May 22, 2010

Alan Solomon
Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

RE: **Palen Solar Power Project, Docket No. 09-AFC-7**
Responses to Questions from the April 28, 29 and May 7, 2010 CEC Workshops
Natural Gas vs. Propane at PSPP
SCE Red Bluff Substation Project Description
Technical Areas: Project Description and Transmission System Engineering

Dear Mr. Solomon:

Attached please find the following Responses to Questions from the April 28, 29 and May 7, 2010 CEC Workshops for the Palen Solar Power Project.

If you have any questions on this submittal, please feel free to contact me directly.

Sincerely,

Alice Harron
Senior Director, Development

Solar Millennium LLC
1625 Shattuck Avenue, Suite 270
Berkeley, CA 94709-4611
tel (1) 510-524-4517
fax (1) 510-524-5516
Info@SolarMillennium.com
http://www.SolarMillennium.com

At the Staff Assessment Workshops on April 28-29, 2010, several requests for information were made by CEC staff to clarify their analysis on Project Description, Worker Safety and Hazardous Materials. In addition, several items were requested at the Soil & Water Workshop on May 7, 2010. The following responses/materials are provided to address these requests.

Technical Areas: Project Description

WORKSHOP REQUEST-

Information Required:

> Staff requested justification for Project using propane gas instead of natural gas from a nearby SoCal Gas natural gas pipeline, the response is as follows.

Response:

SoCal Gas has concluded that the PSPP natural gas demand is too low to justify a transmission line tap as will be provided at Blythe. As an alternative, SoCal is offering us service from the same distribution service tap that serves Cocopah farms. Since the Cocopah distribution tap is not sized to accommodate PSPP gas demand, SM must pay to increase the size of the distribution service tap and pay for 5 miles of distribution pipeline to the project site to receive gas service. In an engineering analysis, SM concluded that, given the amount of fuel usage, a propane installation was more cost effective than making the necessary upgrades to obtain natural gas service.

SOUTHERN CALIFORNIA EDISON
RED BLUFF SUBSTATION
PROJECT DESCRIPTION

Dated: April 15, 2010

Provided for Docket No. 09-AFC-7
Palen Solar Power Project

Provided By Solar Millennium LLC

SOUTHERN CALIFORNIA
EDISON®
An *EDISON INTERNATIONAL®* Company

Robert J. Lugo
Mgr., Grid Interconnection
& Contract Development

April 15, 2010

Mr. Raymond Dracker
Senior Vice President-Project Development
Solar Millennium LLC
1625 Shattuck Avenue
Berkeley, CA 94709

Subject: Final Project Description for SCE's Facilities related to the Solar Millennium LLC Palen Solar Project Interconnection

Dear Mr. Dracker,

SCE previously committed to, and did, submit preliminary project descriptions to generators in mid March 2010. Additionally, SCE has prepared and is transmitting the attached updated Red Bluff Substation Project Description ("Project Description") for your review and inclusion into your environmental documents. This will be SCE's last planned update to the Project Description.

Please keep in mind this description is based on preliminary planning/engineering assumptions. The information provided in SCE's technical description is based on information provide by Solar Millennium. This version of the Project Description must be incorporated into Solar Millennium's Palen Solar Project Application for Certification at the California Energy Commission ("CEC") and in any required federal environmental documents in order to ensure that the appropriate CEQA analysis is performed by the CEC and, if required, NEPA analysis by the appropriate federal agencies. These certified documents will enable SCE to acquire the necessary permits at the California Public Utilities Commission that are required for SCE to commence construction of its facilities.

To effectively coordinate SCE's efforts, I am requesting that Solar Millennium keep SCE informed of the project progress and circulate to SCE any working drafts of the documents that Solar Millennium intends to submit to the agencies for review.

SCE has proceeded in good faith to timely develop this final Project Description with the understanding that Solar Millennium will reimburse SCE its costs incurred to perform such work under the terms of a forthcoming letter agreement. SCE is currently signing a letter agreement that will be circulated shortly for Solar Millennium's signature for execution purposes. In the interim, SCE is willing to provide this Final Project Description with the understanding that the letter agreement will be executed by the parties promptly to SCE's provision of the final Project Description on April 15, 2010.

Please contact Mr. Bhaskar Ray of my staff at (626) 302-7848 if you have any questions pertaining to this letter.

Sincerely,

Robert J Lugo
Manager, Grid Interconnection
and Contract Development

P.O. Box 800
2244 Walnut Grove Ave.
Rosemead, CA 91770
626-302-8501/PAX 28501
Fax 626-302-1152
robert.lugo@sce.com

Enclosures: Red Bluff Project Description and Figures

cc: Ralph Hollenbacher- Solar Millennium (via email)

SOUTHERN CALIFORNIA
EDISON®
An EDISON INTERNATIONAL® Company

Robert J. Lugo
Mgr., Grid Interconnection
& Contract Development

bcc: Charles Adamson
Kathryn Enright
Jill Horswell
Thomas Calabro

P.O. Box 800
2244 Walnut Grove Ave.
Rosemead, CA 91770
626-302-8501/PAX 28501
Fax 626-302-1152
robert.lugo@sce.com

1.0 RED BLUFF SUBSTATION PROJECT DESCRIPTION

1.1 PROJECT OVERVIEW:

1.1.1 Description of Project Elements

Southern California Edison (SCE) proposes to construct the Red Bluff Substation Project (Project) near Desert Center in Riverside County, California (Figure 1) to allow for interconnection of a solar development project in the Desert Center area of the Mojave Desert to SCE's existing Devers-Palo Verde (DPV) Transmission Line (T/L) and creating the Colorado River - Red Bluff and Devers - Red Bluff 500 kV T/Ls.[1] Two alternate sites (Sites 1 and 2 shown in Figure 1) were identified for the Red Bluff Substation. The following is a summary of the Red Bluff Project components for Site 1 (Figure 3). A summary discussion of project components for the Red Bluff Substation at Site 2 is presented in Section 1.7:

- Red Bluff Substation: Construct a 500/220 kV substation on approximately 90 acres of land.
- Transmission Lines: Loop the existing DPV 500 kV transmission line into the Red Bluff Substation by adding a total of approximately 2,000 feet of new transmission lines (two parallel lines approximately 1,000 feet long each within a corridor approximately 1,000 feet wide), creating the Colorado River-Red Bluff and Devers-Red Bluff 500 kV transmission lines.[2]
- Generation Tie Line Connection: Connect the customer-constructed and owned built 220kV generation tie line (gen-tie) into the Red Bluff Substation.
- Modification of existing 220 kV structures: The necessary crossing of the new FPL Buck-Julian Hinds 220 kV transmission lines by the proposed SCE 500 kV loop-in lines may require modifications. New tubular steel poles (details to be determined during detailed engineering phase) to modify the construction at the crossing location that may be needed to replace the existing poles.
- Distribution Line for Substation Light and Power: Construct approximately 300 feet of 12 kV overhead distribution line and approximately 1,000 feet of underground distribution line to connect the existing distribution system along Eagle Mountain Road to Red Bluff Substation to provide substation light and power.
- Telecommunications Facilities: Install optical ground wire (OPGW) on the proposed solar project's generation tie-line connection and connect to associated equipment installed inside both the proposed Red Bluff Substation and the proposed solar

---

[1] Due to the impending Colorado River Switchyard/Substation that was approved at part of SCE's Devers-Palo Verde No. 2 Project (California segment), the naming convention for the proposed Red Bluff Substation and associated transmission tie loop in is proposed to reflect Colorado River Substation and therefore the line convention after the line is looped in to the proposed Colorado River Switchyard/Substation would be the Colorado River – Red Bluff and Devers-Red Bluff (subject to final confirmation once operating dates are agreed upon).

[2] See Note 1.

project's substation.[3] Install a new microwave repeater station, consisting of a new 12 foot by 36 foot communications room and associated equipment, along with a 185 foot tall lattice steel communications tower and two (2) 10 foot diameter microwave antennas.

Estimated Project land disturbance summary data for the two alternate sites is presented in Table 1. Factors used to estimate land disturbances for the two alternate sites are presented in Tables 3, 5, 9, and 11. This project description and the land disturbance estimates are based on planning level assumptions. Additional details would be determined following completion of preliminary and detailed engineering, identification of field conditions, labor availability, equipment, and compliance with applicable environmental and permitting requirements.

TABLE 1
RED BLUFF SUBSTATION PROJECT ESTIMATED LAND DISTURBANCE SUMMARY

PROJECT ELEMENT	SUBSTATION SITE 1 (acres)		SUBSTATION SITE 2 (acres)	
	Temporary	Permanent	Temporary	Permanent
SUBSTATION SYSTEM (1)	10.00	111.30	10.00	133.77
TRANSMISSION SYSTEM (2)	19.43	2.23	19.43	2.23
DISTRIBUTION SYSTEM (3)	0.03	0.12	0.03.	8.28
TELECOMMUNIC-ATION SYSTEM (4)	0.30	0.22	0.30	0.22
TOTAL DISTURBANCE	29.76	113.87	29.76	144.50

(1) see Table 3 for Site 1 and Table 14 for Site 2
(2) see Table 5 for Sites 1 and 2
(3) see Table 9 for Site 1 and Table 16 for Site 2
(4) see Table 11 for Sites 1 and 2

The numbers presented in Table 1 are preliminary and subject to change as the result of detailed engineering.

1.1.2 Approval Process and Approving Public Agencies

A solar development project has been proposed in the vicinity of Desert Center, located on primarily government land under the jurisdiction of the Bureau of Land Management (BLM). The solar developer will submit an Application to the BLM for an Amended Right-of-Way

[3] Subject to confirmation whether the solar developer would incorporate the OPGW within its gen-tie (may be able to be removed as not within SCE's scope of work).

Grant. If approved, the BLM will issue a Record of Decision and a Notice to Proceed allowing construction of the proposed solar development project under the administration of the BLM. Prior to approval of a Project, the BLM will have an Environmental Impact Statement (EIS) prepared by a third-party consultant which analyzes the environmental impacts associated with the proposed project pursuant to the National Environmental Policy Act (NEPA).

The solar development project would interconnect with SCE's regional transmission system via a 220 kV gen-tie line from each solar project to the new Red Bluff Substation where they would connect to SCE's bulk transmission system via SCE's existing DPV 500 kV transmission line. SCE will construct and own the Red Bluff Substation. Although discussions are still underway with the California Public Utilities Commission (CPUC), it is expected that the Red Bluff Substation Project will be reviewed in accordance with a Permit to Construct standard pursuant to CPUC General Order 131-D.

Based on discussions with CPUC and BLM staff, SCE anticipates that the CPUC and BLM will work cooperatively and will conduct a joint California Environmental Quality Act (CEQA)/NEPA review of the substation and transmission connection system. This cooperation will include use of a single environmental consultant who will prepare the EIS and work closely with the CPUC to ensure compliance with CEQA for the substation and transmission connection system.

Additional approvals and permits that may need to be obtained for the Project to proceed include a Biological Opinion from the U.S Fish & Wildlife Service, a Consistency Determination by the California Department of Fish and Game (CDFG), California State Historic Preservation Office (SHPO) approval of the cultural resources Programmatic Agreement (PA), and 401/404 federal water permits from the Army Corps of Engineers and 1601/1602 clean water permits from the CDFG. In addition to these permits additional permits may be required from other federal agencies (e.g. Federal Communication Commission, Federal Aviation Administration, etc.), state agencies (e.g. California Department of Transportation, Department of Toxic Substances Control, South Coast Air Quality Management District, etc.) and local agencies (e.g. Riverside County, cities and local fire departments, etc.).

1.1.3 Length of Construction Activities and Projected Operation Date

Construction of the Red Bluff Substation is expected to start in the second quarter of 2011 and would proceed for two years. The projected substation operating date is in the third quarter of 2013.

1.2 PROJECT LOCATION:

1.2.1 Regional and Local Location

The Red Bluff Site 1 Substation would be located south of Interstate 10 at Eagle Mountain Road, in the County of Riverside, California (Figure1 – Substation Site 1). The Red Bluff Substation is expected to enclose approximately 90 acres, and would be generally located in the center of the parcel. The approximate center of the substation would be at 33.695 degrees North and 115.453 degrees West.

1.2.2 Substation Site Land Use

The Red Bluff Substation Site 1 is located primarily on a 160 acre parcel of privately owned land that would be acquired and owned by SCE. The land is zoned Controlled Development which allows for two single family dwellings per 10 acres. The General Plan Designation is Open Space – Rural. The surrounding land use is vacant – open space. In addition approximately 20 acres of a 70 acre BLM parcel directly to the north may also need to be utilized as part of the substation extents.

1.3 SUBSTATION

1.3.1 Introduction

SCE proposes to construct the Red Bluff Substation Project to interconnect the proposed solar development project to SCE's existing DPV 500 kV transmission line. The DPV 500 kV transmission line will connect to the Red Bluff Substation by looping the line into the Substation. In addition, 220 kV gen-tie lines would be extended from the solar developments to inside the Red Bluff Substation Site/ Property (SCE-controlled property).

1.3.2 Substation Design and Equipment

The Red Bluff Substation would be an 1120MVA, 500/220kV substation with an enclosed area measuring approximately 1,600 feet by 2,400 feet to loop the DPV 500 kV transmission line and provide for the solar developers' 220 kV gen-tie line position(s). The substation will be surrounded by a wall with two gates.

1.3.2.1 Substation Equipment

The 500 kV switchrack would have a total of six positions. Four positions would be utilized in the initial design: one position on a breaker and a half configuration would be to loop the existing DPV 500 kV transmission line to create the Colorado River-Red Bluff and Devers–Red Bluff 500 kV lines[4], two positions would be reserved to loop the future Colorado River – Red Bluff No. 2 and Colorado River-Devers No. 2 500 kV T/Ls[5] and one position would be

[4] See footnote 2 for line convention naming assuming the proposed Colorado River Substation is in service. For ease of the reader, the introductory reference is made to the existing Devers-Palo Verde 500 kV line.

[5] The future Colorado River-RedBluff No.2 and Devers-RedBluff No. 2 T/Ls are licensed in accordance with the "DPV2" CPCN which the CPUC issued a PTM to construct the California portion of the DPV2 Project in November 2008. Please note that the PUC's approval of this project is conditioned upon CAISO approval which is expected during third or fourth quarter of 2010.

for a AA bank position for generation interconnection. The remaining two positions will be available for future expansion.

The 220kV switchrack would have a total of four positions: one position for the AA bank, one position for the gen-tie and the remaining two positions for future expansion.

The Red Bluff Substation would be initially equipped with:

- Two (2) 500 kV Operating buses covering six positions
- Twenty-seven (27) single-phase 500 kV circuit breakers
- Fifty-four (54) single-phase 500 kV disconnect switches
- Four (4) single-phase, 373MVA, 500/220 kV transformers
- Two (2) 220 kV Operating buses covering four positions
- Four (4) 220 kV circuit breakers
- Eight (8) 220 kV group operated disconnect switches
- A Mechanical Electrical Equipment Room (MEER)
- Station light and power transformers
- Station lighting
- 750 kVA emergency generator

1.3.2.2 Development Plan

The Substation Site 1 development plan is presented in Figure 2.

1.3.2.3 Site Access

Access to the Red Bluff Substation Site 1 would be from the Eagle Mountain exit from Highway I-10. A new access road would be constructed from the highway off ramp angling approximately 800 feet towards the northeast substation corner then continuing south approximately 1,000 feet to the main entry gate.

This new access road is anticipated to be 24 feet in width with a two foot wide shoulder on each side. Construction would include compaction of the sub-soil and the placing a 4 inch thick layer of asphalt concrete over a 6 inch thick layer of compacted aggregate road-base over the 24-foot wide road. In order to accomplish the above road improvements, an average width of 30 feet has been assumed to include allowances for side slopes and surface runoff control resulting in a total land disturbance of approximately 1.3 acres.

1.3.2.4 Lighting and Perimeter Features

Lighting at the proposed substation would consist of high-pressure sodium, low intensity lights located in the switchyards, around the transformer banks, and in areas of the yard where operating and maintenance activities may take place during evening hours for emergency/scheduled work. Maintenance lights would be controlled by a manual switch and would normally be in the “off” position. The lights would be directed downward, and shielded to reduce glare outside the facility.

The proposed substation would be enclosed on four sides by an eight-foot-high wall with two 24 feet-wide rolling gates. A band of at least three strands of barbed wire would be affixed near the top of the perimeter wall inside of the substation and would not be visible from the outside.

1.3.2.5 Operation and Maintenance

Once constructed, the Red Bluff Substation would be unstaffed, and electrical equipment within the substation would be remotely monitored. SCE personnel would visit for routine maintenance purposes. Routine maintenance would include equipment testing, monitoring, and repair. SCE personnel would generally visit the substation three to four times per month.

1.3.2.6 Electric and Magnetic Fields (EMF)

A NEPA analysis does not commonly include a discussion of potential environmental impacts from electric and magnetic fields (EMF) due to the lack of a consensus among scientists that EMF exposure poses a risk to human health. Nor are there any CEQA standards regarding the analysis of potential human health risks caused by EMF exposure. However, the EIS prepared for this project is expected to contain a discussion of EMF to accommodate the public's interest and concern regarding potential human health effects related to EMF exposure from transmission lines.

Although there are no NEPA or CEQA standards regarding the analysis of potential human risks associated with EMF exposure, the CPUC reviewed and updated its EMF policy in 2006 (CPUC Decision 06-01-042) for California's regulated electric utilities. This policy decision update reaffirmed the finding that state and federal public health regulatory agencies have not established a direct link between exposure to EMF and human health effects, and that the existing "no-cost and low-cost" precautionary-based EMF policy should be continued for electrical facilities. As the electrical infrastructure is upgraded in California, measures to reduce magnetic fields will be incorporated into the project design in accordance with the California EMF Design Guidelines for Electrical Facilities, CPUC Decision 93-11-013 and CPUC Decision 06-01-042. Furthermore, the design of the proposed substation and transmission lines will incorporate "no-cost and low-cost" measures such as placing major substation electrical equipment away from the substation property lines to reduce magnetic fields. These measures would be documented in a project specific Field Management Plan.

1.3.3 Substation Construction

1.3.3.1 Grading and Drainage

Red Bluff Substation Site 1 would be prepared by clearing existing vegetation and installing a temporary chain-link fence to surround the construction site. The site would be graded in accordance with approved grading plans. The area to be enclosed by the proposed substation perimeter wall would be graded to a slope that varies between one and two percent and compacted to 90 percent of the maximum dry density.

The Red Bluff Substation Site 1 is located north of the Chuckwalla Mountains which contributes to surface storm water runoff through the proposed site. A designated Blue-line stream is located running south to north through the center of the proposed substation site. Although this appears to be a minor drainage feature, it would be necessary to redirect this flow around one side of the substation. The substation's southern boundaries would be protected from surface runoff by the installation of a berm designed to direct the flow around both sides of the substation pad. These drainage improvements would potentially disturb an area approximately 80 feet wide around three sides of the fenced in substation resulting in a total permanent disturbance area of approximately 20 acres.

Internal surface runoff would be directed towards a detention basin located at the north end of the substation. The basin would measure approximately 120 feet by 200 feet occupying approximately one-half acre and would be enclosed by an 8-foot high chain-link fence and one 20-foot wide double drive gate.

The final site drainage design would be subject to the conditions of the grading permit obtained from the County of Riverside.

Table 2 provides the approximate volume and type of earth materials to be used or disposed of at Substation Site 1 (within the substation wall and the required drainage structures outside/around the substation).

TABLE 2
SUBSTATION SITE 1 AND ACCESS ROAD - GROUND SURFACE IMPROVEMENT MATERIALS AND ESTIMATED VOLUMES

Element	Material	Approximate Volume (yd^3)
Site Cut (1) Site Fill (1)	Soil Soil	1,000,000 1,000,000
Waste Removal (export)	Soil/Vegetation	23,000
Substation Equipment Foundations	Concrete	14,000
Equipment and cable trench excavations (2)	Soil	15,500
Cable Trenches (3)	Concrete	200
Internal Driveway	Asphalt concrete Class II aggregate base	3,200 4,800
External Driveway	Asphalt concrete Class II aggregate base	700 1,100
Substation Rock Surfacing	Rock, nominal 1 to 1-1/2 inch per SCE Standard	33,000

(1) The design concept would be intended to balance the earthwork quantities, utilizing any site cut material as site fill, where feasible.
(2) Excavation "spoils" would be placed on site during the below-ground construction phase and used to the extent possible for the required on-site grading.
(3) Standard cable trench elements are factory fabricated, delivered to the site and installed by crane. Intersections are cast in place concrete.

The numbers presented in Table 2 are preliminary and subject to change as the result of detailed engineering.

1.3.3.2 Staging Areas

Additional temporary land disturbance (up to approximately 10 acres) adjacent to the Red Bluff Substation Site 1 property may be necessary for temporary equipment storage and material staging areas associated with construction efforts.

1.3.3.3 Geotechnical Studies

Prior to the start of construction, SCE expects to conduct a geotechnical study of the substation site and the transmission line routes that would include an evaluation of the depth to the water table, evidence of faulting, liquefaction potential, physical properties of subsurface soils, soil resistivity, slope stability, and the presence of hazardous materials.

1.3.3.4 Below Grade Construction

After the substation site is graded, below grade facilities would be installed. Below grade facilities include a ground grid, underground conduit, trenches, and all required foundations. The design of the ground grid would be based on soil resistively measurements collected during a geotechnical investigation that would be conducted prior to construction.

1.3.3.5 Equipment Installation

Above grade installation of substation facilities (i.e., buses, circuit breakers, steel structures, and the MEER) would commence after the below grade structures are in place.

1.3.3.6 Hazards and Hazardous Materials

Construction of the Project would require the limited use of hazardous materials, such as fuels, lubricants, and cleaning solvents. All hazardous materials would be stored, handled and used in accordance with applicable regulations. Material Safety Data Sheets would be made available at the construction site for all crew workers.

The Storm Water Pollution Prevention Plan prepared for the Project would provide the locations for storage of hazardous materials during construction, as well as protective measures, notifications, and cleanup requirements for any incidental spills or other potential releases of hazardous materials.

1.3.3.7 Waste Management

Construction of the Project would result in the generation of various waste materials that can be recycled and salvaged. Waste items and materials would be collected by construction crews and separated into roll off boxes at the materials staging area. All waste materials that are not recycled would be categorized by SCE in order to assure appropriate final disposal. Non-hazardous waste would be transported to local authorized waste management facilities.

Soil excavated for the Red Bluff Substation would either be used as fill or disposed of off-site at an approved licensed facility.

1.3.3.8 Post-Construction Cleanup

Any damage to existing roads as a result of construction would be repaired once construction is complete, in accordance with local agency requirements.

Following completion of construction activities, SCE would also restore all areas that were temporarily disturbed by construction of the Project to as close to preconstruction conditions as possible, or, where applicable, to the conditions agreed upon between the landowner and SCE. In addition, all construction materials and debris would be removed from the area and recycled or properly disposed of off-site at local authorized waste management facilities. SCE would conduct a final inspection to ensure that cleanup activities were successfully completed.

1.3.3.9 Land Disturbance

Table 3 provides a preliminary estimate of temporary and permanent land disturbance related to construction of the substation at Substation Site 1 (outside the substation fence and the required drainage structures outside/around the substation). The numbers presented in Table 3 are preliminary and subject to change as the result of detailed engineering.

TABLE 3
SUBSTATION SITE 1 CONSTRUCTION –ESTIMATED LAND DISTURBANCE SUMMARY (PRELIMINARY)

CONSTRUCTION ACTIVITY	ACRES TEMPORARILY DISTURBED	ACRES PERMANENTLY DISTURBED
Substation Grading	-	90.0
Drainage/Side Slopes	-	20.0
Substation Access Road (1)	-	1.3
Staging Area	10.0	-
Total Acres Disturbed	10.0	111.3

(1) Based on road dimensions of 1800 feet long by 30 feet wide.

1.3.10 Construction Equipment and Labor

The estimated elements, materials, number of personnel and equipment required for construction of the Red Bluff Substation Site 1 are summarized below in Table 4 below. The numbers presented in Table 4 are preliminary and subject to change as the result of additional detailed engineering.

In addition to the information provided in Table 4, a temporary office trailer and equipment trailer may be placed within the proposed substation construction area during the construction phase of the project.

Construction would be performed by either SCE construction crews or contractors, managed by SCE construction management personnel. SCE anticipates a minimum of approximately 25 construction personnel working on any given day. SCE anticipates that crews would work concurrently whenever possible; however, the estimated deployment and number of crew members would be dependent upon governing agency permitting requirements, material availability, and construction scheduling. For example, electrical equipment (such as substation MEER, wiring, and circuit breaker) installation may occur while transmission line construction proceeds.

Construction activities would generally be scheduled during daylight hours in accordance with applicable noise abatement ordinances. In the event construction activities need to occur on different days or hours, SCE would obtain variances as necessary from appropriate jurisdiction where the work would take place.

TABLE 4
SUBSTATION SITES 1 AND 2 CONSTRUCTION EQUIPMENT AND LABOR ESTIMATES (PRELIMINARY)

Activity and number of Personnel	Number of Work Days	Equipment and Quantity	Duration of Use (Hours/Day)
Survey (2 people)	10	2-Survey Trucks (Gasoline)	8
Grading (8 people)	60	1-Dozer (Diesel) 2-Loader (Diesel) 1-Scraper (Diesel) 1-Grader (Diesel) 2-Water Truck (Diesel) 2-4x4 Backhoe (Diesel) 1-4x4 Tamper (Diesel) 1-Tool Truck (Gasoline) 1-Pickup 4x4 (Gasoline)	4 4 3 3 2 2 2 2 2
Fencing (4 people)	25	1-Bobcat (Diesel) 1-Flatbed Truck (Gasoline) 1-Crewcab Truck (Gasoline)	8 2 4
Civil (8 people)	90	1-Excavator (Diesel) 1-Foundation auger (Diesel) 2-Backhoes (Diesel) 1-Dump truck (Diesel) 1-Skip Loader (Diesel) 1-Water Truck (Diesel) 2-Bobcat Skid Steer (Diesel) 1-Forklift (Propane) 1-17 TonCrane (Diesel) 1-Tool Truck (Gasoline)	4 5 3 2 3 3 3 4 2 hours/day for 45 days 3
MEER (6 people)	60	1-Carry-all Truck (Gasoline) 1-Tool truck (Gasoline) 1-Stake Truck (Gasoline)	3 2 2
Electrical (10) people)	120	2-Scissor Lifts (Propane) 2-Manlifts (Propane) 1-Reach Manlift (Propane) 1-15 ton Crane (Diesel) 1-Tool Trailer 3-Crew Trucks (Gasoline)	3 3 4 3 3 2
Wiring (2 people)	90	1-Manlift (Propane) 1-Tool Trailer	4 3

Activity and number of Personnel	Number of Work Days	Equipment and Quantity	Duration of Use (Hours/Day)
Maintenance Crew Equipment Check (2 people)	30	2-MaintenanceTrucks (Gasoline)	4
Testing (2 people)	90	1-Crew Truck (Gasoline)	3
Asphalting (6 people)	40	2-Paving Roller (Diesel) 1-Asphalt Paver (Diesel) 1-Stake Truck (Gasoline) 1-Tractor (Diesel) 1-Dump Truck (Diesel) 2-Crew Trucks (Gasoline) 1-Asphalt Curb Machine (Diesel)	4 4 4 3 3 2 3

1.4 TRANSMISSION LINES AND RELATED STRUCTURES – SUBSTATION SITE 1

1.4.1 Design and Equipment

SCE's transmission line requirements for the solar project(s) interconnection to the DPV 500 kV transmission line are broken into the following components: 1) 500 kV Loop-in lines; 2) gen-tie 220 kV line connection; and 3) existing structure modifications. Each of these components is described below.

1.4.1.1 500 kV Transmission Line Loop-In Design

The proposed Red Bluff Substation would be connected to the existing DPV 500 kV transmission source line via a loop-in line. The loop-in line would dissect the existing line and change it into two line segments: The Colorado River-Red Bluff and the Devers-Red Bluff 500 kV transmission lines.[6] The new piece of each line segment into the Red Bluff Substation would be approximately 1,000 feet long.

The new 500 kV line segments would be constructed using approximately four transmission structures - two of which are expected to be single-circuit lattice steel tower (LST)) or tubular steel pole (TSP)) and two of which are expected to be modified double-circuit LSTs.

[6] See Footnote 2 for discussion of line representation.

The 500 kV double circuit structures would be utilized just outside of the substation wall (but within the SCE-controlled Red Bluff Substation Site). The purpose of the double circuit tower is two-fold in that it requires a smaller ‘footprint’ in the substation vicinity and it places the conductors in a vertical arrangement facilitating proper phasing at the substation racks. To achieve this, these towers would be approximately 40 feet taller than the single circuit towers. The conductor utilized would be 2B-2156 kcmil “Bluebird” Aluminum Conductor Steel Reinforced (ACSR) conductor.

Some of the new transmission structures may require a new right of way along that portion of the loop-in lines between SCE’s existing ROW and the new Red Bluff Substation Site/Property. Other transmission structures would be within SCE’s existing ROW. Three dead-end structures would be required for each line segment (a total of six structures for both lines), to reach the edge of the Red Bluff Substation Site/Property - see Figure 4.

1.4.1.2 220 kV Generation Tie-Line Extension Design

The proposed gen-tie connection design into the Red Bluff Substation is described for each proposed solar project separately in a project-specific appendix.

1.4.1.3 220 kV Transmission Line Structure Modifications/Replacement Design

The proposed routes for the 500 kV transmission loop-in line require crossing over the recently constructed Florida Power and Light’s (FPL) Buck-Julian Hinds 220 kV transmission line. In order to allow this 220 kV line to safely cross under the 500 kV loop-in lines, it may be necessary to modify the FPL structures to comply with the ‘Grade A crossing’ requirements found in CPUC General Order No. 95 (GO 95). The GO 95 ‘Grade A Crossing’ requires that the towers be able to withstand a ‘1/3 broken wire’ condition. In the SCE system, there are currently two types of suspension towers (EHT and EGA) that satisfy this criterion and have been previously utilized in other projects. In order to minimize cost. SCE would attempt to utilize these lower cost suspension towers rather than a dead-end structure; however, that cannot be known with certainty at this time.

At the point of the undercrossing, the FPL Buck-Julian Hinds 220 kV line may possibly need to be lowered or otherwise reconfigured. The preferred approach at this time would be to determine the appropriate loop-in structures and position them within the proper span. Additional towers may be required to bring the modified spans to current standards and specifications.

The detailed modifications to the FPL 220 kV transmission line required to accommodate the 500 kV loop-in lines cannot be known until further engineering work and studies are completed. The type and size of towers and footings would depend on survey information, weather studies, soil analysis and final transmission engineering.

1.4.2 <u>Transmission Line and Related Structures Construction</u>

1.4.2.1 Marshalling Yards/Staging Areas

A temporary equipment and material staging area would be established for short-term utilization within the Red Bluff Substation Site 1 Property.

Equipment and materials to be stored at the temporary equipment and material staging area may include:

- Construction trailer
- Construction equipment
- Conductor/wire reels
- Transmission structure components
- Overhead ground wire/Optical ground wire cable
- Hardware
- Insulators
- Consumables, such as fuel and joint compound
- Portable sanitation facilities
- Waste materials for salvaging, recycling, and/or disposal
- Commonly used Best Management Practices materials such as straw wattles, gravel, sandbags, and silt

The size of the temporary equipment and material staging area would be dependent upon a detailed site inspection and would take into account, where practical, suggestions by the SCE Crew Foreman or the SCE Contractor selected to do the work. An area of approximately 0.5 to 1.5 acres may be required. Additional temporary areas may be required for crew “show up” yards and would be used for temporary parking. Land disturbed at the temporary equipment and material staging area would be restored to preconstruction conditions following the completion of construction.

1.4.2.2 Access and Spur Roads

This portion of the project involves construction within existing and new ROW. It is assumed that existing public roads as well as existing transmission line roads would be used as much as possible during construction of this project. This project may also require new transmission line roads to access the new transmission line segments and structure locations. Transmission line roads are classified into two groups: access roads and spur roads. Access roads are through roads that run between tower sites along a ROW and serve as the main transportation route along line ROWs; spur roads are roads that lead from access roads and terminate at one or more structure sites.

Rehabilitation work may be necessary in some locations along the existing transmission line roads to accommodate construction activities. This work may include the re-grading and repair of existing access roads, spur roads and associated drainage hardware. These roads would be cleared of vegetation, blade-graded to remove potholes, ruts, and other surface irregularities, and re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 14 feet, with 2 feet of shoulder on each side (depending upon field conditions) for a total road width of 18 feet.

Similar to rehabilitation of existing roads, all new road alignments would first be cleared and grubbed of vegetation. Roads would be blade-graded to remove potholes, ruts, and other surface irregularities, fill material would be deposited where necessary, and roads would be re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 14 feet, with 2 feet of shoulder on each side but may be wider depending on final engineering requirements and field conditions. Access road associated drainage hardware that had been damaged or in need of adjustment would be restored to working condition. New road gradients would be leveled so that any sustained grade does not exceed 12 percent. All curves would have a radius of curvature of not less than 50 feet, measured at the center line of the usable road surface. The new roads would typically have turnaround areas near the structure locations.

1.4.2.3 Modifications of Existing Transmission Structures
The structure modifications begin with hauling and stacking bundles of steel at tower locations per engineering drawing requirements. This activity requires use of several tractors with 40-foot trailers and a rough terrain forklift. After steel is delivered and stacked, crews would proceed with the structure modification to leg extensions, body panels, boxed sections, bridges, and peaks, as necessary. Grading may be necessary to establish a temporary laydown area approximately 150 feet by 150 feet (0.52 acre) adjacent to the existing structure for equipment and material staging during the structure modification process. For each structure, a crane truck or rough terrain, the structure would be stabilized by a minimum 120-ton all-terrain or rough terrain crane, then the various steel components used to reinforce the towers would be lifted into place with a minimum 80-ton all-terrain or rough terrain crane and the tower modification work would be performed by a combined erection and torquing crew.

1.4.2.4 Removal of Existing 500 kV Transmission Structures
Transmission line facilities to be removed include existing 500 kV transmission structures and associated hardware (i.e., insulators, vibration dampeners, suspension clamps, ground wire clamps, shackles, links, nuts, bolts, washers, cotters pins, insulator weights, and bond wires). The existing access routes would be used to reach structure sites, but some rehabilitation work on these roads may be necessary before removal activities begin. In addition, grading may be necessary to establish a temporary laydown area approximately 150 feet by 150 feet (0.52 acre) adjacent to the existing structure for equipment and material staging during the structure removal. For each structure, a crane truck or rough terrain crane would be used to support structure during dismantle and removal. A crane pad would be located within the laydown area used for structure assembly. If the existing terrain is not suitable to support crane activities, a temporary 50 feet by 50 feet (0.06 acre) crane pad would be constructed. The existing structure footings would be removed to a depth of approximately 2 feet below ground level. Holes would be filled, compacted, and the area would be smoothed to match surrounding grade.

SCE may temporarily transfer the existing 500 kV conductor to temporary structures during the removal and replacement of the existing 500 kV structures. Upon completion of the construction of the 500 kV replacement structures and dismantling of the existing 500 kV structure to a level below the conductor attachment height, the existing conductor would be transferred over from the temporary structures and attached to the new 500 kV structures.

1.4.2.5 Construction of New 500 kV and 220kV Transmission Structures
The new 500kV and 220kV structure locations and 220kV gen-tie structure locations would first be graded and/or cleared of vegetation as required to provide a reasonably level and vegetation-free surface for footing and structure construction. Site preparation for the

temporary laydown area required for the assembly of the 500 kV and 220 kV structures would also be cleared of vegetation and graded as required to provide a reasonably level and vegetation-free surface for temporary area needed for the laydown, assembly, and erection of the structures. This area is approximately 200 feet by 200 feet (0.92 acre). Erection of the structure would require an erection crane to be set up adjacent to and 60 feet from the centerline of the structure. A crane pad would be located within the laydown area used for structure assembly. If the existing terrain is not suitable to support crane activities, a temporary 50 feet by 50 feet (0.06 acre) crane pad would be constructed.

The structures would require drilled, poured-in-place, concrete footings that would form the structure foundation. Actual footing diameters and depths for each of the structure foundations would depend on the soil conditions and topography at the site and would be determined during detailed engineering.

The foundation process starts with the excavation of the hole for the structure. The hole would be excavated using truck or track-mounted augers with various diameter augers to match the diameter requirements of the structure. The excavated material would be distributed at the structure site, used as fill for the new roads or substation site, or used in the rehabilitation of existing access roads. Alternatively, the excavated soil may be disposed of at an off-site disposal facility in accordance with all applicable laws.

Following excavation of the foundation footing for each structure, steel reinforced rebar cage(s) would be set in the excavated footing holes, anchor bolts and/or stub angles would be set in place, precision would be verified by a surveyor, and concrete would then be placed. The steel reinforced rebar cage(s) would be assembled off site and delivered to the structure location by flatbed truck. A typical transmission structure would require approximately 50 to 80 cubic yards of concrete delivered to the structure location depending upon the type of structure being constructed, soil conditions, and topography at each site. The transmission structure footings would project approximately 1-4 feet above the ground level.

During construction, existing commercial ready-mix concrete supply facilities would be used where feasible. If commercial ready-mix concrete supply facilities do not exist within the general area of need, a temporary concrete batch plant would be set up. If necessary, approximately two acres of property would be sub-partitioned from the temporary equipment and material staging area within the Red Bluff Substation Site/Property for a temporary concrete batch plant. Equipment would include a central mixer unit (drum type); three silos for injecting concrete additives, fly ash, and cement; a water tank; portable pumps; a pneumatic injector; and a loader for handling concrete additives not in the silos. Dust emissions would be controlled by watering the area and by sealing the silos and transferring the fine particulates pneumatically between the silos and the mixers.

The assembly would consist of hauling the structure components from the staging yard to their designated structure location using semi-trucks with 40-foot trailers. Crews would then assemble portions of each structure on the ground at the structure location, while on the ground, the top section may be pre-configured with the necessary insulators and wire-stringing hardware before being set in place. An 80-ton all-terrain or rough terrain crane would be used to position the base section on top of previously prepared foundation. When the base section is secured, the remaining portions of the structure would then be placed upon the base section and bolted together.

After construction is completed, the transmission structure site would be graded such that water would run toward the direction of the natural drainage. In addition, drainage would be designed to prevent ponding and erosive water flows that could cause damage to the structure footing. The graded area would be compacted and would be capable of supporting heavy vehicular traffic.

1.4.2.6 Guard Structures

Guard structures would be installed at the FPL Buck-Julian Hinds 220 kV transmission crossing. Guard structures are temporary facilities designed to stop the movement of a conductor should it momentarily drop below a conventional stringing height. Typical guard structures are standard wood poles, taller in height than the line being crossed. Depending on the width of the new line being constructed, the number of guard poles installed on either side of a crossing would be between two and four. The guard structures are removed after the conductor is secured into place. In some cases, the wood poles could be substituted with the use of specifically equipped boom-type trucks with heavy outriggers staged to prevent the conductor from dropping.

1.4.2.7 Wire Stringing of 500 kV and 220 kV Conductor

Wire-stringing includes all activities associated with the installation of conductors. This activity includes the installation of primary conductor and overhead ground wire (OHGW), vibration dampeners, weights, spacers, and suspension and dead-end hardware assemblies. Insulators and stringing sheaves (rollers or travelers) are typically attached during the steel erection process.

A standard wire-stringing plan includes a sequenced program of events starting with determination of wire pulls and wire pull equipment set-up positions. Advanced planning by supervision determines circuit outages, pulling times, and safety protocols needed for ensuring that safe and quick installation of wire is accomplished.

Wire-stringing activities would be conducted in accordance with SCE specifications, which is similar to process methods detailed in Institute of Electrical and Electronics Engineers Standard (IEEE) 524-2003, Guide to the Installation of Overhead Transmission Line Conductors.

Wire pulls are the length of any given continuous wire installation process between two selected points along the line. Wire pulls are selected, where possible, based on availability of dead-end structures at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of stringing and splicing equipment setups. In some cases, it may be preferable to select an equipment setup position between two suspension structures. Anchor rods would then be installed to provide dead-ending capability for wire sagging purposes, and also to provide a convenient splicing area.

To ensure the safety of workers and the public, safety devices such as traveling grounds, temporary grounding grid/mats around stringing equipment, guard structures, and radio-equipped public safety roving vehicles and linemen would be in place prior to the initiation of wire-stringing activities.

The following four steps describe the wire installation activities utilized by SCE:

- Step 1: Sock Line, Threading: Typically, a lightweight sock line is passed from structure to structure, which would be threaded through the wire rollers in order to engage a camlock device that would secure the pulling sock in the roller. This threading process would continue between all structures through the rollers of a particular set of spans selected for a conductor pull.

- Step 2: Pulling: The sock line would be used to pull in the conductor pulling cable. The conductor pulling cable would be attached to the conductor using a special swivel joint to prevent damage to the wire and to allow the wire to rotate freely to prevent complications from twisting as the conductor unwinds off the reel. A piece of hardware known as a running board would be installed to properly feed the conductor into the roller; this device keeps the bundle conductor from wrapping during installation.

- Step 3: Splicing, Sagging, and Dead-ending: After the conductor is pulled in, the conductor would be sagged to proper tension and dead-ended to structures.

- Step 4: Clipping-in, Spacers: After the conductor is dead-ended, the conductors would be secured to all tangent structures; a process called clipping in. Once this is complete, spacers would be attached between the bundled conductors of each phase to keep uniform separation between each conductor.

The dimensions of the area needed for the stringing setups associated with wire installation are variable and depends upon terrain. The preferred minimum area needed for tensioning equipment set-up sites requires approximately an area of 150 feet by 500 feet (1.72 acres); the preferred minimum area needed for pulling equipment set-up sites requires approximately an area of 150 feet by 300 feet (1.03 acres); however, crews can work from within slightly smaller areas when space is limited. Each stringing operation would include one puller positioned at one end and one tensioner and wire reel stand truck positioned at the other end.

For stringing equipment that cannot be positioned at either side of a dead-end transmission structure, field snubs (i.e., anchoring and dead-end hardware) would be temporarily installed to sag conductor wire to the correct tension.

The puller and tensioner set-up locations require level areas to allow for maneuvering of the equipment. When possible, these locations would be located on existing level areas and existing roads to minimize the need for grading and cleanup. The final number and locations of the puller and tensioner sites would be determined during detailed engineering for the Proposed Project and the construction methods chosen by SCE or its Contractor.

An overhead ground wire (OHGW) for shielding would be installed on the transmission line. The OHGW would be installed in the same manner as the conductor; it is typically installed in conjunction with the conductor, depending upon various factors, including line direction, inclination, and accessibility.

1.4.2.8 Housekeeping and Construction Site Cleanup
Any damage to existing roads as a result of construction would be repaired once construction is complete.

SCE would restore all areas that are temporarily disturbed by project activities (including equipment and material staging yard, pull and tension sites, and structure laydown and assembly sites) to pre-construction conditions following the completion of construction. Restoration may include grading and restoration of sites to original contours and reseeding where appropriate. In addition, all construction materials and debris would be removed from the area and recycled or properly disposed of at an off-site disposal facility in accordance with all applicable laws. SCE would conduct a final inspection to ensure that cleanup activities are successfully completed.

1.4.2.9 Land Disturbance
Table 5 below provides estimates of temporary and permanent land disturbance areas related to construction of the transmission lines on both Site 1 and Site 2 since the transmission line construction areas of disturbance will be approximately the same for both sites. The numbers presented in Table 5 are preliminary and subject to change as the result of detailed engineering.

TABLE 5
RED BLUFF SUBSTATION SITES 1 AND 2
TRANSMISSION LINE CONSTRUCTION – LAND DISTURBANCE

Project Feature	Site Quantity	Disturbed Acreage Calculation (L x W)	Acres Disturbed During Construction	Acres Temporarily Disturbed	Acres Permanently Disturbed
Modify Existing 500 kV Lattice Steel Tower (1)	2	150' x 150'	1.03	1.03	0.00
Remove Existing 500 kV Lattice Steel Tower (1)	2	150' x 150'	1.03	1.03	0.00
Temporary Conductor Field Snub/Transfer Area (2)	8	200' x 150'	5.51	5.51	0.00
Construct New 500 kV Lattice Steel Tower (3)	2	200' x 200'	1.84	1.20	0.64
Construct New 220 kV Lattice Steel Tower (4)	2	200' x 200'	1.84	1.40	0.43
Conductor & OPGW Stringing Setup Area - Puller (5)	3	300' x 150'	3.10	3.10	0.00
Conductor & OPGW Stringing Setup Area - Tensioner (5)	3	500' x 150'	5.17	5.17	0.00
New Access/Spur Roads (6)	0.5	linear miles x 14' wide	0.85	0.00	0.85
Red Bluff Sub - Material & Equipment Staging Area	1	approx. 1.5 acres	1.50	1.50	0.00

Project Feature	Site Quantity	Disturbed Acreage Calculation (L x W)	Acres Disturbed During Construction	Acres Temporarily Disturbed	Acres Permanently Disturbed
Guard Structures	2	100’ x 100’	0.46	0.46	0.00
TOTAL ESTIMATED DISTURBED ACRES (7)			**22.33**	**18.57**	**1.92**

Notes to Table 5:

1. Includes the removal of existing conductor, teardown of existing structure, and removal of foundation 2' below ground surface.
2. Includes area needed for temporary conductor transfer towers and/or conductor removal, field snubs, and splicing new conductor; area to be restored after construction.
3. Includes foundation installation, structure assembly & erection, and conductor & OHGW attachment; a majority of the area to be restored after construction; a portion of ROW beneath and within 35 feet of the LST to remain permanently cleared of vegetation and access area of 25 feet around structures; area to be permanently disturbed for each 500 kV LST equals 0.32 acres.
4. Includes foundation installation, structure assembly & erection, and conductor & OHGW attachment; a majority of the area to be restored after construction; a portion of ROW beneath and within 25' of the LST to remain permanently cleared of vegetation; area to be permanently disturbed for each LST equals 0.22 acres.
5. Based on 9,000 foot conductor reel lengths, number of circuits, and route design.
6. Based on length of road in miles x road width of 18 feet.
7. The disturbed acreage calculations are estimates based upon SCE’s preferred area of use for the described project feature, the width of the existing right-of-way, or the width of the proposed right-of-way and, they do not include any new access/spur road information; they are subject to revision based upon final engineering and review of the project by SCE's Construction Manager and/or Contractor awarded project.

Note: All data provided in this table is based on planning level assumptions and may change following completion of more detailed engineering, identification of field conditions, availability of material, and equipment, and any environmental and/or permitting requirements.

1.4.2.10 Operation and Maintenance

Following the completion of project construction, operation and maintenance of the new lines would commence. Operation, inspection, and maintenance activities would occur at least once per year, and they would be consistent with CPUC General Order No. 165. The frequency of inspection and maintenance activities would depend upon weather effects and any unique problems that may arise due to such variables as substantial storm damage or vandalism.

1.4.2.11 Construction Equipment and Labor

Construction of the Proposed Project would be performed by SCE Crews or contract personnel with SCE responsible for project administration and inspection. The estimated number of persons and types of equipment required for each phase of transmission line construction for the Red Bluff Project is shown in Table 6 - Construction Equipment and Workforce Estimates by Activity To Construct New 500 kV Loop-in Lines, and Table 7- Construction Equipment and Workforce Estimates by Activity for 500 kV Transmission Line Structure Modification/Replacement. The equipment and workforce estimates presented in Tables 6 and 7 are approximately the same for construction of the transmission lines on both Site 1 and Site 2 since the line construction areas of disturbance and associated work activities will be approximately the same. The numbers presented are preliminary and subject to change as the result of detailed engineering.

TABLE 6

RED BLUFF SUBSTATION SITES 1 AND 2

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT NEW 500 KV LOOP-IN LINES

Work Activity				Activity Production			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Survey (1)				**4**	**6**		**0.5 Miles**
3/4-Ton Pick-up Truck, 4x4	200	Gas	2		6	8	1 Mile/Day
Temporary Equipment & Material Staging Area (2)				**4**			
1-Ton Crew Cab, 4x4	300	Diesel	1		Duration of Project	2	
30-Ton Crane Truck	300	Diesel	1			2	
Water Truck	350	Diesel	1				
10,000 lb Rough Terrain Fork Lift	200	Diesel	1			5	
Truck, Semi, Tractor	350	Diesel	1			1	
Roads & Landing Work (3)				**5**	**6**		**0.5 Miles & 4 Pads**
1-Ton Crew Cab, 4x4	300	Diesel	2		6	2	0.5 Miles/Day & 0.66 Structure Pads/Day
Road Grader	350	Diesel	1		4	4	
Backhoe/Front Loader	350	Diesel	1		4	6	
10-cu. yd. Dump Truck	350	Diesel	2		4	8	
Drum Type Compactor	250	Diesel	1		4	4	
Track Type Dozer	350	Diesel	1		4	6	
Lowboy Truck/Trailer	500	Diesel	2		2	2	
Install LST Foundations (4)				**9**	**9**		**4 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		9	2	0.50 LST/Day
30-Ton Crane Truck	300	Diesel	1		9	5	
Backhoe/Front Loader	200	Diesel	1		6	8	
Auger Truck	500	Diesel	1		6	8	
10-cu. yd. Dump Truck	350	Diesel	2		9	8	
10-cu. yd. Concrete Mixer Truck	425	Diesel	4		6	5	
LST Steel Haul (5)				**6**	**7**		**7 LSTs**

TABLE 6

RED BLUFF SUBSTATION SITES 1 AND 2

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT NEW 500 KV LOOP-IN LINES

Work Activity				**Activity Production**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		7	2	1 LST/Day
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		7	6	
40' Flat Bed Truck/ Trailer	350	Diesel	1		7	8	
LST Steel Assembly (6)				**7**	**18**		**4 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	3		18	4	0.25 LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		18	4	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		18	6	
30-Ton Crane Truck	300	Diesel	2		18	8	
Compressor Trailer	350	Diesel	2		18	6	
LST Erection (7)				**8**	**25**		**7 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		25	5	0.33 LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		25	5	
Compressor Trailer	120	Diesel	1		25	6	
80-Ton Rough Terrain Crane	350	Diesel	1		25	6	
Guard Structure Installation (8)				**6**	**1**		**4 Structures**
3/4-Ton Pick-up Truck, 4x4	300	Gas	1		1	6	4 Structures/Day
1-Ton Crew Cab, 4x4	300	Diesel	1		1	6	
Compressor Trailer	120	Diesel	1		1	6	
Auger Truck	500	Diesel	1		1	6	
Extendable Flat Bed Pole Truck	350	Diesel	1		1	6	
30-Ton Crane Truck	500	Diesel	1		1	8	
80ft. Hydraulic Man-lift/Bucket Truck	350	Diesel	1		1	4	
Install Conductor & OPGW (9)				**16**	**11**		**0.5 Circuit Miles**

TABLE 6

RED BLUFF SUBSTATION SITES 1 AND 2

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT NEW 500 KV LOOP-IN LINES

Work Activity				Activity Production			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		11	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		9	8	
Wire Truck/Trailer	350	Diesel	2		10	2	
Dump Truck (Trash)	350	Diesel	1		5	2	
20,000 lb. Rough Terrain Fork Lift	350	Diesel	1		8	2	
22-Ton Manitex	350	Diesel	1		8	8	
30-Ton Manitex	350	Diesel	2		8	6	
Splicing Rig	350	Diesel	1		8	2	
Splicing Lab	300	Diesel	1		4	2	0.25 miles/day
Spacing Cart	10	Diesel	1		4	8	
Static Truck/ Tensioner	350	Diesel	1		10	2	
3 Drum Straw line Puller	300	Diesel	1		6	4	
60lk Puller	525	Diesel	1		6	3	
Sag Cat w/ 2 winches	350	Diesel	1		6	2	
580 Case Backhoe	120	Diesel	1		6	2	
D8 Cat	300	Diesel	1		6	3	
Lowboy Truck/Trailer	500	Diesel	1		9	2	
Restoration (10)				**7**	**3**		**0.5 Miles**
1-Ton Crew Cab, 4x4	300	Diesel	2		3	2	
Road Grader	350	Diesel	1		3	6	
Backhoe/Front Loader	350	Diesel	1		3	6	
Drum Type Compactor	250	Diesel	1		3	6	0.5 Mile/Day
Track Type Dozer	350	Diesel	1		3	6	
Lowboy Truck/Trailer	300	Diesel	1		3	3	

<u>Notes to Table 6: Crew Size Assumptions:</u>

#1 Survey = one 4-man crew
#2 Temporary Equipment & Material Staging Area = one 4-man crew; note this information is duplicated on the 220 kV Loop-in & 500kV & Gen-Tie WF & E Tables

#3 Roads and Landing work = one 5-man crew
#4 Install Foundations for LSTs = one 9-man crew
#5 LST Steel Haul = one 4-man crew
#6 LST Steel Assembly =one 7-man crews
#7 LST Erection = one 8-man crew
#8 Guard Structure Installation = one 6-man crew
#9 Conductor & OPGW Installation = two 8-man crews
#10 Restoration = one 7-man crew
Note: All data provided in this table is based on planning level assumptions and may change following completion of more detailed engineering, identification of field conditions, availability of labor, material, and equipment, and any environmental and permitting requirements.

TABLE 7

RED BLUFF SUBSTATION SITES 1 AND 2

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY FOR 500 KV TRANSMISSION LINE STRUCTURE MODIFICATION/REPLACEMENT

Work Activity				**Activity Production**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Survey (1)				**4**	**2**		**3 Structures**
3/4-Ton Pick-up Truck, 4x4	200	Gas	2		2	8	2 Mile/Day
Temporary Equipment & Material Staging Area(2)				**4**			
1-Ton Crew Cab, 4x4	300	Diesel	1		Duration of Project	2	
30-Ton Crane Truck	300	Diesel	1			2	
Water Truck	350	Diesel	1			8	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1			5	
Truck, Semi, Tractor	350	Diesel	1			1	
Roads & Landing Work (3)				**5**	**3**		**.5 Miles & 3 Pads**
1-Ton Crew Cab, 4x4	300	Diesel	2		3	2	0.5 Miles/Day & 2 Structure Pads/Day
Road Grader	350	Diesel	1		2	4	
Backhoe/Front Loader	350	Diesel	1		2	6	
Drum Type Compactor	250	Diesel	1		2	4	
Track Type Dozer	350	Diesel	1		2	6	
Lowboy Truck/Trailer	500	Diesel	2		2	2	
LST Removal (4)				**8**	**4**		**3 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		4	6	0.75 LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		4	6	
Compressor Trailer	120	Diesel	1		4	6	

TABLE 7

RED BLUFF SUBSTATION SITES 1 AND 2

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY FOR 500 KV TRANSMISSION LINE STRUCTURE MODIFICATION/REPLACEMENT

Work Activity				Activity Production			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
80-Ton Rough Terrain Crane	350	Diesel	1		4	6	
Install LST Foundations (5)				**9**	**8**		**3 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		8	2	0.50 LST/Day
30-Ton Crane Truck	300	Diesel	1		8	5	
Backhoe/Front Loader	200	Diesel	1		6	8	
Auger Truck	500	Diesel	1		8	8	
10-cu. yd. Dump Truck	350	Diesel	2		8	8	
10-cu. yd. Concrete Mixer Truck	425	Diesel	3		8	5	
LST Steel Haul (6)				**4**	**3**		**3 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		3	2	1 LST/Day
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		3	6	
40' Flat Bed Truck/ Trailer	350	Diesel	1		3	8	
LST Steel Assembly (7)				**7**	**14**		**3 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		14	4	0.25 LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		14	4	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		12	6	
30-Ton Crane Truck	300	Diesel	1		14	8	
Compressor Trailer	350	Diesel	1		12	6	
LST Erection (8)				**8**	**5**		**3 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		5	5	1 LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		5	5	
Compressor Trailer	120	Diesel	1		3	6	
80-Ton Rough Terrain Crane	350	Diesel	1		5	6	
Conductor Transfer (9)				**16**	**5**		**.5 Circuit Miles**

TABLE 7

RED BLUFF SUBSTATION SITES 1 AND 2

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY FOR 500 KV TRANSMISSION LINE STRUCTURE MODIFICATION/REPLACEMENT

Work Activity				Activity Production			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		5	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		5	8	
Wire Truck/Trailer	350	Diesel	2		3	2	
Dump Truck (Trash)	350	Diesel	1		5	2	
20,000 lb. Rough Terrain Fork Lift	350	Diesel	1		5	2	
22-Ton Manitex	350	Diesel	1		5	8	
30-Ton Manitex	350	Diesel	2		5	6	
Splicing Rig	350	Diesel	1		5	2	
Splicing Lab	300	Diesel	1		3	2	1 tower/day
Spacing Cart	10	Diesel	1		3	8	
Static Truck/ Tensioner	350	Diesel	1		3	2	
3 Drum Straw line Puller	300	Diesel	1		3	4	
60lk Puller	525	Diesel	1		3	3	
Sag Cat w/ 2 winches	350	Diesel	1		3	2	
580 Case Backhoe	120	Diesel	1		5	2	
D8 Cat	300	Diesel	1		5	3	
Lowboy Truck/Trailer	500	Diesel	1		2	2	
Restoration (10)				**7**	**3**		**.5 Miles**
1-Ton Crew Cab, 4x4	300	Diesel	2		3	2	
Road Grader	350	Diesel	1		1	6	
Backhoe/Front Loader	350	Diesel	1		1	6	
Drum Type Compactor	250	Diesel	1		1	6	0.5 Mile/Day
Track Type Dozer	350	Diesel	1		3	6	
Lowboy Truck/Trailer	300	Diesel	1		2	3	

<u>Notes to Table 7: Crew Size Assumptions:</u>

#1 Survey = one 4-man crew
#2 Temporary Equipment & Material Staging Area = one 4-man crew, this information is duplicated on 220kV Loop-in & Gen-Tie modification WF&E Tables
#3 Roads & Landing Work = one 5-man crew
#4 LST Removal = one 8-man crew

#5 Install Foundations for LSTs = one 9-man crew
#6 LST Steel Haul = one 4-man crew
#7 LST Steel Assembly =one 7-man crews
#8 LST Erection = one 8-man crew
#9 Conductor Transfer = two 8-man crews
#10 Restoration = one 7-man crew
Note: All data provided in this table is based on planning level assumptions and may change following completion of more detailed engineering, identification of field conditions, availability of labor, material, and equipment, and any environmental and permitting requirements.

1.5 DISTRIBUTION SYSTEM FOR STATION LIGHT AND POWER – SUBSTATION SITE 1

1.5.1 Distribution System Description

In order to provide the necessary station light and power for the Red Bluff Substation, the existing Desert Center 12 kV circuit would be extended overhead south on Eagle Mountain road from 33.700 North and 115.454 West for approximately 300 feet by installing approximately 2-3 poles (see Figure 10 - Pole Configuration). The line extension would then be continued south underground in new conduits along the Red Bluff Substation driveway for approximately 1,000 feet to Red Bluff Substation - see Figure 3. Within the substation boundaries, a new padmounted 750 kVA station light and power transformer would be installed.

The overhead conductor size would be 1/0 ACSR and the underground cable size would be a 1/0 CLP. Circuit modification may be required to provide support for voltage regulating requirements.

A laydown area within the SCE-owned Red Bluff Substation Site/Property may be required to store any materials needed during construction. Crews would work Monday through Friday in one 8 to 10 hour shift each day. Two line trucks with 3-person crews (6 people total) would be called upon to perform the work. A new access road may be required to support the new over head distribution lines along Eagle Mountain Road from the existing Desert Center 12 kV circuit to Red Bluff Substation. The access road would be approximately 300 feet long and approximately 18 feet wide.

1.5.1.2 Operations and Maintenance

Operation, inspection, and maintenance activities would occur at least once per year, and they would be consistent with CPUC General Order No. 165. The frequency of inspection and maintenance activities would depend upon weather effects and any unique problems that may arise due to such variables as substantial storm damage or vandalism.

1.5.2 Distribution System Construction

1.5.2.1 Land Disturbance

Table 8 provides an estimate of the temporary and permanent land disturbance related to construction of the distribution system for station light and power. The numbers presented in Table 8 are preliminary and subject to change as the result of detailed engineering.

TABLE 8
DISTRIBUTION SYSTEM FOR STATION POWER AND LIGHT CONSTRUCTION SUBSTATION SITE 1 – ESTIMATED LAND DISTURBANCE

CONSTRUCTION ACTIVITY	ACRES TEMPORARILY DISTURBED	ACRES PERMANENTLY DISTURBED
Access road (1)	-	0.12 acres
12kV overhead circuit on 3 poles (2)	-	0.00 acres
Underground 12kV line (3)	0.03	-
Total Disturbance	0.03	0.12 acres

(1) Based on road dimensions of 300 feet long x 18 feet wide.
(2) Each pole requires a permanent land disturbance of 1 square foot.
(3) 12kV underground line is 1,000 feet long by 1.5 feet wide trench.

1.5.2.2 Construction Equipment and Labor

The estimated equipment and number of workers required to construct the distribution system for station light and power is presented in Table 9. The numbers presented in Table 9 are preliminary and subject to change as the result of detailed engineering.

TABLE 9
CONSTRUCTION EQUIPMENT AND WORKFORCE AND ESTIMATES BY ACTIVITY TO CONSTRUCT THE DISTRIBUTION SYSTEM FOR STATION LIGHT AND POWER – SUBSTATION SITE 1

Work Activity						Activity Production	
Primary Equipment Description	Estimated Horse-Power	Probable fuel type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Estimated Average Duration of Use (Hrs/Day)	Estimated Production Per Day
Trenching, Structure Excavation (1)				4	2		
1-ton crew cab	300	Diesel	1			2	
Backhoe front loader	300	Diesel	1			6	
Overhead Line (2)				6	5		
1-ton crew cab 4x4	300	Diesel	1			2	
55-foot double bucket truck	350	Diesel	1			6	
50-foot digger derrick	350	Diesel	1			4	
Underground Cable Pulling (3)				4	2		
1-ton crew cab, 4x4	300	Diesel	1			2	
Router placer truck	350	Diesel	1			6	

Hydraulic rewind puller	300	Diesel	1			6	
Underground Cable Makeup				4	5		
1-ton crew cab, 4x4	300	Diesel	1			2	

(1) Trenching and conduit installation = one 4-man crew
(2) Overhead Line Work = one 6-man crew
(3) Underground Cable Pulling – one 4-man crew

1.6 TELECOMMUNICATION SYSTEM – SUBSTATION SITE 1

1.6.1 Telecommunication System Description

A telecommunication system (Figure 3) would be required in order to provide monitoring and remote operation capabilities of the electrical equipment at Red Bluff Substation, and transmission line protection. To provide this system, SCE would build the following:

- line protection, SCADA and telecommunications circuits from the solar developer's substation to the Red Bluff Substation and Devers Substation utilizing optical ground wires on the customer's 220 kV gen-tie line.
- line protection, SCADA and telecommunications circuits from Red Bluff Substation to Devers Substation and Colorado River Substation.

SCE would build these circuits using some existing infrastructure, as well as the following new infrastructure;

- an optical system between the solar developers substation and the Red Bluff Substation
- a microwave system between Red Bluff Substation and a new Desert Center Communications Site
- a microwave system between a new Desert Center Communications Site and the existing Chuckwalla Mountain Communications Site

1.6.1.1 Equipment and Installation

SCE would install the following equipment:

- new microwave equipment in a new 25 foot by 40 foot communications room inside the MEER at Red Bluff Substation.
- a new 185 foot microwave tower at Red Bluff Substation. This tower should be located near the communications room inside the MEER. The tower base would be a square with 35 foot sides. The concrete tower anchors would be about 6 foot in diameter.
- a new Desert Center Communications Site which would have a tower identical to the one at Red Bluff Substation. It would have microwave equipment and dishes for paths to Red Bluff Substation and Chuckwalla Communications Site. The microwave repeater station would be located along Rice Road due west of the airport. It would consist of an area approximately 100 feet by 50 feet and include a 12 feet by 30 feet communication room and a 185 foot tall lattice steel microwave tower and two 8-foot diameter microwave antennas.

- microwave equipment and a dish at Chuckwalla Communications Site.

1.6.1.2 Laydown Areas and Access Roads
Laydown areas would include SCE's proposed Red Bluff Substation and the area adjacent to the proposed microwave repeater station. A new access road would be required to the new Desert Center Communications Site.

1.6.1.3 Operation and Maintenance
The telecommunications system would require periodic routine maintenance as well as emergency procedures for service continuity. Routine maintenance would include equipment testing, equipment monitoring, and repair. No additional SCE personnel, beyond normal staffing levels, would be required to operate or maintain the telecommunication system for the substation.

Typical maintenance of the telecommunications equipment requires an annual visit by one person, using one van, staying 3 hours at the substation or communications site. The engine would not be kept running.

1.6.2 <u>Telecommunications Systems Construction</u>

SCE or contractor crews would use standard construction methods to construct the required facilities.

1.6.2.1 Grading and Land Disturbance
Telecommunication construction activities would include the following:

1) SCE would construct the Desert Center Communications Site (Figure 4) to house microwave transmission equipment. The site would be fenced and cover an area 100 foot long and 50 foot wide. It would consist of a 12 foot by 36 foot prefabricated building with a 5 foot by 30 foot raised concrete walkway, and a 499 gallon propane tank on 12 foot by 8 foot concrete pad. The interior of the building would have include a separate generator room containing a 20 kW propane powered generator to ensure safe operation of the solar developer's gen-tie line protection in the event of an outage on the Desert Center 12 kV distribution line.

A 185 foot microwave communications tower would be constructed, requiring four concrete anchors for support, which would typically be 6 foot in diameter and 40 foot deep.

A new dirt access entry, 20 feet wide and 30 feet long, would be created from Rice Road to the site. Since the site is located in a flood plain area, an 8 foot high berm would be constructed on the north, west and south sides. Soil from excavation of the site will be used to construct the berm.

The primary source of electrical service will be from a tap into the nearest 12 kV line, which would require the installation of approximately 3-5 wooden poles for approximately 730 feet to the northeast.

Table 10 provides estimates of temporary and permanent land disturbances related to construction of the telecommunication system. The numbers presented in Table 10 are preliminary and subject to change as the result of detailed engineering.

TABLE 10
TELECOMMUNICATION SYSYTEM CONSTRUCTION – SUBSTATION SITE 1 ESTIMATED LAND DISTURBANCE

CONSTRUCTION ACTIVITY	ACRES TEMPORARILY DISTURBED	ACRES PERMANENTLY DISTURBED
Duct from Red Bluff MEER to first 220kV tower outside station (1)	0.03	-
Desert Center Microwave Repeater Site (2)	-	0.19
Access Road (3)	-	0.01
12 kV Distribution Line (4)	-	0.02
Total Acres Disturbed	0.03	0.22

(1) 1,000 feet long by 1.5 feet wide trench.
(2) Based on a graded site area of 120 feet by 70 feet.
(3) Based on road dimensions of 30 feet long by 20 feet wide.
(4) Based on 730 foot long line with one pole per 100 feet and 1.5 square feet disturbance per pole

1.6.2.2 Construction Equipment and Labor

See Table 11 for the construction workforce and type of equipment expected to be used in constructing the proposed telecommunications facilities. The numbers presented in Table 11 are preliminary and subject to change as the result of detailed engineering.

TABLE 11
CONSTRUCTION EQUIPMENTMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT THE TELECOMMUNICATION SYSTEM

CONSTRUCTION ACTIVITY	NUMBER OF PERSONNEL	NUMBER OF DAYS	EQUIPMENT REQUIREMENTS
Building and Tower Foundation	6	10	2-crew trucks (gas/diesel) 1-backhoe (diesel) 1-stakebed truck (diesel) 1-concrete mixer (diesel)
Building Shell	4	2	2-crew trucks (gas/diesel) 1-crane (diesel) 1-lowbed truck (diesel)
Tower Construction Crew	4	15	2-crew trucks (gas/diesel) 1- 100 ft. crane (diesel) 1- 100 ft. bucket truck (diesel)

Microwave Dish Installation Crew	4	10	2-crew trucks (gas/diesel) 1-100 ft. crane (diesel) 1 – 100 ft, bucket truck (diesel)
Telecommunications Installation Crew	2	10	1-2 ton truck (gas/diesel) 1 – crew truck (gas)

1.6.2.3 Hazards and Hazardous Waste
The telecom building would contain a 48VDC lead-calcium flooded cell battery, in order to operate the optical equipment. The total volume of electrolyte will be 200 gallons. The total weight of the lead will be 5,000 pounds. There would also be a 499 gallon propane tank in the telecom building.

1.6.2.4 Post Construction Cleanup
Surplus soil, if any, would be disposed of off-site at an approved license facility.

1.7 RED BLUFF SUBSTATION SITE 2

1.7.1 <u>Introduction</u>

A second substation site alternative (Figure 1) was also reviewed. The Red Bluff Substation Site 2 and associated transmission, distribution, and telecommunications facilities are located in the vicinity of the Red Bluff Substation Site 1 and its associated facilities.

1.7.2 <u>Substation Site 2 Location</u>

The Red Bluff Substation Site 2 is located approximately 5 miles east of California State Highway 177, south of Interstate 10, in the County of Riverside. The approximate center of the substation would be at 33.697 degrees North and 115.325 degrees West. The substation would be constructed on federal land. Access to Interstate 10 is anticipated to be provided via a 6,000-foot long section of the existing Aztec Road along the southern frontage of the freeway and through the improvements to approximately 20,000 feet of the existing dirt pipeline patrol road to the substation site (Figure 1).

1.7.2.1 <u>Substation Site 2 Design Description</u>

Although located at a different site, the Red Bluff Substation design on Site 2 would be essentially similar in scope as was described for Site 1 (see Section 1.3.2).

1.7.2.2 <u>Substation Site 2 Land Disturbance</u>

Construction of the substation itself would be similar in scope as described for Substation Site 1, although there would be some additional grading due to the topography of this site.
The Site 2 development plan is presented in Figure 5.

An approximately 20,000 foot long access road would need to be constructed to the site, relatively flat and wide enough to accommodate the delivery of transformers to the site

Table 12 provides the approximate volume and type of earth materials to be used or disposed of from the Red Bluff Substation Site 2 (within the substation fence and the required drainage structures outside/around the substation).

TABLE 12
SUBSTATION SITE 2 AND ACCESS ROAD GROUND SURFACE IMPROVEMENT MATERIALS AND ESTIMATED VOLUMES

Element	Material	Approximate Volume (yd^3)
Site Cut (1) Site Fill (1)	Soil Soil	1,000,000 1,000,000
Waste Removal (export)	Soil/Vegetation	23,000
Substation Equipment Foundations	Concrete	14,000
Equipment and cable trench excavations (2)	Soil	15,500
Cable Trenches (3)	Concrete	200
Internal Driveway	Asphalt concrete Class II aggregate base	3,200 4,800
External Driveway	Asphalt Class II aggregate base Concrete for culverts	6,000 9,000 1,000
Substation Rock Surfacing	Rock, nominal 1 to 1-1/2 inch per SCE Standard	33,000

(1) The design concept would be intended to balance the earthwork quantities, utilizing the site cute material as site fill.
(2) Excavation "spoils" would be placed on site during the below-ground c construction phase and used to the extent possible for the required on-site grading.
(3) Standard cable trench elements are factory fabricated, delivered to the site and installed by crane. Intersections are cast in place concrete.

Because the Red Bluff Substation Site 2 is located down-slope from the Chuckwalla Mountains, surface runoff in the form of several eroded channels (designated as Blue-line streams) traverse the site. It is anticipated that alteration of three of these channels would be required in order to protect the substation's southern exposure from flooding. Preliminary engineering suggests that a trapezoidal channel would be required to convey the stormwater runoff around both sides of the substation, discharging the flow through two existing culverts under Highway I-10. Other surface flow at the south end of the substation would be directed into the new trapezoidal channels by earthen berms placed along the southern edge of the substation wall. These drainage improvements would disturb an area approximately 30 acres.

Internal surface runoff would be directed towards a detention basin located at the north end of the substation. The basin would measure approximately 120 feet by 200 feet occupying approximately one-half acre and would be enclosed by an 8-foot high chain-link fence and one 20-foot wide double drive gate.

To provide room for the new drainage channel on the east side, additional grading would be necessary to cut back a small hill near the south-east substation corner. It is anticipated that this would increase the area of disturbance by an additional two acres.

If required, the final site drainage design would be subject to the conditions of the grading permit obtained from the County of Riverside.

Table 13 presents estimates of temporary and permanent land disturbance related to construction of the Red Bluff Substation at Site 2 (outside the substation fence and the required drainage structures outside/around the substation). The numbers presented in Tables 12 and 13 are preliminary and subject to change as the result of detailed engineering.

TABLE 13
SUBSTATION SITE 2 CONSTRUCTION – ESTIMATED LAND DISTURBANCE

CONSTRUCTION ACTIVITY	ACRES TEMPORARILY DISTURBED	ACRES PERMANENTLY DISTURBED
Substation grading	-	90.00
Drainage/side slopes	-	30.00
Substation Access road (1)	-	13.77
Staging area	10.00	
Total Disturbance	10.00	133.77

(1) Based on road dimensions of 20,000 feet long by 30 feet wide

1.7.2.3 Substation Construction Equipment and Labor

The estimated number or personnel and equipment required for construction of the Red Bluff substation at Site 2 are summarized in Table 14.

TABLE 14
SUBSTATION SITE 2 CONSTRUCTION EQUIPMENT AND LABOR ESTIMATES

Activity and number of Personnel	Number of Work Days	Equipment and Quantity	Duration of Use (Hours/Day)
Survey (2 people)	10	2-Survey Trucks (Gasoline)	8

Activity and number of Personnel	Number of Work Days	Equipment and Quantity	Duration of Use (Hours/Day)
Grading (8 people)	60	1-Dozer (Diesel) 2-Loader (Diesel) 1-Scraper (Diesel) 1-Grader (Diesel) 2-Water Truck (Diesel) 2-4x4 Backhoe (Diesel) 1-4x4 Tamper (Diesel) 1-Tool Truck (Gasoline) 1-Pickup 4x4 (Gasoline)	4 4 3 3 2 2 2 2 2
Fencing (4 people)	25	1-Bobcat (Diesel) 1-Flatbed Truck (Gasoline) 1-Crewcab Truck (Gasoline)	8 2 4
Civil (8 people)	90	1-Excavator (Diesel) 1-Foundation auger (Diesel) 2-Backhoes (Diesel) 1-Dump truck (Diesel) 1-Skip Loader (Diesel) 1-Water Truck (Diesel) 2-Bobcat Skid Steer (Diesel) 1-Forklift (Propane) 1-17 Ton Crane (Diesel) 1-Tool Truck (Gasoline)	4 5 3 2 3 3 3 4 2 hours/day for 45 days 3
MEER (6 people)	60	1-Carry-all Truck (Gasoline) 1-Tool truck (Gasoline) 1-Stake Truck (Gasoline)	3 2 2
Electrical (10) people)	120	2-Scissor Lifts (Propane) 2-Manlifts (Propane) 1-Reach Manlift (Propane) 1-15 ton Crane (Diesel) 1-Tool Trailer 3-Crew Trucks (Gasoline)	3 3 4 3 3 2
Wiring (6 people)	90	1-Manlift (Propane) 1-Tool Trailer	4 3
Maintenance Crew Equipment Check (2 people)	30	2-MaintenanceTrucks (Gasoline)	4
Testing (2 people)	90	1-Crew Truck (Gasoline)	3

Activity and number of Personnel	Number of Work Days	Equipment and Quantity	Duration of Use (Hours/Day)
Asphalting (6 people)	40	2-Paving Roller (Diesel)	4
		1-Asphalt Paver (Diesel)	4
		1-Stake Truck (Gasoline)	4
		1-Tractor (Diesel)	3
		1-Dump Truck (Diesel)	3
		2-Crew Trucks (Gasoline)	2
		1-Asphalt Curb Machine (Diesel)	3

1.7.3 Transmission Lines and Related Structures – Substation Site 2

1.7.3.1 <u>500 kV Transmission Line Loop-in</u>

1.7.3.1.1 Transmission Line Loop-In Description

Although located at a different site, the 500 kV transmission line loop-in design connecting to Site 2 would be essentially similar in scope as was described for Site 1 (see Section 1.4.1.1) - see Figure 12.

1.7.3.1.2 Transmission Line Loop-In Construction Equipment and Labor

Labor and equipment requirements to construct the 500 kV transmission line loop-in on Site 2 would be essentially similar in scope as was described for Site 1 (see Section 1.4.2).

1.7.3.2 <u>220 kV Transmission Line Structure Modifications/Replacement Design</u>

1.7.3.2.1 System Description

Although located at a different site, the design for any 220 kV transmission line structure modifications/replacements connecting to Site 2 would be essentially similar in scope as was described for Site 1 (see Section 1.4.1.3) - see Figure 1.

1.7.3.2.2 Construction Equipment and Labor

Labor and equipment requirements for the 220 kV structure modifications/replacements on Site 2 would be essentially similar in scope as was described for Site 1 (see Section 1.4.2.10).

1.7.3.3 Land Disturbance

Estimates of temporary and permanent land disturbance related to construction of the transmission lines on Site 2 are approximately the same as Site 1 (see Table 5)

1.7.4 Distribution System for Station Light and Power

1.7.4.1 System Description

Placement of the substation at Site 2 would require rebuilding the Desert Center 12 kV circuit overhead along the south frontage of the freeway approximately 20,000 feet to upgrade the circuit from single-phase to three-phase construction and then extending approximately 1,000 feet underground (south) towards the substation. This rebuild would require approximately 100 poles, assuming an average span of 200 feet (Figure 10).

1.7.4.2 Construction Equipment, Labor and Land Disturbance

The requirement for conductor sizes and types, circuit modifications for voltage regulation, SL&P transformer size, laydown location at Site 1 (see Section 1.5.1) and workforce times and requirements (see Section 1.5.2) are similar at Site 2. This distribution line work could follow the new/upgraded access road that will likely be required to support the rebuilt overhead distribution lines from existing circuitry to the Site 2 Substation.

Table 15 provides an estimate of the temporary and permanent land disturbance related to construction of the distribution system for station light and power at the Red Bluff Substation Site 2. The numbers presented in Tables 15 and 16 are preliminary for planning purposes and subject to change as the result of detailed engineering.

TABLE 15
DISTRIBUTION SYSTEM FOR STATION POWER AND LIGHT CONSTRUCTION SUBSTATION SITE 2 – ESTIMATED LAND DISTURBANCE

CONSTRUCTION ACTIVITY	ACRES TEMPORILY DISTURBED	ACRES PERMANENTLY DISTURBED
Access Road (1)	**_**	**8.26**
12 kV Overhead Circuit on 100 poles (2)	**_**	**0.01**
Underground 12 kV line (3)	**0.03**	**-**
Total disturbance	**0.03**	**8.27**

(1) Based on road dimensions of 20,000 feet long by 18 feet wide.
(2) Each pole requires a land disturbance of approximately one square foot.
(3) 12 kV underground line is 1,000 feet long by 1.5 feet wide.

The estimated number of workers and equipment required to construct the distribution system for station light and power is presented in Table 16.

TABLE 16
CONSTRUCTION EQUIPMENT AND WORKFORCE AND ESTIMATES BY ACTIVITY TO CONSTRUCT THE DISTRIBUTION SYSTEM FOR STATION LIGHT AND POWER – SUBSTATION SITE 2

Work Activity						Activity Production	
Primary Equipment Description	**Estimated Horse-Power**	**Probable fuel type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Estimated Average Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Trenching, Structure Excavation (1)				4	2		
1-ton crew cab	300	Diesel	1			2	
Backhoe front loader	300	Diesel	1			6	
Overhead Line (2)				8	30		
1-ton crew cab 4x4	300	Diesel	2	5		2	
55-foot double bucket truck	350	Diesel	2			6	
50-foot digger derrick	350	Diesel	2			4	
Underground Cable Pulling (3)				4	1		
1-ton crew cab, 4x4	300	Diesel	1			2	
Router placer truck	350	Diesel	1			6	
Hydraulic rewind puller	300	Diesel	1			6	
Underground Cable Makeup				4	5		
1-to crew cab, 4x4	300	Diesel	1			2	
55-foot double-bucket truck	350	Diesel	1			4	

(1) Trenching and conduit installation = one 4-man crew
(2) Overhead Line Work = two 4-man crew
(3) Underground Cable Pulling – one 4-man crew

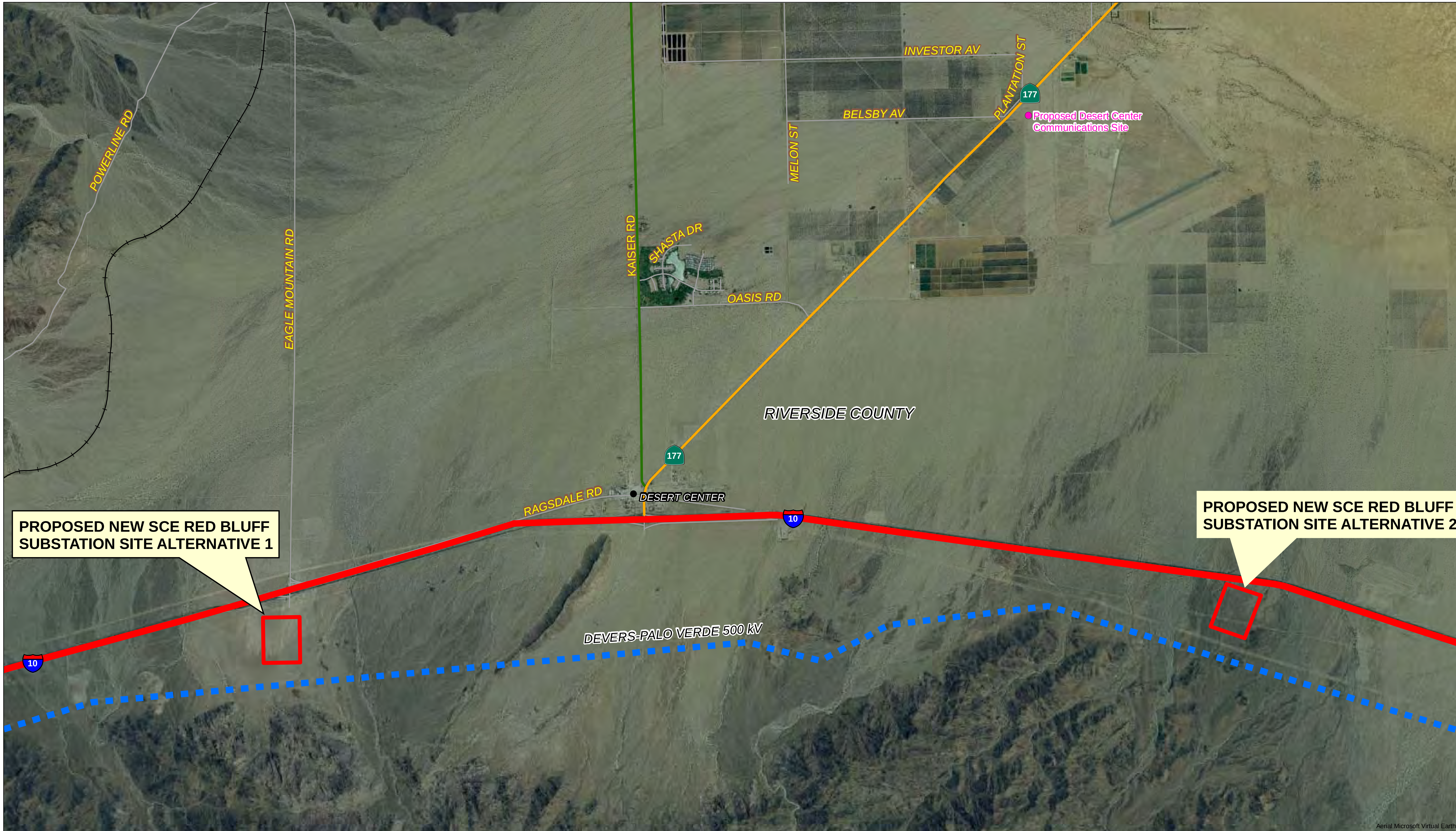
1.7.5 <u>Telecommunication System</u>

1.7.5.1 System Description

There would be no substantial difference in the required telecommunication system design if the substation were constructed on Site 1 or Site 2.

1.7.5.2 Construction

There would be no substantial difference in the telecommunication system construction scope of work if the substation were constructed on Site 1 or Site 2.



SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

FIGURE 1
PROPOSED NEW SCE RED BLUFF SUBSTATION SITES

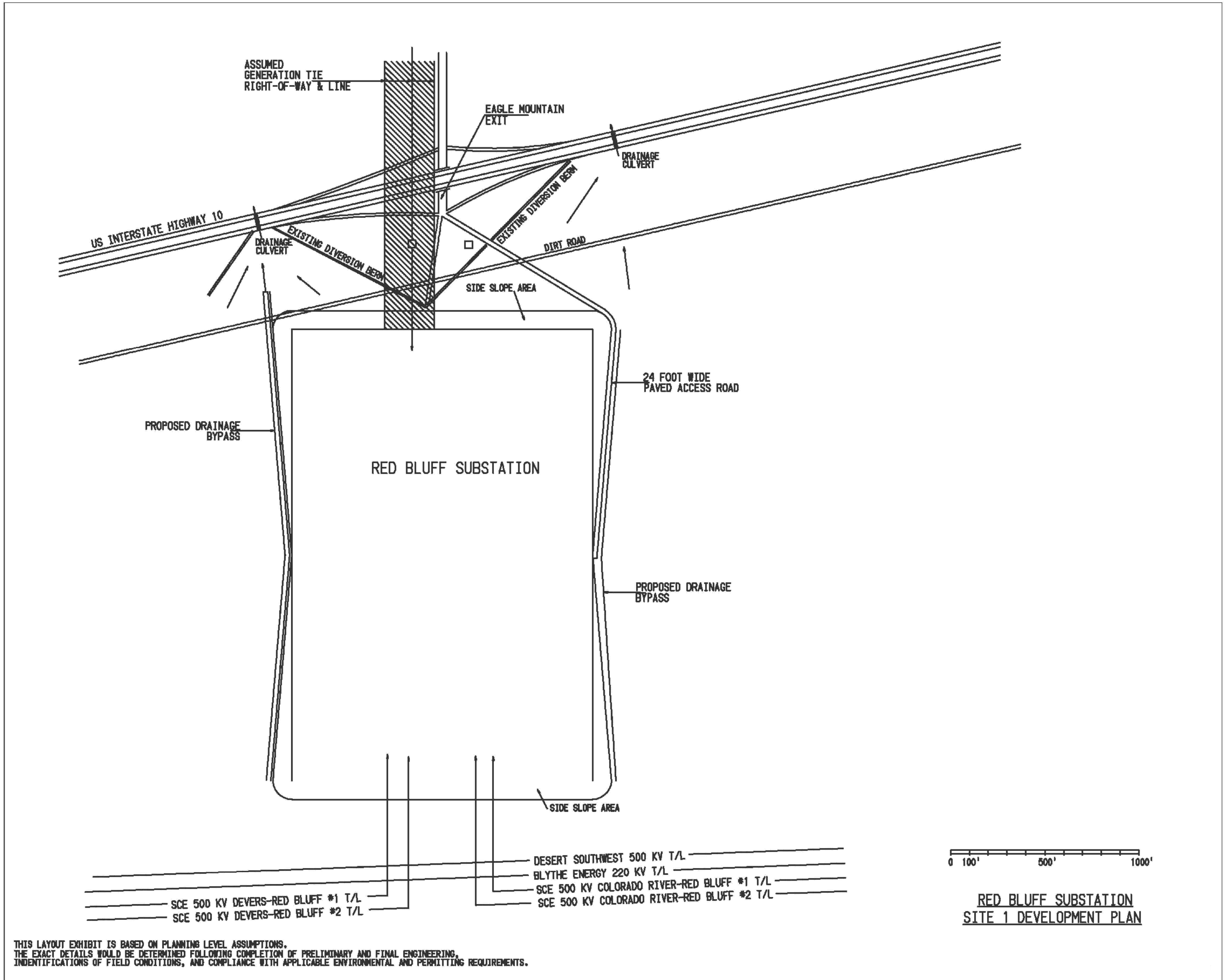
Features depicted herein are planning level accuracy, and intended for informational purposes only. Distances and locations may be distorted at this scale. Always consult with the proper legal documents or agencies regarding such features.
© Real Properties - Survey and Mapping.

Legend
- Proposed Red Bluff Substation Sites
- Existing 500kV Transmission Lines (SCE, 2009)
- Proposed Desert Center Communications Site
- Freeways (TBM, 2008)
- Highways (TBM, 2008)
- Major Road (TBM, 2008)
- Minor Road (TBM, 2008)
- Railroad (TBM, 2008)

N W E S

0 0.25 0.5 1 Miles

P:\GIS\Data\Projects\MasterData\Major Transmission Projects\Red Bluff Substation Project RBSP\2010\OT000000000_InterconnectionMaps\RBSP_Fig1_AltSite_Locations_v1.mxd 4/6/2010



SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

FIGURE 2
PROPOSED NEW SCE RED BLUFF SUBSTATION SITE 1 DEVELOPMENT PLAN

Features depicted herein are planning level accuracy, and intended for informational purposes only. Distances and locations may be distorted at this scale. Always consult with the proper legal documents or agencies regarding such features.

TYPICAL SINGLE CIRCUIT 500KV

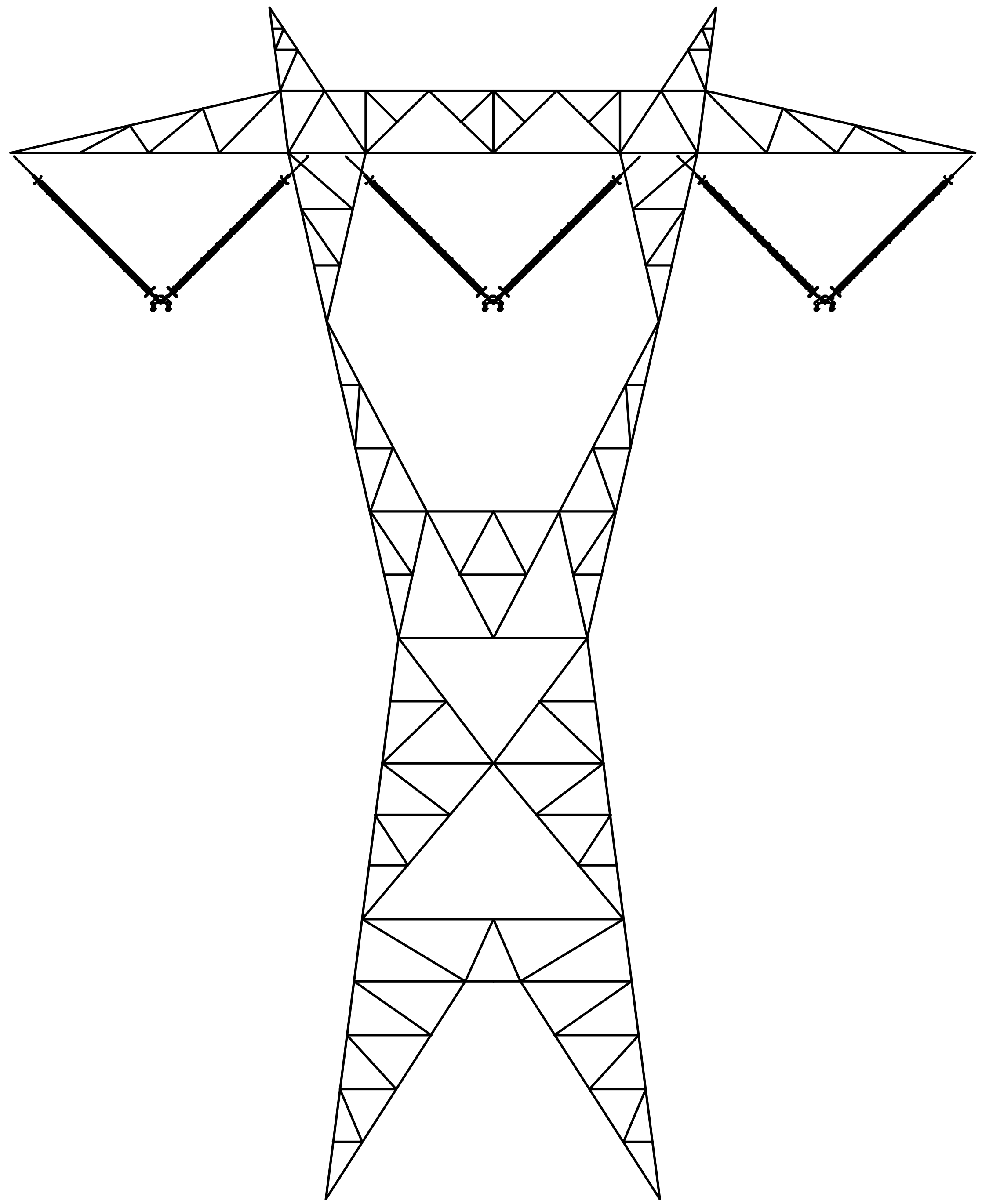


FIGURE 3
TYPICAL SINGLE CIRCUIT 500 KV
LATTICE STEEL TOWER CONFIGURATION

TYPICAL SINGLE CIRCUIT TSP 500KV

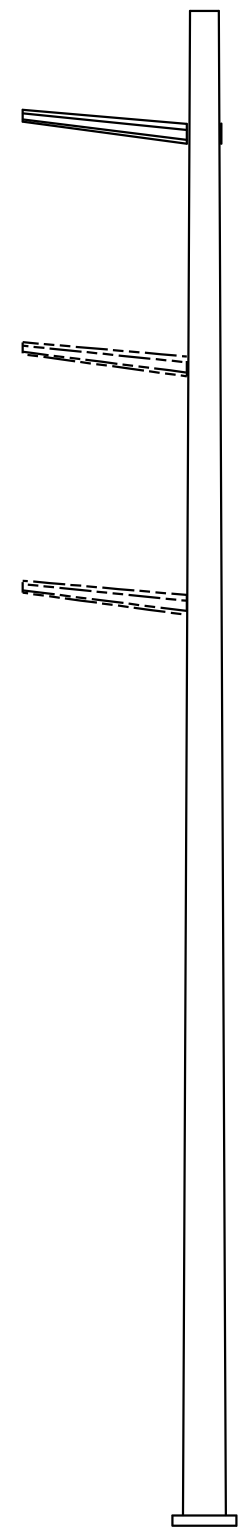
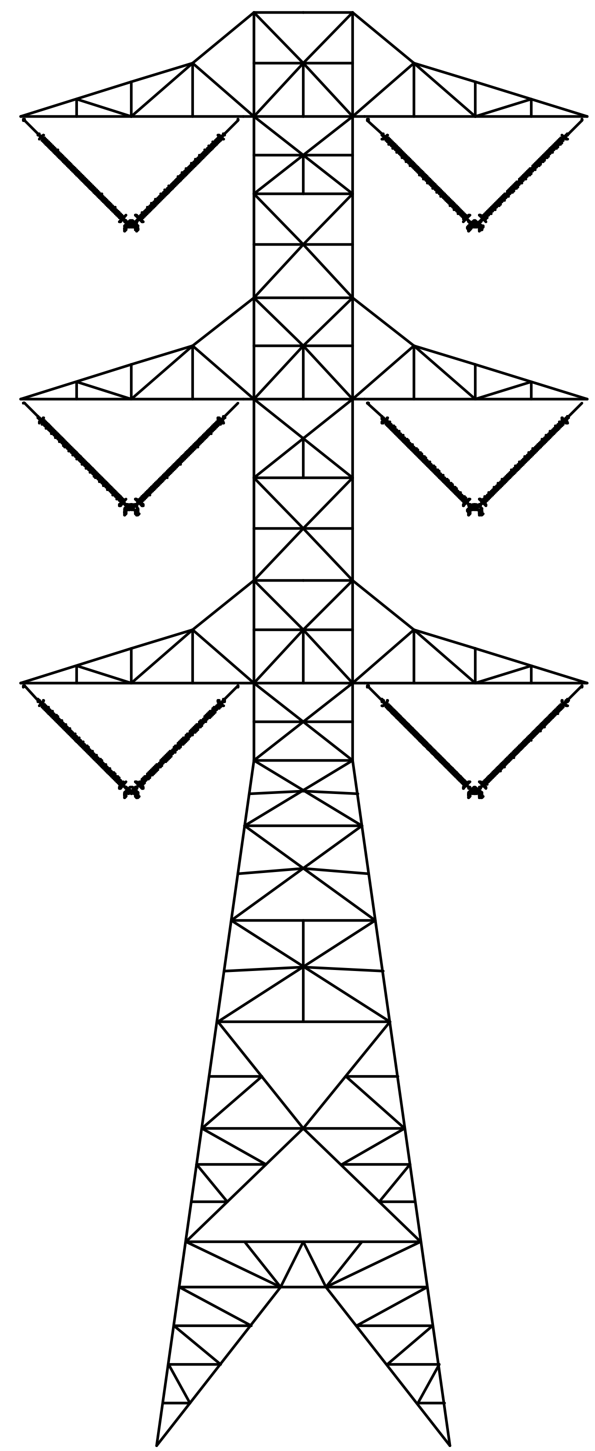


FIGURE 4
TYPICAL SINGLE CIRCUIT 500 KV
TUBULAR STEEL POLE CONFIGURATION

TYPICAL DOUBLE CIRCUIT 500KV



SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

FIGURE 5
TYPICAL DOUBLE CIRCUIT 500 KV
LATTICE STEEL TOWER CONFIGURATION

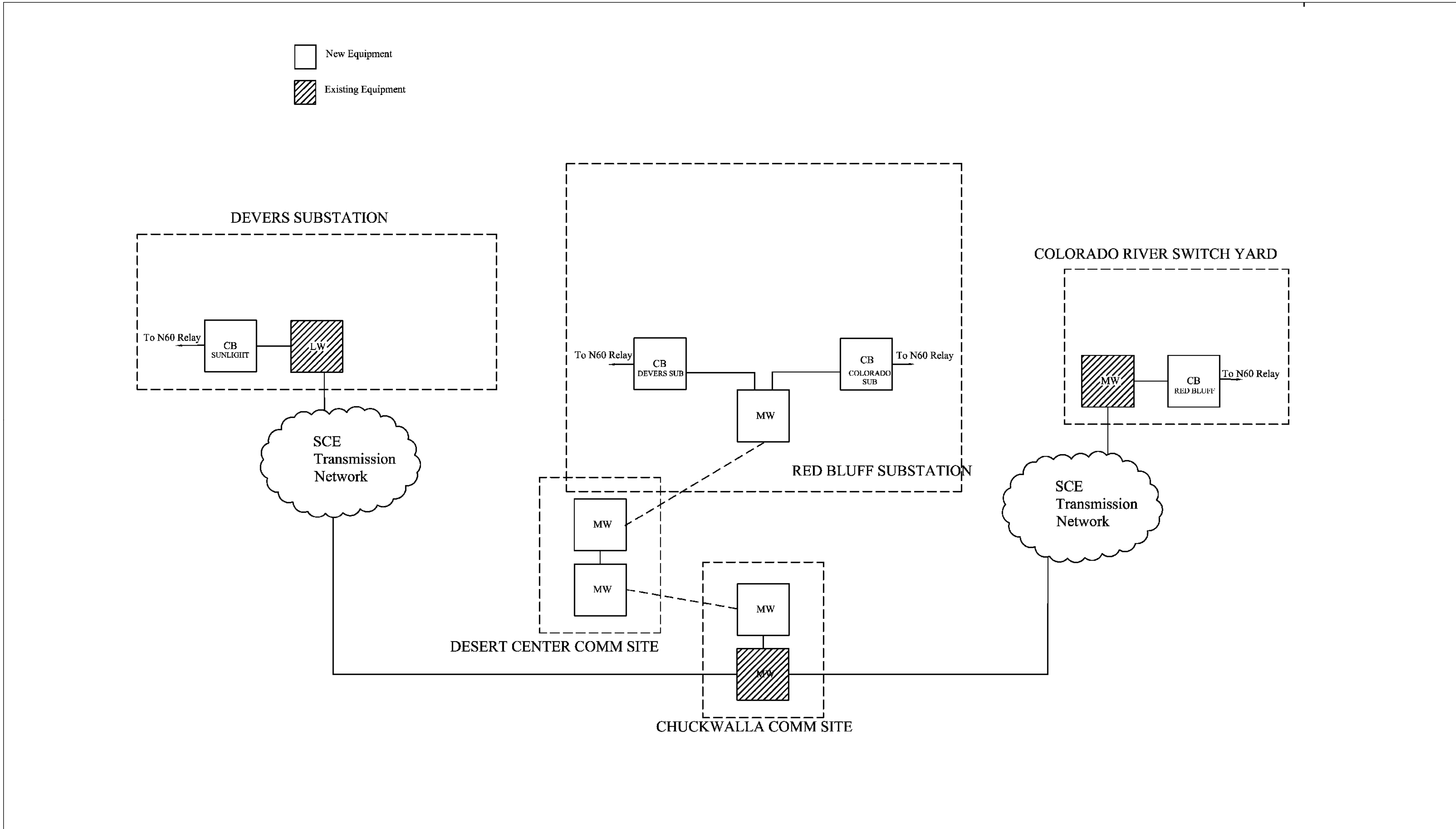
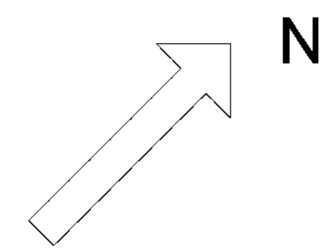


FIGURE 6
PROPOSED NEW SCE RED BLUFF SUBSTATION TELECOMMUNICATION PLAN

Features depicted herein are planning level accuracy, and intended for informational purposes only. Distances and locations may be distorted at this scale. Always consult with the proper legal documents or agencies regarding such features.



Proposed Desert Center Communcations Site located on BLM land, east of Hwy 177 and north of access road to airport.
Coordinates: 33 45 30.4 **N** 115 20 36.8 W

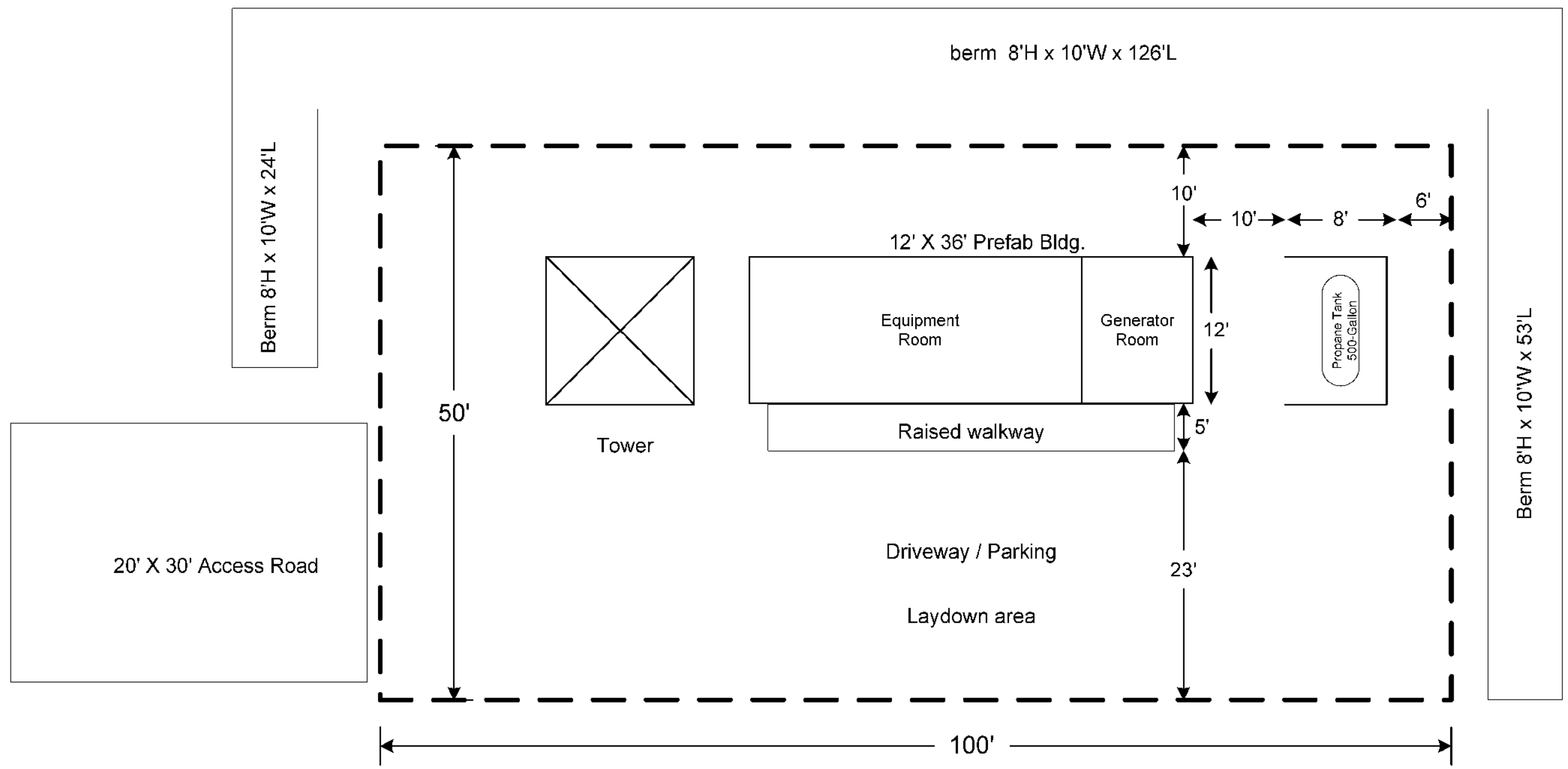
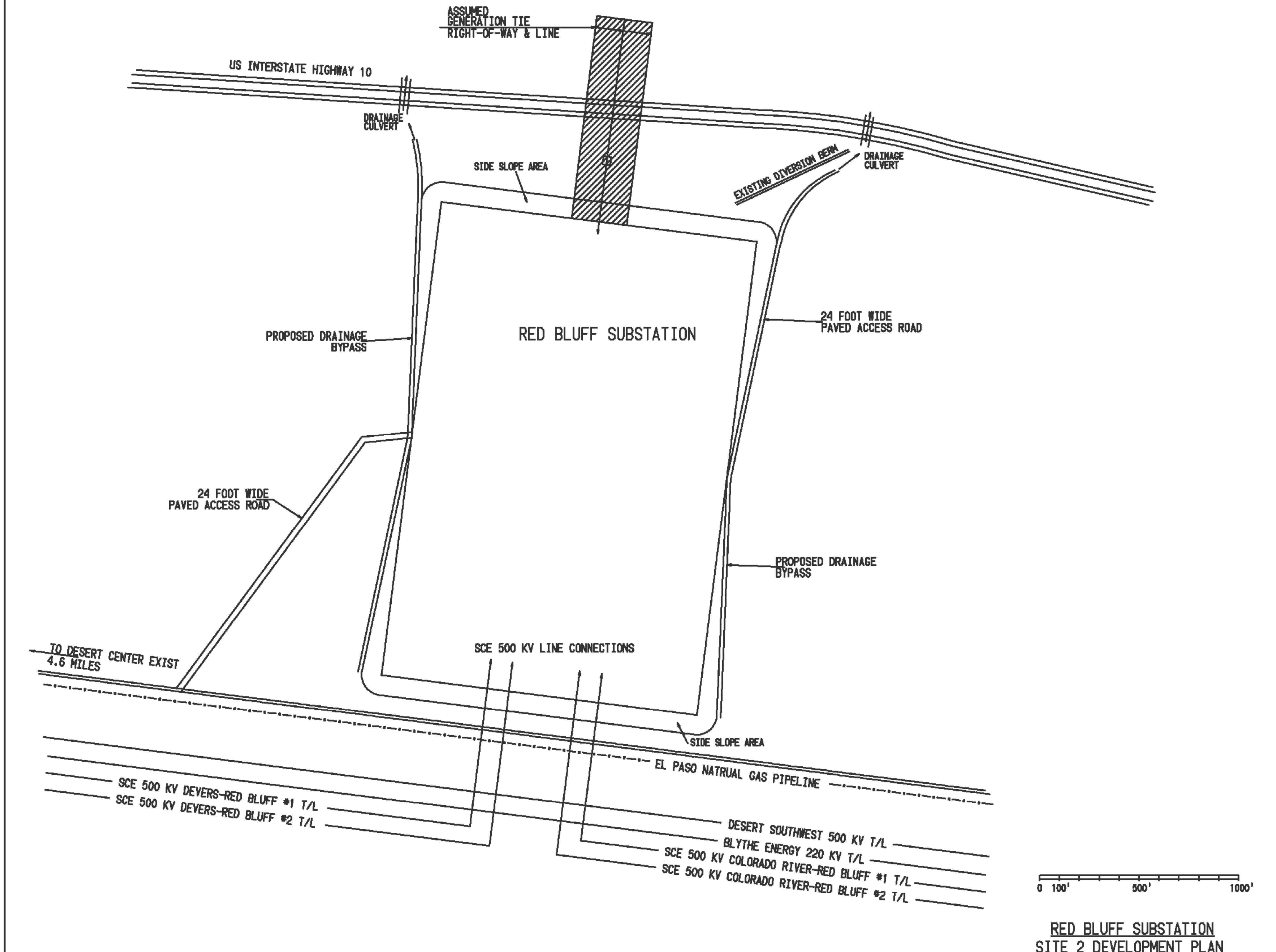


FIGURE 7
PROPOSED NEW SCE RED BLUFF DESERT CENTER COMMUNICATION SITE

Features depicted herein are planning level accuracy, and intended for informational purposes only. Distances and locations may be distorted at this scale. Always consult with the proper legal documents or agencies regarding such features.



RED BLUFF SUBSTATION
SITE 2 DEVELOPMENT PLAN

THIS LAYOUT EXHIBIT IS BASED ON PLANNING LEVEL ASSUMPTIONS.
THE EXACT DETAILS WOULD BE DETERMINED FOLLOWING COMPLETION OF PRELIMINARY AND FINAL ENGINEERING, INDENTIFICATIONS OF FIELD CONDITIONS, AND COMPLIANCE WITH APPLICABLE ENVIRONMENTAL AND PERMITTING REQUIREMENTS.

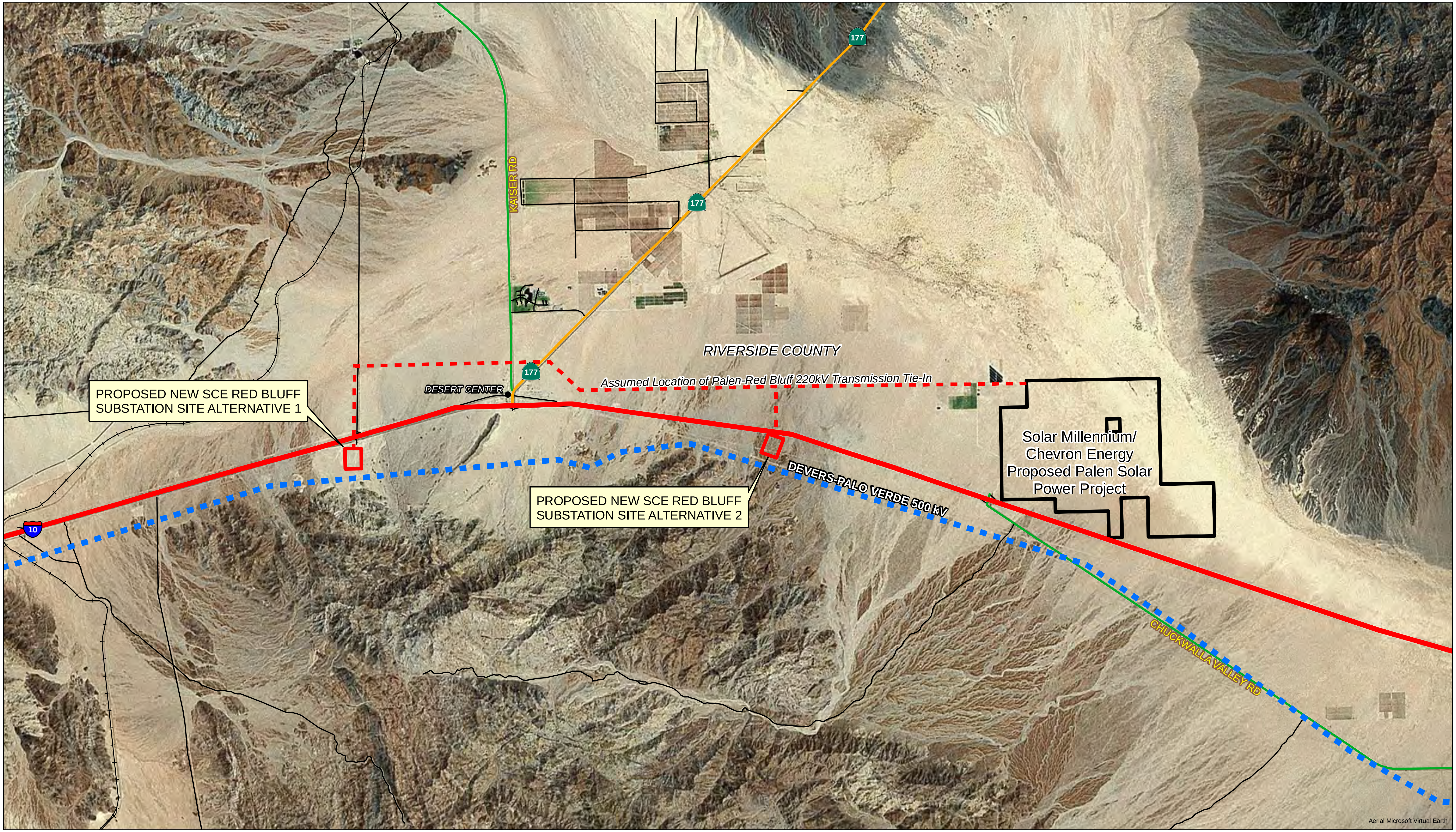
P:\GISData\Projects\MasterData\Major Transmission Projects\Red Bluff Substation Project RBSP\2010NOT000000000_InterconnectionMaps\RBSP_Fig8_AltSite2_DevPlan_v1.mxd 4/6/2010

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

FIGURE 8
PROPOSED NEW SCE RED BLUFF SUBSTATION SITE 2 DEVELOPMENT PLAN

Features depicted herein are planning level accuracy, and intended for informational purposes only. Distances and locations may be distorted at this scale. Always consult with the proper legal documents or agencies regarding such features.

N W E S



SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

FIGURE B-1
GENERATION INTERCONNECTION FROM SOLAR MILLENNIUM/CHEVRON ENERGY PROPOSED PALEN SOLAR POWER PROJECT TO PROPOSED NEW SCE RED BLUFF SUBSTATION SITES

Features depicted herein are planning level accuracy, and intended for informational purposes only. Distances and locations may be distorted at this scale. Always consult with the proper legal documents or agencies regarding such features.
© Real Properties - Survey and Mapping.

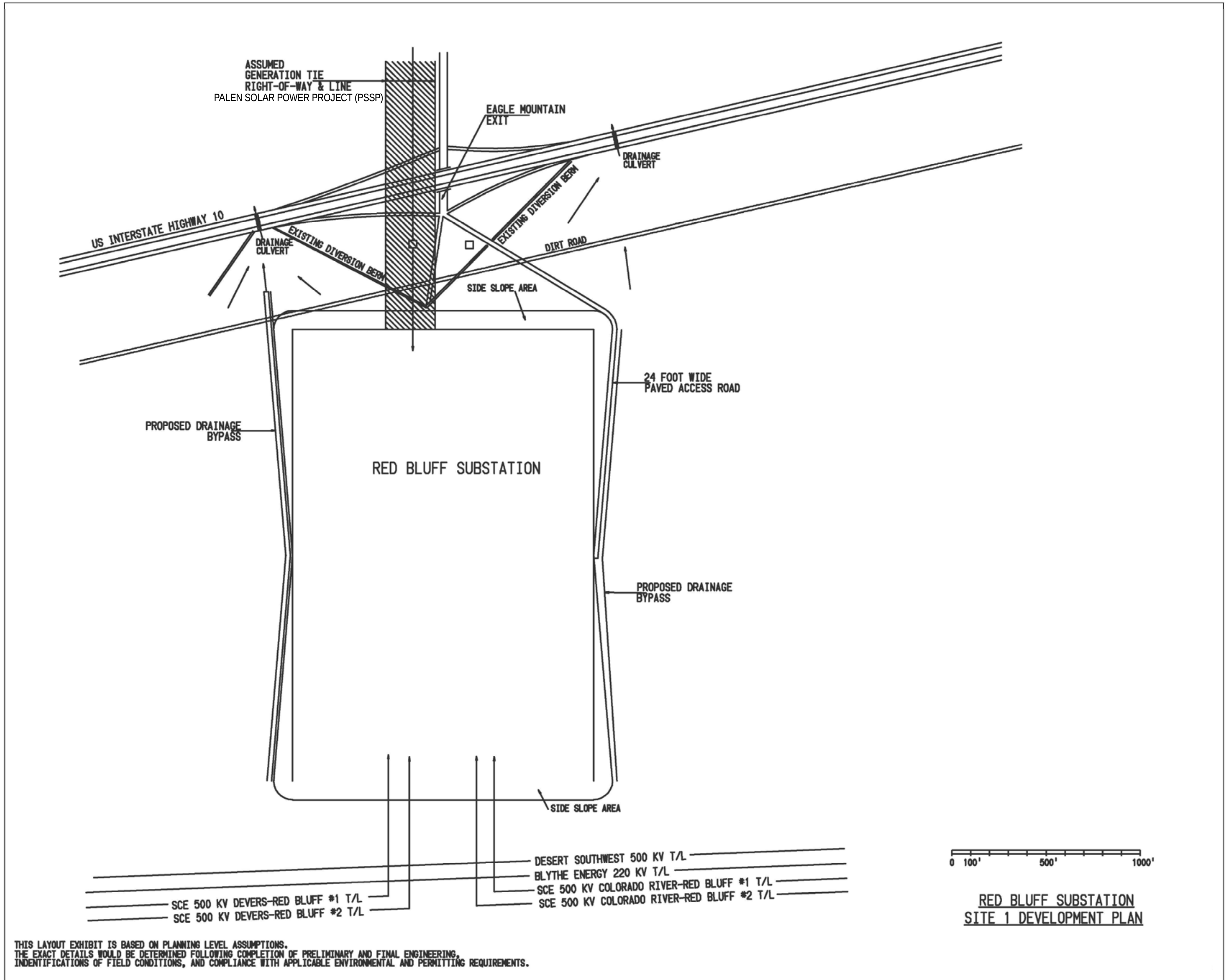
Thomas Bros. Maps is a registered trademark of Rand McNally & Company. Reproduced with permission granted by Rand McNally & Company.

Legend
- Chevron Energy - Palen Project Site
- Proposed Red Bluff Substation Sites
- Existing Transmission Lines, (SCE 2009)
- Proposed Palen Transmission Tie-In
- Freeways (TBM, 2008)
- Highways (TBM, 2008)
- Major Road (TBM, 2008)
- Minor Road (TBM, 2008)
- Railroad (TBM, 2008)

N W E S

0 0.5 1 2 Miles

P:\GISData\Projects\MasterData\Major Transmission Projects\Red Bluff Substation Project RBSP\2010NOT000000000_InterconnectionMaps\RBSP_FigB1_Palen_Location_v1.mxd 4/6/2010



SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

FIGURE B-2
PROPOSED NEW SCE RED BLUFF SUBSTATION SITE 1 GEN-TIE HOOKUP FROM SOLAR MILLENNIUM/CHEVRON ENERGY PROPOSED PALEN SOLAR POWER PROJECT

Features depicted herein are planning level accuracy, and intended for informational purposes only. Distances and locations may be distorted at this scale. Always consult with the proper legal documents or agencies regarding such features.

N
W E
S

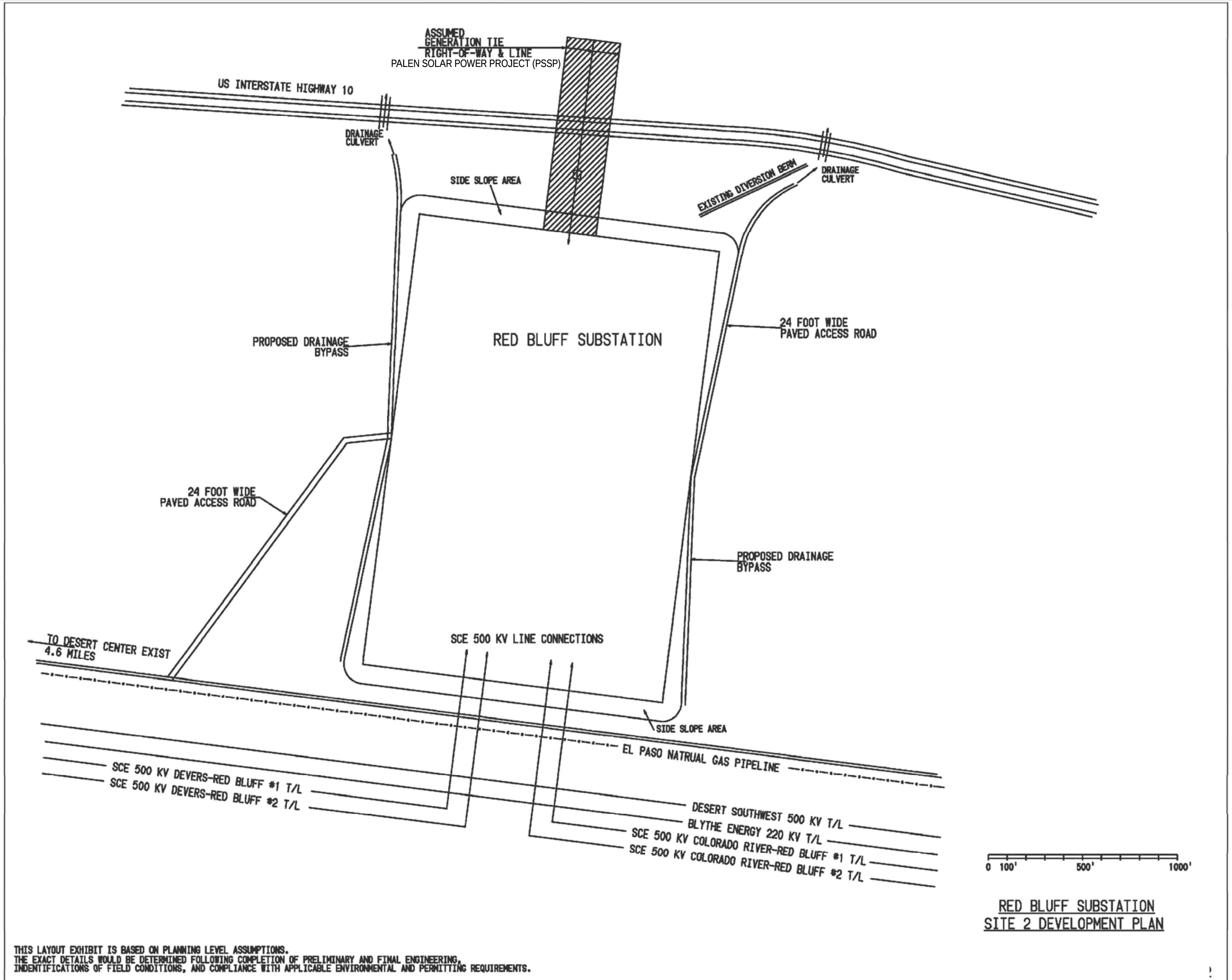
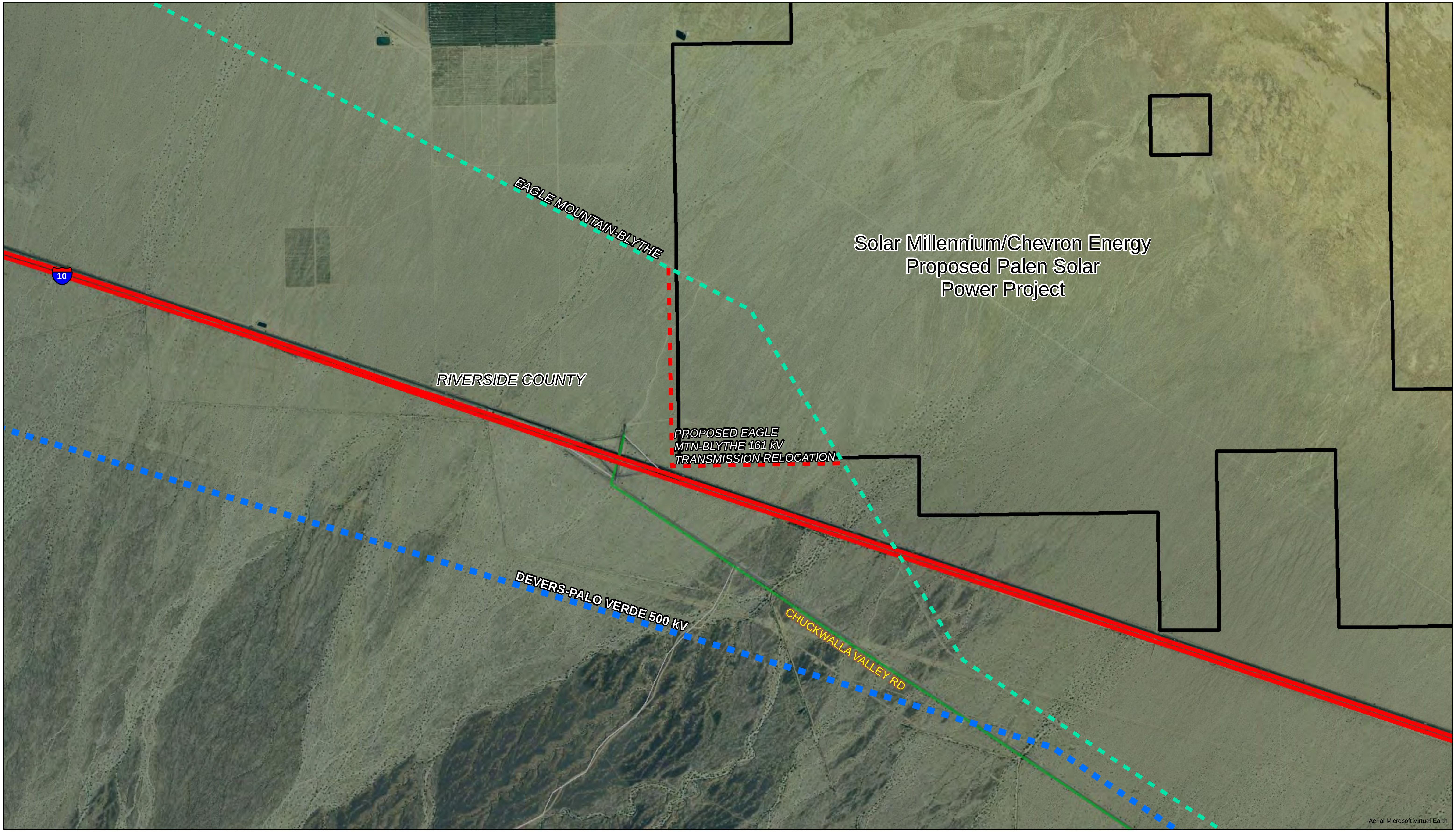


FIGURE B-3
PROPOSED NEW SCE RED BLUFF SUBSTATION SITE 2 GEN-TIE HOOKUP FROM SOLAR MILLENNIUM/CHEVRON ENERGY PROPOSED PALEN SOLAR POWER PROJECT

Features depicted herein are planning level accuracy, and intended for informational purposes only. Distances and locations may be distorted at this scale. Always consult with the proper legal documents or agencies regarding such features.

N
W E
S



SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

FIGURE B-4
SOLAR MILLENNIUM/CHEVRON ENERGY PROPOSED PALEN SOLAR POWER PROJECT EAGLE MOUNTAIN-BLYTHE 161 kV TRANSMISSION LINE RELOCATION

Features depicted herein are planning level accuracy, and intended for informational purposes only. Distances and locations may be distorted at this scale. Always consult with the proper legal documents or agencies regarding such features.

Legend
- Chevron Energy - Palen Project Site
- Existing Major Transmission Lines, (SCE 2009)
- Existing Eagle Mountain-Blythe 161 kV Transmission (SCE, 2009)
- Proposed Eagle Mtn-Blythe 161 kV Transmission Relocation (SCE, 2009)
- Freeways (TBM, 2008)
- Major Road (TBM, 2008)
- Minor Road (TBM, 2008)

N W E S

0 750 1,500 3,000 Feet

P:\GISData\Projects\MasterData\Major Transmission Projects\Red Bluff Substation Project RBSP\2010\NOT000000000_InterconnectionMaps\RBSP_FigB4_EagleMtn-Blythe_161kV_Trans_Relocation_v1.mxd 4/7/2010

PROPOSED PALEN SOLAR POWER PROJECT (PSPP)
INTERCONNECTION TO

SOUTHERN CALIFORNIA EDISON'S PROPOSED
RED BLUFF SUBSTATION

1.0 PROJECT DESCRIPTION OF THE GENERATOR INTERCONNECTION FROM PALEN SOLAR POWER PROJECT TO SOUTHERN CALIFORNIA EDISON'S PROPOSED RED BLUFF SUBSTATION

1.1 PROJECT OVERVIEW

1.1.1 Description of Project Elements

Palen Solar I, LLC proposes to construct and operate the Palen Solar Power Project (PSSP), which is comprised of two identical 250-megawatt (MW) (total capacity 500 MW) solar parabolic trough plants. The solar energy facility is located in the Mojave Desert in eastern Riverside County about ten miles northeast of Desert Center (Figure B-1). A single circuit, 220 kV generation interconnection transmission line is proposed to be constructed from the PSSP on-site central switchyard to the Southern California Edison (SCE) regional transmission grid at SCE's proposed Red Bluff Substation near Desert Center. Two alternate sites for the Red Bluff Substation (Sites 1 and 2 shown in Figure B-1) have been identified by SCE. The following is a summary of the generation interconnection components:

- Substation Source Line Connection: SCE would connect the second 500 kV into the Red Bluff Substation by installing necessary towers and conductors between the 500 kV switchrack and the 500 kV transmission line south of the substation.
- Generation Tie Line Connection: SCE would connect the PSPP-built 220 kV generation tie line (gen-tie) into the Red Bluff Substation by installing the last span of conductor between the 220 kV switchrack and the first PSPP-built 220 kV transmission line structure north of the substation.
- 161 kV Transmission Line Relocation: SCE would relocate approximately 6,200 feet of SCE's existing Eagle Mountain-Blythe 161 kV transmission line to avoid crossing the southwest section of the PSSP.
- Telecommunications Facilities: The joint developers would utilize optical ground wire (OPGW) on the PSSP interconnection generation tie-line and would terminate the fiber optics cable inside the PSSP central switchyard. SCE would install the last span of fiber optics cable between the 220 kV switchrack and the first PSPP-built transmission line structure north of Red Bluff Substation. SCE would make the final terminations to associated communications equipment installed inside both SCE's Red Bluff Substation and the PSPP central switchyard.

1.1.2 <u>Duration of Construction Activities and Projected Operation Date</u>

Subject to execution of a Large Generation Generator Agreement (LGIA) between SCE, the joint developers and the California System Independent System Operator (CAISO), construction of the interconnection facilities identified in Section 1.1.1 is expected to occur in the first quarter of 2013.

1.1.3 Transmission Line Design

1.1.3.1 Design of 500 kV source Line Transmission Structures

PSPP would require that the Red Bluff Substation be connected to a second 500 kV transmission source line via an additional loop-in line. The loop-in line would be connected to new line construction between Colorado River Substation and Devers Substation, creating the Colorado River-Red Bluff #2 and the Devers-Red Bluff #2 500 kV transmission lines. The new piece of each line segment into the Red Bluff Substation would be approximately 1,000 feet long.

The new 500 kV line segments would be constructed identical to the segments required for the initial construction of the Red Bluff Substation.

Some transmission structures may require a new right-of-way along that portion of the loop-in lines between SCE's existing ROW and the new Red Bluff Substation site. Other transmission structures would be within SCE's existing ROW. Three dead-end structures would be required for each line segment (a total of six structures for both lines), to reach the edge of the Red Bluff Substation Site

1.1.3.2 220 kV Generation Tie-Line Extension Design

The proposed Red Bluff Substation design includes bringing the final span from the PSPP 220 kV gen-tie line into the switchrack, just north of the Red Bluff Substation (Figure B-2, Substation Site 1; Figure B-3, Substation Site 2). There would be one single-circuit lattice steel tower (LST) or tubular steel pole (TSP) structure just north of the Red Bluff Substation for the connection of the PSPP gen-tie line to a 220 kV position inside the Red Bluff Substation.

While the PSSP 220 kV gen-tie line would initially carry 500 MW, the TSP or LST is expected to be designed for maximum future load, potentially utilizing 2B-1590 kcmil "Lapwing" Aluminum Conductor Steel Reinforced (ACSR) conductor. SCE would work with the joint developers to determine what conductor would be installed.

The first structure constructed by PSPP would be located just north of the Red Bluff Substation would be a dead end structure. SCE would work with PSPP to integrate the final design. SCE would construct, own, operate, and maintain the final span of the circuit from the substation dead end structure to the tower connection at the first PSPP structure - see Figure B-2.

1.1.4 Transmission Line Construction

1.1.4.1 Construction of 220kV Gen-Tie Transmission Structures

The construction of the 220kV gen-tie structure (Figure B-2), Substation Site 1; Figure B-3, Substation Site 2) just north of the Red Bluff Substation would be the responsibility of PSPP.

1.1.4.2 Wire Stringing of 220 kV Conductor

Wire-stringing includes all activities associated with the installation of conductors. This activity includes the installation of primary conductor and overhead ground wire (OHGW), vibration dampeners, weights, spacers, and suspension and dead-end hardware assemblies. Insulators and stringing sheaves (rollers or travelers) are typically attached during the steel erection process.

A standard wire-stringing plan includes a sequenced program of events starting with determination of wire pulls and wire pull equipment set-up positions. Advanced planning by supervision determines circuit outages, pulling times, and safety protocols needed for ensuring that safe and quick installation of wire is accomplished.

Wire-stringing activities would be conducted in accordance with SCE specifications, which is similar to process methods detailed in Institute of Electrical and Electronics Engineers Standard (IEEE) 524-2003, Guide to the Installation of Overhead Transmission Line Conductors.

Wire pulls are the length of any given continuous wire installation process between two selected points along the line. Wire pulls are selected, where possible, based on availability of dead-end structures at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of stringing and splicing equipment setups. In some cases, it may be preferable to select an equipment setup position between two suspension structures. Anchor rods would then be installed to provide dead-ending capability for wire sagging purposes, and also to provide a convenient splicing area.

To ensure the safety of workers and the public, safety devices such as traveling grounds, temporary grounding grid/mats around stringing equipment, guard structures, and radio-equipped public safety roving vehicles and linemen would be in place prior to the initiation of wire-stringing activities.

The following four steps describe the wire installation activities utilized by SCE:

- Step 1: Sock Line, Threading: Typically, a lightweight sock line is passed from structure to structure, which would be threaded through the wire rollers in order to engage a cam lock device that would secure the pulling sock in the roller. This threading process would continue between all structures through the rollers of a particular set of spans selected for a conductor pull.

- Step 2: Pulling: The sock line would be used to pull in the conductor pulling cable. The conductor pulling cable would be attached to the conductor using a special swivel joint to prevent damage to the wire and to allow the wire to rotate freely to prevent complications from twisting as the conductor unwinds off the reel. A piece of hardware known as a running board would be installed to properly feed the conductor into the roller; this device keeps the bundle conductor from wrapping during installation.

- Step 3: Splicing, Sagging, and Dead-ending: After the conductor is pulled in, the conductor would be sagged to proper tension and dead-ended to structures.

- Step 4: Clipping-in, Spacers: After the conductor is dead-ended, the conductors would be secured to all tangent structures; a process called clipping in. Once this is complete, spacers would be attached between the bundled conductors of each phase to keep uniform separation between each conductor.

The dimensions of the area needed for the stringing setups associated with wire installation are variable and depends upon terrain. The preferred minimum area needed for tensioning equipment set-up sites requires approximately an area of 150 feet by 500 feet (1.72 acres); the preferred minimum area needed for pulling equipment set-up sites requires approximately an area of 150 feet by 300 feet (1.03 acres); however, crews can work from within slightly smaller areas when space is limited. Each stringing operation would include one puller positioned at one end and one tensioner and wire reel stand truck positioned at the other end.

For stringing equipment that cannot be positioned at either side of a dead-end transmission structure, field snubs (i.e., anchoring and dead-end hardware) would be temporarily installed to sag conductor wire to the correct tension.

The puller and tensioner set-up locations require level areas to allow for maneuvering of the equipment. When possible, these locations would be located on existing level areas and existing roads to minimize the need for grading and cleanup. The final number and locations of the puller and tensioner sites would be determined during detailed engineering for the Proposed Project and the construction methods chosen by SCE or its Contractor.

An overhead ground wire (OHGW) for shielding would be installed on the transmission line. The OHGW would be installed in the same manner as the conductor; it is typically installed in conjunction with the conductor, depending upon various factors, including line direction, inclination, and accessibility.

1.1.4.3 Construction of 500 kV Source Line Transmission Structures

The construction of the 500 kV source line structures (Figure B-2. Substation Site 1; Figure B-3, Substation Site 2) just south of the Red Bluff Substation would be the responsibility of SCE and would be similar in scope as described in Section 1.4.2 of the main Red Bluff separate project description.

1.1.4.4 Land Disturbance

Table B-1 below provides an estimate of temporary and permanent land disturbance areas related to construction of the gen-tie transmission lines at either Site 1 or Site 2 since the transmission line construction areas of disturbance will be approximately the same for both sites. The numbers presented in Table B-1 are preliminary and subject to change as the result of detailed engineering.

TABLE B-1
RED BLUFF SUBSTATION SITES 1 AND 2 / PSPP
GEN-TIE TRANSMISSION LINE CONSTRUCTION – LAND DISTURBANCE

Project Feature	Site Quantity	Disturbed Acreage Calculation (L x W)	Acres Disturbed During Construction	Acres Temporarily Disturbed	Acres Permanently Disturbed
Install New 220 kV Gen-Tie Span to Switchrack (1)	1	150' x 300'	1.03	1.03	0.00
TOTAL ESTIMATED DISTURBED ACRES (2)			**1.03**	**1.03**	**0.00**
Notes to Table B-1:					
1. Structure construction work, including foundation installation, structure assembly & erection, is the responsibility of First Solar, and is therefore not described herein. All disturbance is solely for the installation of the final SCE-owned span between the final structure and the substation 220kV switchrack. This work would require only temporary disturbance area to set up wire stringing and pulling equipment.					
2. The disturbed acreage calculations are estimates based upon SCE's preferred area of use for the described project feature, the width of the existing right-of-way, or the width of the proposed right-of-way and, they do not include any new access/spur road information; they are subject to revision based upon final engineering and review of the project by SCE's Construction Manager and/or Contractor awarded project.					
Note: All data provided in this table is based on planning level assumptions and may change following completion of more detailed engineering, identification of field conditions, availability of material, and equipment, and any environmental and/or permitting requirements.					

1.1.5 Eagle Mountain-Blythe 161 kV Transmission Line Relocation

1.1.5.1 Introduction

SCE's existing Eagle Mountain-Blythe 161 kV transmission line crosses the southwest portion of the PSSP (Figure B-4). In order to maximize the development of the solar field, PSSP's joint developers have requested that SCE relocate approximately 6,200 feet of the Eagle Mountain.-Blythe 161kV transmission line. This work can be broken down into the following components: 1) line relocation; and, 2) line removal from the existing alignment.

1.1.5.2 Line Relocation

The line relocation would be accomplished by installing approximately 18-65 foot tall' H-Frame structures (each structure is composed of 2 poles for a total of 36 poles), 3-65 foot tall, three pole structures, (each composed of 3 poles for a total of 9 poles), approximately 8,000 circuit feet of 336.4 ACSR 30/7 conductor, and all associated hardware and guying. The new structures will be set approximately 8.5 feet deep and the new span lengths will range from 350 to 450 feet depending on line direction.

1.1.5.3 Line Removal

Approximately 6,200 feet of transmission line would be removed. The following would need to be removed: 7-65 feet tall H-Frame structures (each structure is composed of 2 poles for a total of 14 poles), 1-65 foot tall Three Pole Structure (each structure is composed of 3 poles for a total of 3 poles), approximately 6,200 circuit feet of 336.4 ACSR 30/7 conductor, and all associated hardware and guy wire.

1.1.5.4 Construction Activities

1.1.5.4.1 Marshalling Yard

A separate marshalling yard would be required for the removal and relocation of the portion of the existing Eagle Mountain-Blythe 161kV transmission line that crosses the PSPP (Figure B-4) and the construction of the new relocated 161 kV transmission line.

Equipment and materials to be stored at the temporary equipment and material staging area may include:

- Construction trailer
- Construction equipment
- Conductor/wire reels
- Transmission structure components
- Overhead ground wire/Optical ground wire cable
- Hardware
- Insulators
- Consumables such as fuel and joint compound
- Portable sanitation facilities
- Waste materials for salvaging, recycling, and/or disposal
- Best Management Practices (BMP) related materials such as straw waddles, silt fencing and sandbags.

The size and location of the temporary equipment and material staging area would be dependent upon a detailed site inspection. An area of approximately 20 acres would be required. Land disturbed at the temporary equipment and material staging area would be allowed to naturally return to preconstruction conditions following the completion of construction.

1.1.5.4.2 Transmission Line Access and Spur Roads

Transmission line roads are classified into two groups: access roads and spur roads. Access roads are through roads that run between structure sites along a right-of-way (ROW) and serve as the main transportation route along line ROWs. Spur roads branch off of access roads and terminate at one or more structure sites. Existing public roads and existing transmission line roads would be used wherever feasible. It is expected that some new roads would be needed to access the new transmission line segments and structure locations.

Rehabilitation work may be necessary in some locations along the existing transmission line roads to accommodate construction activities. As required, these roads could be cleared of vegetation, blade-graded to remove potholes, ruts, and other surface irregularities, or re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 14 feet with 2 feet of shoulder on each side but may be wider depending on final engineering requirements and field conditions.

New road alignments would first be cleared and cleared of vegetation. Roads would be blade-graded to remove potholes, ruts, and other surface irregularities. Fill material would be deposited on the roads where necessary, and roads would be re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 14 feet with 2 feet of shoulder on each side but may be wider depending on final engineering requirements and field conditions. New road gradients would be leveled so that any sustained grade does not exceed 12 percent. All curves would have a curvature radius of not less than 50 feet measured at the center line of the usable road surface. The new spur roads would usually have turnaround areas near the structure locations.

1.1.5.4.3 Construction of New 161 kV Transmission Structures

The new structure locations would first be graded and/or cleared to provide a reasonably level and vegetation-free surface for footing construction. Sites would be graded such that water would run toward the direction of the natural drainage. In addition, drainage would be designed to prevent ponding and erosive water flows that could cause damage to the base of the poles. The graded area would be compacted to at least 90 percent relative density, and would be capable of supporting heavy vehicular traffic.

Assembly and erection of the wood pole structures typically would require a temporary laydown area of approximately 150 feet by 75 feet. In locations where the terrain in the laydown area is already reasonably level (for example, at an existing pole location), only vegetation removal would occur to prepare the site for construction. In locations where a level surface is not present (for example, a new pole site), both vegetation clearing and grading would be necessary to prepare the laydown area for construction.

The Proposed Project would utilize wood poles. The wood would be direct buried in boreholes approximately 2 to 4 feet in diameter and 8 to 10 feet deep, and are typically installed using a line truck. Once the wood poles are set in place, bore spoils (material from holes drilled) would be used to backfill the hole. If the bore spoils are not suitable for backfill, imported clean fill material, such as clean fill dirt and/or pea gravel, would be used. Excess bore spoils would be distributed at each pole site and used as backfill for the holes left after removal of existing structures or disposed of off-site in accordance with all applicable laws.

Pole installation would begin by transporting the poles by flatbed trucks and pole trailers from the staging area and laying the individual poles on the ground at each new structure location. While on the ground, the top section would be pre-configured with the necessary insulators and wire-stringing hardware. A line truck (with a boom on it would be used to position each pole into previously augured holes When each of the poles for a structure is secured, the top section would be framed out.

Wood poles would be direct buried and back filled with native soil.

After construction is completed, the transmission structure site would be graded such that water would run toward the direction of the natural drainage. In addition, drainage would be designed to prevent ponding and erosive water flows that could damage the structure footing. The graded area would be compacted and capable of supporting heavy vehicular traffic.

1.1.5.4.4 Wire Stringing of 161 kV Conductors
Wire-stringing includes all activities associated with the installation of conductors. This activity includes the installation of primary conductor, overhead ground wire (OHGW), and suspension and dead-end hardware assemblies. Insulators and stringing sheaves (rollers or travelers) are typically attached during the steel erection process.

A standard wire-stringing plan includes a sequence of events starting with determination of wire pulls and wire pull equipment set-up positions. Advanced planning by supervision determines circuit outages, pulling times, and safety protocols to ensure that safe and effective installation of wire is accomplished.

Wire-stringing activities would be conducted in accordance with SCE specifications that are similar to process methods detailed in Institute of Electrical and Electronics Engineers Standard 524-2003, Guide to the Installation of Overhead Transmission Line Conductors.

Wire pulls are the length of any given continuous wire installation process between two selected points along the line. Wire pulls are selected, where possible, based on availability of dead-end structures at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of stringing and splicing equipment setups. In some cases, it may be preferable to select an equipment setup position between two suspension structures. Anchor rods would then be installed to provide dead-ending capability for wire sagging purposes, and also to provide a convenient splicing area.

To ensure the safety of workers and the public, safety devices such as traveling grounds, guard structures, and radio-equipped public safety roving vehicles and linemen would be in place prior to the initiation of wire-stringing activities.

The following four steps describe the wire installation activities proposed by SCE:

- Step 1: Sock Line, Threading: Typically, a lightweight sock line is passed from structure to structure, which would be threaded through the wire rollers in order to engage a cam lock device that would secure the pulling sock in the roller. This threading process would continue between all structures through the rollers of a particular set of spans selected for a conductor pull.

- Step 2: Pulling: The sock line would be used to pull-in the conductor pulling rope. The conductor pulling rope would be attached to the conductor using a special swivel joint to prevent damage to the wire and to allow the wire to rotate freely to prevent complications from twisting as the conductor unwinds off the reel.

- Step 3: Splicing, Sagging, and Dead-ending: After the conductor is pulled-in, the conductor would be sagged to proper tension and dead-ended to structures.

- Step 4: Clipping-in, Spacers: After the conductor is dead-ended, the conductors would be secured to all tangent structures; a process called clipping in.

The dimensions of the area needed for the stringing setups associated with wire installation are variable and depend upon terrain. The preferred minimum area needed for tensioning equipment set-up sites requires approximately 500 feet by 100 feet (1.15 acres). The preferred minimum area needed for pulling equipment set-up sites requires approximately 300 feet by 150 feet (1.03 acres). Crews though can work from within slightly smaller areas when space is limited. Each stringing operation would include one puller positioned at one end and one tensioner and wire reel stand truck positioned at the other end.

Stringing equipment that cannot be positioned at either side of a dead-end transmission structure would require installation of temporary field snubs (i.e., anchoring and dead-end hardware) to sag conductor wire to the correct tension.

The puller and tensioner set-up locations would require level areas to allow for maneuvering of the equipment. When possible, these locations would be located on existing level areas and existing roads to minimize the need for grading and cleanup. The final number and locations of the puller and tensioner sites would be determined during detailed engineering based on the construction methods chosen by SCE or its Contractor.

An overhead ground wire (OHGW) for shielding would be installed on the transmission line. The OHGW would be installed in the same manner as the conductor. The OHGW is typically installed in conjunction with the conductor, depending upon various factors including line direction, inclination, and accessibility.

1.1.5.4.5 Removal of Existing 161 kV Transmission Structures

Transmission line facilities to be removed include existing 161 kV transmission structures located on the portion of the existing Eagle Mountain-Blythe 161kV transmission line that crosses the PSSP (Figure B-4) and associated hardware (i.e., insulators, vibration dampeners, suspension clamps, ground wire clamps, shackles, links, nuts, bolts, washers, cotters pins, insulator weights, and bond wires). Existing access roads would be used to reach structure sites. Some rehabilitation work on these roads may be necessary before removal activities begin. In addition, grading may be necessary to establish a temporary laydown area adjacent to the existing structure for equipment and material staging during the structure removal. The laydown area would be approximately 100 feet by 50 feet (0.10 acre). Each structure would require a crane truck or rough terrain crane to support the structure during dismantle and removal. A crane pad would be located within the laydown area used for structure assembly. If the existing terrain is not suitable to support crane activities, a temporary 50 feet by 50 feet (0.06 acre) crane pad would be constructed. The existing structure footings would be removed to a depth of approximately 2 feet below ground level. Holes would be filled, compacted, and the area would be smoothed to match surrounding grade.

1.1.5.4.6 Housekeeping and Construction Site Cleanup

Damage to existing roads as a result of construction would be repaired once construction is complete. All areas that are temporarily disturbed by project activities (including equipment and material staging yard, pull and tension sites, and structure laydown and assembly sites) would be restored to preconstruction conditions following the completion of construction. Restoration may include grading and restoration of sites to original contours and reseeding where appropriate. In addition, all construction materials and debris would be removed from the area and recycled or properly disposed of at an off-site disposal facility in accordance with all applicable laws. A final inspection would be conducted to ensure that cleanup activities are successfully completed.

Table B-2 below provides information on temporary and permanent land disturbance areas related to construction of the transmission lines.

1.1.5.4.7 Labor and Equipment

Construction of the Proposed Project would be performed by SCE Crews or contract personnel with SCE responsible for project administration and inspection. The estimated number of persons and types of equipment required for each phase of transmission line construction for the PSPP 161 kV line relocation Project is shown in Table B-3, Construction Equipment and Estimated Workforce, By Activity, For 161 kV Transmission Line Structure Removal & Relocation.

1.1.5.4.8 Operation and Maintenance

Following the completion of project construction, operation and maintenance of the new relocated line would commence. Operation, inspection, and maintenance activities would occur at least once per year in compliance with CPUC General Order No. 165. The frequency of inspection and maintenance activities would depend upon weather effects and any unique problems that may arise due to such variables as substantial storm damage or vandalism.

TABLE B-2
SCE EAGLE MOUNTAIN-BLYTHE 161KV TRANSMISSION LINE RELOCATION FOR PSSP – LAND DISTURBANCE

Project Feature	Site Quantity	Disturbed Acreage Calculation (L x W)	Acres Disturbed During Construction	Acres to be restored	Acres Permanently Disturbed
Guard Structures	4	50' x 75'	0.3	0.3	0.0
161kV Conductor Removal Setup Area - Tensioner (3)	2	500' x 100'	2.3	2.3	0.0
Remove Existing Wood 3 Pole Structure (1)	1	100' x 50'	0.1	0.1	0.0
Construct New Wood H-Frame Pole (2)	18	100' x 50'	2.1	0.8	1.3
Construct New Wood 3 Pole Structure (1)	3	100' x 50'	0.3	0.3	0.0
161kV Conductor & OPGW Stringing Setup Area - Tensioner (3)	2	500' x 100'	2.3	2.3	0.0
161 kV Conductor Pulling Site	2	300’ X 100’	1.38	1.38	0.0
161kV Conductor Splicing Setup Areas (3)	4	150' x 100'	1.4	1.4	0.0
New Access Roads (4)	1.4	linear miles x 14’ wide	2.4	0.0	2.4
Total Estimated (5)			**14.9**	**8.9**	**3.6**

Notes:
1. Includes the removal of existing conductor, teardown of existing structure, and removal of foundation 2' below ground surface.
2. Includes structure assembly & erection, conductor & OPGW installation. Area to be restored after construction. Portion of R/W within 25' of the Tubular Steel Pole and within 10' of Light Weight Steel Pole, and H-Frame to remain cleared of vegetation. Permanently disturbed areas for TSP=0.06 acre, LWS=0.05 acre, and H-Frame=0.06acre.
3. Based on 9,000’ conductor reel lengths, number of circuits, and route design.
4. Based on approximate length of road in miles x road width of 14’.
5. The disturbed acreage calculations are estimates based upon SCE’s preferred area of use for the described project feature, the width of the existing right-of-way, or the width of the proposed right-of-way and, they do not include any new access/spur road information; they are subject to revision based upon final engineering and review of the project by SCE's Construction Manager and/or Contractor awarded project.

Footing / Base Volume and Area Calculations:
Average Wood H-Frame & Wood 3 Pole Structure depth 12ft deep, 2.5ft diameter, qty 2 per H-Frame: earth removed for pole base = 4.4 cu. yds.; surface area = 9.8 sq. ft.

TABLE B-3
CONSTRUCTION EQUIPMENT AND ESTIMATED WORKFORCE BY ACTIVITY
RELOCATE SINGLE-CIRCUIT 161KV T/L

WORK ACTIVITY				**ACTIVITY PRODUCTION**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Survey (1)				**4**	**3**		**1.2 Miles**
1/2-Ton Pick-up Truck, 4x4	200	Gas	2		3	8	1 Mile/Day
Marshalling Yard (2)				**4**			
1-Ton Crew Cab, 4x4	300	Diesel	1			2	
30-Ton Crane Truck	300	Diesel	1		Duration of Project	2	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1			5	
Water Truck	350	Diesel	2			8	
Truck, Semi, Tractor	350	Diesel	1			1	
Roads & Landing Work (3)				**5**	3		**1.2 Miles**
1-Ton Crew Cab, 4x4	300	Diesel	1		1	2	
Road Grader	350	Diesel	1		1	4	
Backhoe/Front Loader	350	Diesel	1		1	6	
Drum Type Compactor	250	Diesel	1		1	4	2 Miles/Day
Track Type Dozer	350	Diesel	1		1	6	
Excavator	300	Diesel	1		1	6	
Lowboy Truck/Trailer	500	Diesel	1		2	2	
Remove Existing Conductor (4)				**14**	**5**		**1.2 Circuit Miles**
1-Ton Crew Cab, 4x4	300	Diesel	4		5	8	
Sleeving Truck	300	Diesel	1		3	4	
30-Ton Crane Truck	300	Diesel	1		3	4	
80ft. Hydraulic Man-lift/Bucket Truck	350	Diesel	3		3	8	0.5 Mile/Day
Bull Wheel Puller	500	Diesel	1		3	6	
Hydraulic Rewind Puller	300	Diesel	1		3	6	
40' Flat Bed Trailer	N/A	N/A	3		3	2	
Truck, Semi, Tractor	350	Diesel	1		3	1	
Wood H-Frames/Poles Removal (5)				**6**	**3**		**7 H-Frame Poles/ 1 Three Pole Structures**
1-Ton Crew Cab, 4x4	300	Diesel	2		1	5	9 H-Frames or Poles/Day
10,000 lb. Rough Terrain Forklift	200	Diesel	1		1	4	

TABLE B-3
CONSTRUCTION EQUIPMENT AND ESTIMATED WORKFORCE BY ACTIVITY
RELOCATE SINGLE-CIRCUIT 161KV T/L

WORK ACTIVITY				ACTIVITY PRODUCTION			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
30-Ton Crane Truck	300	Diesel	1		1	6	
Compressor Trailer	120	Diesel	1		1	6	
Flat Bed Truck/ Trailer	350	Diesel	1		1	8	
Install Wood H-Frames/Poles (5)				**6**	**6**		**18 H-Frame Poles/ 3 Three Pole Structures**
1-Ton Crew Cab, 4x4	300	Diesel	2		6	5	4 H-Frames or Poles/Day
10,000 lb. Rough Terrain Forklift	200	Diesel	1		3	4	
30-Ton Crane Truck	300	Diesel	1		6	6	
Compressor Trailer	120	Diesel	1		5	6	
Flat Bed Truck/ Trailer	350	Diesel	1		3	8	
Install Conductor (6)				**16**	**11**		**3.1 Circuit Miles**
3/4-Ton Truck, 4x4	300	Gas	4		11	8	0.37 Mile/Day
1-Ton Crew Cab Truck, 4x4	300	Diesel	6		11	8	
Wire Truck/Trailer	350	Diesel	4		7	2	
Dump Truck (Trash)	350	Diesel	1		9	2	
Bucket Truck	350	Diesel	2		11	8	
20,000 lb. Rough Terrain Fork Lift	350	Diesel	1		9	2	
22-Ton Manitex	350	Diesel	2		9	8	
Splicing Rig	350	Diesel	1		3	6	
Splicing Lab	300	Diesel	1		3	6	
Static Truck/ Tensioner	350	Diesel	1		6	6	
3 Drum Straw Line Puller	300	Diesel	1		6	6	
Lowboy Truck/Trailer	500	Diesel	1		4	2	
Restoration (7)				**7**	**1**		**1.2 Miles**
1-Ton Crew Cab, 4x4	300	Diesel	2		1	2	1 Mile/Day
Road Grader	350	Diesel	1		1	6	
Backhoe/Front Loader	350	Diesel	1		1	6	

TABLE B-3
CONSTRUCTION EQUIPMENT AND ESTIMATED WORKFORCE BY ACTIVITY
RELOCATE SINGLE-CIRCUIT 161KV T/L

WORK ACTIVITY				ACTIVITY PRODUCTION			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Drum Type Compactor	250	Diesel	1		1	6	
D8 Cat	300	Diesel	1		1	6	
Lowboy Truck/Trailer	500	Diesel	1		1	3	

Crew Size Assumptions:

#1 Survey = one 4-man crew
#2 Marshalling Yards = one 4-man crew
#3 Roads & Landing Work = one 5-man crew
#4 Remove Existing Conductor = one 14-man crew
#5 Remove/Install Existing Wood H-Frames/Wood Poles = one 6-man crew
#6 Conductor Installation = two 8-man crews
#7 Restoration = one 7-man crew

1.1.6 Telecommunication system description

A telecommunication system would be required in order to provide monitoring and remote operation capabilities of the electrical equipment at the Red Bluff Substation for protection of the PSSP gen-tie line. To provide this system, SCE would require the following:

- PSPP shall utilize optical ground wire (OPGW) on its interconnection generation tie-line and will terminate the fiber optics cable inside the PSPP central switchyard.
- SCE would construct a duct bank from the Red Bluff Substation MEER building to one of the new transmission towers of the PSPP 220kV generator tie line. The duct bank from the MEER building would contain one five inch duct. The trench would be dug 36 inches deep and 18 inches wide. The conduit would be laid in and then covered with slurry. The slurry would be covered with soil that came out the excavation. The total length of the duct is approximately 1,000 foot.
- SCE shall make the final terminations to associated communications equipment installed inside both SCE's Red Bluff Substation and the PSPP central switchyard.
- SCE would construct two duct banks from the Red Bluff Substation MEER building to two of the new transmission towers of the Devers – Red Bluff and Colorado River – Red Bluff 500kV transmission lines. The duct bank from the MEER building would contain one five inch duct. The trench would be dug 36 inches deep and 18 inches wide. The conduit would be laid in and then covered with slurry. The slurry would be covered with soil that came out the excavation. The total length of each of the ducts is approximately 1,000 foot.

Table B-4 provides estimates of temporary and permanent land disturbances related to construction of the telecommunication system. The numbers presented in Table B-4 are preliminary and subject to change as the result of detailed engineering.

TABLE B-4
TELECOMMUNICATION SYSYTEM CONSTRUCTION – SUBSTATION SITE 1 ESTIMATED LAND DISTURBANCE

CONSTRUCTION ACTIVITY	ACRES TEMPORARILY DISTURBED	ACRES PERMANENTLY DISTURBED
Duct from Red Bluff MEER to first 220kV tower outside station (1)	0.03	-
Two Ducts from Red Bluff MEER to first 500kV towers outside station (1)	0.06	-
Total Acres Disturbed	0.09	0

(1) 1,000 feet long by 1.5 feet wide trench.

1.6.2.2 Construction equipment and labor

See Table B-5 for the construction workforce and type of equipment expected to be used in constructing the proposed telecommunications facilities. The numbers presented in Table B-5 are preliminary and subject to change as the result of detailed engineering.

TABLE B-5
CONSTRUCTION EQUIPMENTMENT AND ESTIMATED WORKFORCE BY ACTIVITY TO CONSTRUCT THE TELECOMMUNICATION SYSTEM

CONSTRUCTION ACTIVITY	NUMBER OF PERSONNEL	NUMBER OF DAYS	EQUIPMENT REQUIREMENTS
Trench Construction	5	12	2-crew trucks (gas/diesel) 1-backhoe (diesel) 1-stakebed truck (diesel) 1-concrete mixer (diesel)
Underground Fiber Cable Installation	5	3	1-crew trucks (gas/diesel) 2-line trucks (diesel)
Telecommunications Installation Crew	2	20	2-vans (gas)

1.6.2.3 Post construction Cleanup

Surplus soil, if any, would be disposed of off-site at an approved license facility.

Best Management Practices (BMP's)

BMP NO.	BMP DESCRIPTION
AIR QUALITY	
AIR-1	The construction activities would be in compliance with AQMD requirements, as applicable to the project,
AESTHETICS AND VISUAL RESOURCES	
AES-1	LSTs and TSPs would be galvanized steel with a dulled grey finish that minimizes reflected light.
AES-2	Insulators that minimize reflection of light would be utilized.
AES-3	Substation equipment would have materials that minimize reflective light.
AES-4	If chain link fence is used, it would have a dulled-finish.
AES-5	The substation lighting would be designed to be manually operated for non-routine nighttime work.
BIOLOGICAL RESOURCES	
BIO-1	Preconstruction biological clearance surveys would be conducted to identify special-status plants and wildlife.
BIO-2	SCE would prepare a Worker Environmental Awareness Program (WEAP). All construction crews and contractors would be required to participate in WEAP training prior to starting work on the project.
BIO-3	All transmission and subtransmission towers and poles would be designed to be avian-safe in accordance with the suggested practices for Avian Protection on Power Lines: the State of the Art in 2006 (Avian Power Line Interaction Committee 2006).
CULTURAL RESOURCES	
CR-1	A cultural resource inventory of the project area would be conducted for cultural resources prior to any disturbance. All surveys would be conducted and documented as per applicable laws, regulations, and guidelines.
CR-2	To the extent feasible, all ground-disturbing activities shall be sited to avoid or minimize impacts to cultural resources listed as, or potentially-eligible for listing as, unique archaeological sites, historical resources, or historic properties.
CR-3	A protective buffer zone would be established and maintained around each recorded archaeological site within or immediately adjacent to the ROW.
PALEONTOLOGY RESOURCES	
PALEO-1	A paleontologist would conduct a pre-construction field survey of the project area.
PALEO-2	Prior to construction, a certified paleontologist would supervise monitoring of construction excavations.
GEOLOGY AND SOILS	
GEO-1	Prior to final design of substation facilities, and transmission and, a

	combined geotechnical engineering and engineering geology study would be conducted to identify site-specific geologic conditions and potential geologic hazards in sufficient detail to support sound engineering practices.
GEO-2	For new substation construction, specific requirements for seismic design would be followed based on the Institute of Electrical and Electronic Engineers' 693 "Recommended Practices for Seismic Design of Substations".
GEO-3	New access roads, where required, would be designed to minimize ground disturbance during grading.
GEO-4	Cut and fill slopes would be minimized by a combination of benching and following natural topography where feasible.
GEO-5	Any disturbed areas associated with temporary construction would be returned to preconstruction conditions (to the extent feasible) after the completion of project construction.
HAZARDS AND HAZARDOUS WASTE	
HAZ-1	A Phase I ESA would be performed at each new or expanded substation location and along newly acquired transmission subtransmission line ROWs.
HAZ-2	SCE would implement standard fire prevention and response practices for the construction activities.
HAZ-3	As applicable, SCE would follow fire codes per Cal Fire Power Line Fire Prevention Fire Guide requirements for vegetation clearance during construction of the project to reduce the fire hazard potential.
HAZ-4	Hazardous materials and waste handling would be managed in accordance with the following SCE plans and programs: • *Spill Prevention, Countermeasure, and Control Plan (SPCC Plan).* In accordance with Title 40 of the CFR, Part 112, SCE would prepare a SPCC for proposed and/or expanded substations, as applicable. • *Hazardous Materials Business Plans (HMBPs).* Prior to operation of new or expanded substations, SCE would prepare or update and submit, in accordance with Chapter 6.95 of the CHSD, and Title 22 CCR, an HMBP, as applicable. • *Storm Water Pollution Prevention Plan (SWPPP):* A project-specific construction SWPPP would be prepared and implemented prior to the start of construction of the transmission line and substation. • *Health and Safety Program:* SCE would prepare and implement a health and safety program to address site-specific health and safety issues. • *Hazardous Materials and Hazardous Waste Handling:* A project-specific hazardous materials management and hazardous waste management program would be developed prior to initiation of the

	project. Material Safety Data Sheets would be made available to all Project workers • *Emergency Release Response Procedures:* An Emergency Response Plan detailing responses to releases of hazardous materials would be developed prior to construction activities. All construction personnel, including environmental monitors, would be aware of state and federal emergency response reporting guidelines.
HAZ-5	Hazardous materials would be used or stored and disposed of in accordance with Federal, State, and Local regulations.
HAZ-6	The substation would be grounded to limit electric shock and surges that could ignite fires.
HAZ-7	All construction and demolition waste would be removed and transported to an appropriately permitted disposal facility.
HYDROLOGY AND WATER QUALITY	
HYDRO-1	Construction equipment would be kept out of flowing stream channels as feasible.
HYDRO-2	Towers would be located to avoid active drainage channels, especially downstream of steep hill slope areas, to minimize the potential for damage.
LAND USE	
LAND USE-1	SCE shall provide 14 days of advance notice of the start of construction to property owners located within 300 feet of construction-related activities.
NOISE	
NOISE-1	SCE would comply with local noise ordinances.
TRANSPORTATION AND TRAFFIC	
TRANS-1	Traffic control services would be used for equipment, supply delivery, and conductor stringing, as applicable.
TRANS-2	Construction traffic would be scheduled for off-peak hours to the extent feasible and would not block emergency equipment routes.
TRANS-3	If work requires modifications or activities within local roadway and railroad ROWs, appropriate permits would be obtained prior to the commencement of construction activities.

STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION

In the Matter of:
APPLICATION FOR CERTIFICATION
for the *PALEN SOLAR POWER PROJECT*

Docket No. 09-AFC-7
PROOF OF SERVICE
(Revised 5/14/2010)

APPLICANT

Alice Harron
Senior Director of Project Development
1625 Shattuck Avenue, Suite 270
Berkeley, CA 94709-1161
harron@solarmillenium.com

Elizabeth Ingram,
Associate Developer
Solar Millennium LLC
1625 Shattuck Avenue, Suite 270
Berkeley, CA 94709
berg@solarmillennium.com

Ram Ambatipudi
Chevron Energy Solutions
150 E. Colorado Blvd., Ste. 360
Pasadena. CA 91105

APPLICANT'S CONSULTANT

Arrie Bachrach
AECOM Project Manager
1220 Avenida Acaso
Camarillo, CA 93012
arrie.bachrach@aecom.com

COUNSEL FOR APPLICANT

Scott Galati, Esq.
Galati/Blek, LLP
455 Capitol Mall, Suite 350
Sacramento, CA 95814
sgalati@gb-llp.com

Peter Weiner
Matthew Sanders
Paul, Hastings, Janofsky & Walker LLP
55 2nd Street, Suite 2400-3441
San Francisco, CA 94105
peterweiner@paulhastings.com
matthewsanders@paulhastings.com

INTERESTED AGENCIES

Holly L. Roberts, Project Manager Bureau of Land Management
Palm Springs-South Coast Field Office
1201 Bird Center Drive Palm Springs, CA 92262
CAPSSolarPalen@blm.gov

California ISO
e-recipient@caiso.com

INTERVENORS
California Unions for Reliable Energy (CURE)
Tanya A. Gulesserian,
Marc D. Joseph
Jason W. Holder
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080
tgulesserian@adamsbroadwell.com
jholder@adamsbroadwell.com

Michael E. Boyd, President
Californians for Renewable Energy, Inc.
5439 Soquel Drive
Soquel, CA 95073-2659
michaelboyd@sbcglobal.net

Alfredo Figueroa
Californians for Renewable Energy, Inc.
424 North Carlton
Blythe, CA 92225
lacunadeaztlan@aol.com

Basin and Range Watch
Kevin Emmerich/Laura Cunningham
P.O. Box 153
Baker, CA 92309
atomictoadranch@netzero.net

ENERGY COMMISSION

Robert Weisenmiller
Commissioner and Presiding Member
rweisenm@energy.state.ca.us

Karen Douglas
Chair and Associate Member
kldougla@energy.state.ca.us

Raoul Renaud
Hearing Officer
rrenaud@energy.state.ca.us

Alan Solomon
Project Manager
asolomon@energy.state.ca.us

Lisa DeCarlo
Staff Counsel
ldecarlo@energy.state.ca.us

Jennifer Jennings
Public Adviser's Office
publicadviser@energy.state.ca.us

<u>DECLARATION OF SERVICE</u>

I, Carl Lindner, declare that on, May 22, 2010, I served and filed copies of the attached Responses to Questions from the April 28, 29 & May 7, 2010 CEC Workshops
Natural Gas vs. Propane use at PSPP
SCE Red Bluff Substation Project Description
Technical Areas: Project Description and Transmission System Engineering

The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[http://www.energy.ca.gov/sitingcases/solar_millennium_palen]**.

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(C*heck all that Apply*)

For service to all other parties:

__X_ sent electronically to all email addresses on the Proof of Service list;

__ by personal delivery or by overnight delivery service or depositing in the United States mail at Camarillo, California with postage or fees thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

For filing with the Energy Commission:

__X_ sending an original paper copy and one electronic copy, mailed respectively, to the address below (preferred method);

OR

_____ depositing in the mail an original and 12 paper copies, along with 13 CDs, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 09-AFC-7
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

Carl E. Lindner