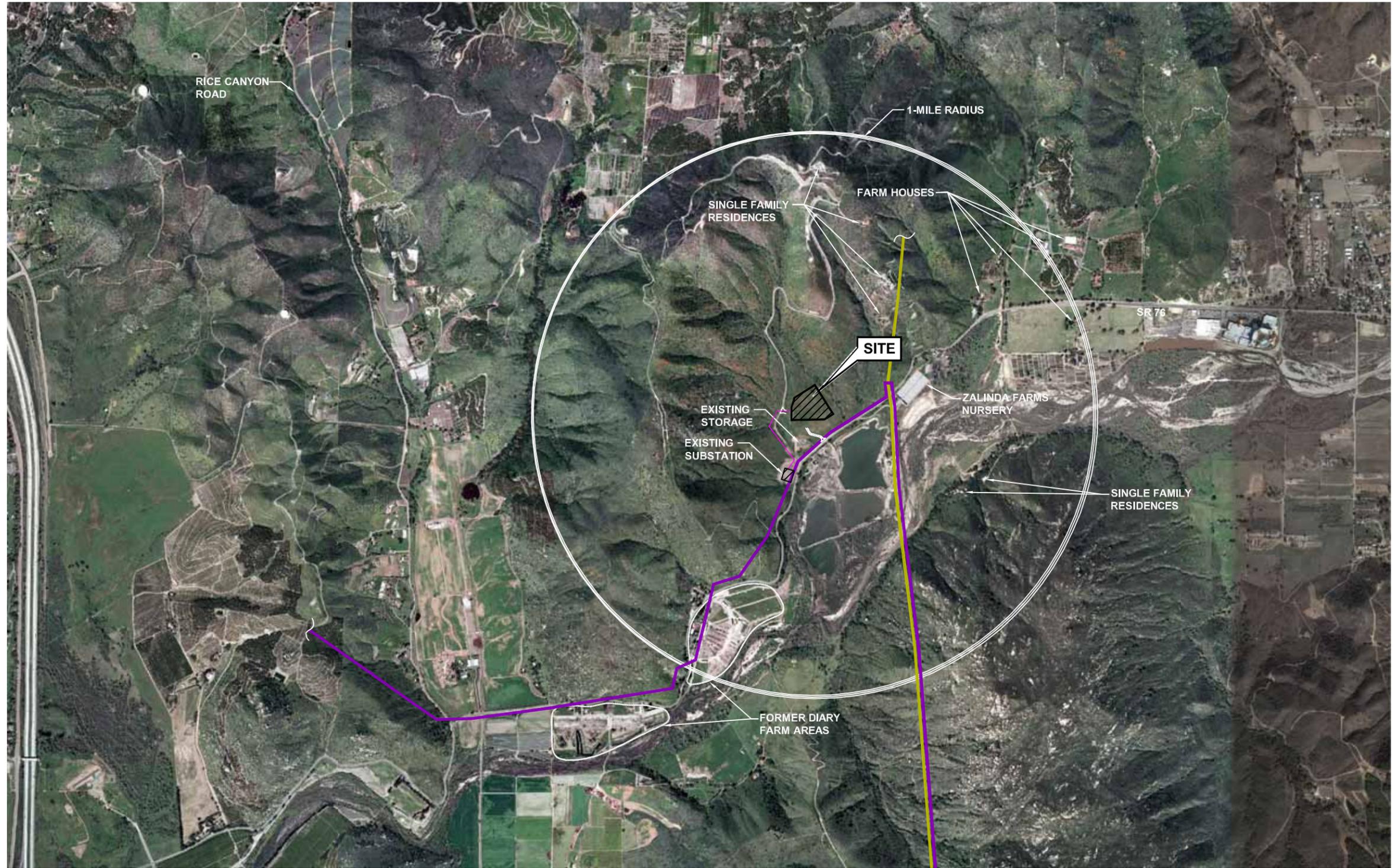
AGENCY	AUTHORITY
California Independent System Operator J. Nickel (916) 608-7062 jnickel@caiso.com	Compliance with interconnection and maintenance requirements
County of San Diego Department of Planning and Land Use 5201 Ruffin Road, Suite B San Diego, CA 92123 J. Ramaiya (858) 694-3015	Compliance with County Planning and Building ordinances.

3.4 REFERENCES

Dusi, Alan. Sempra Utilities. Personal communication with TRC, June 4, 2008.

LEGEND

- Proposed Electric Transmission Line
- Existing 230KV Transmission Line
- Existing 69KV Transmission Line

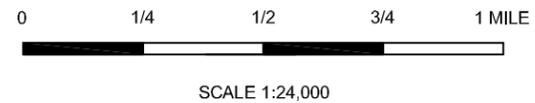


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SOURCE:

Google Earth Professional, 2005.



PROJECT: 125158

FACILITY:

ORANGE GROVE PROJECT
SAN DIEGO COUNTY, CALIFORNIA

**TRANSMISSION LINE LOCATIONS
AT 1:24,000 SCALE**

FIGURE 3.1-1