DOCKET
09-AFC-5
DATE APR 16 2010
RECD. APR 22 2010

ENVIRONMENTAL ANALYSIS

LOCKHART SUBSTATION INTERCONNECTION & COMMUNICATION FACILITIES

MOJAVE SOLAR POWER PLANT

April 16, 2010

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1.0 INTRODUCTION AND PURPOSE

An Application for Certification (AFC) was prepared by Abengoa Solar, Inc. (Abengoa) in 2009 for the 250-megawatt (MW) Abengoa Mojave Solar Project (AMSP), pursuant to California Energy Commission (CEC) guidelines. The AFC was posted by CEC on August 12, 2009, and a Draft Staff Assessment was posted on March 15, 2010. The AMSP is a solar electric-generating facility that will be owned and operated by Mojave Solar, LLC. Electricity generated by the plant would be distributed to transmission lines owned and operated by Southern California Edison (SCE), specifically, the existing Coolwater–Kramer No. 1, 220-kilovolt (kV) transmission line. The AMSP Interconnection System Impact Study (ISIS) was completed in coordination with the California Independent System Operator (CAISO) and is located in Appendix N of the AMSP AFC. The Interconnection Facilities Study (IFS) is in progress to detail the on-the-ground system-wide improvements; as a separate process, SCE is leading the permitting effort for the transmission improvements beyond the Project-specific interconnection to the statewide system.

SCE proposes to construct the Lockhart Substation and associated facilities (the "Project") to interconnect the AMSP to the Coolwater–Kramer 220-kV line and various substations in the region that is the subject of this analysis. The new Lockhart Substation is proposed to be located within the footprint of the AMSP site, as would the associated generation tie line connections and the distribution line for the substation's light and power. However, a portion of the interconnection to the 220-kV line, the proposed "transmission line loop," would be located partially outside the limits of the AMSP boundary and within the existing SCE right-of-way for the Kramer to Coolwater 220-kV line. Additionally, the proposed telecommunication system between the Lockhart Substation and the various substations in the region would require new fiber optic cables. The proposed fiber optic cable routes fall outside the limits of the AMSP boundary and are also addressed in this analysis.

The purpose of this analysis is to inform CEC, interested parties, and the public of the potential direct and indirect environmental and public health effects related to the Project. The proposed substation, connection to offsite transmission lines, and installation of communications facilities are considered foreseeable subsequent actions to the construction of the AMSP and, therefore, must be analyzed for impacts and incorporated into the AMSP Final Staff Assessment to comply with requirements under the California Environmental Quality Act (CEQA). Each of the Project elements are addressed in this analysis; however, particular emphasis is placed on those elements that lie outside the AMSP footprint and previous analyses. The analysis is based on information from the AFC for the AMSP; the Staff Assessment for the AMSP (posted by CEC on March 15, 2010); and updated records searches, field visits, and data gathering for the Project study area outside the AMSP footprint. In addition, agency and intervenor comments and data requests resulting from the AFC application were reviewed. The Project would require a stand-alone analysis under both the National Environmental Policy Act (NEPA) and CEQA prior to approval and implementation.

This analysis summarizes the potential for significant environmental impacts and identifies mitigation measures that can be implemented to reduce or avoid significant impacts. Mitigation measures, best management practices (BMPs) and design measures identified within the Final Staff Assessment for the

AMSP would also apply to the proposed substation and interconnection facilities within the boundary of the AMSP.

It should be noted that this analysis was based on a preliminary description of the necessary interconnection and communications facilities provided by SCE. Additional analysis would be conducted pursuant to CEQA and NEPA once preliminary engineering has been completed by SCE for these facilities.

2.0 DESCRIPTION OF THE PROPOSED PROJECT

2.1 PROJECT LOCATION

The Lockhart Substation and some of the associated interconnection facilities are proposed to be located within the limits of the AMSP, which is private land located approximately 5.5 miles northeast of the intersection of California State Highway 58 (SR 58) and Harper Lake Road in the County of San Bernardino. The proposed transmission line loops to the Kramer to Coolwater 220-kV line extending just south of the AMSP boundary into an existing SCE transmission line right-of-way. The proposed telecommunication lines—consisting of fiber optic cables that would be strung on existing poles or new poles, or placed in new or existing underground conduits—are confined to three routes extending from the Lockhart Substation in a southeast direction, directly west and southwest. Specifically, the Lockhart to Tortilla Substation Fiber Optic Line is located mostly within the County of San Bernardino and partially within the city limits of Barstow as the route nears the Tortilla Substation. The Lockhart to Kramer Substation Fiber Optic Line takes a westerly path, most of which follows the existing Lockhart 33-kV and Kramer to Coolwater 220-kV transmission line routes toward the Kramer Substation, also located within the County of San Bernardino. Finally, the Kramer to Victor Substation Fiber Optic Line traverses from north to south, mostly paralleling the west side of Highway 395 between the intersection of SR 58/Highway 395 and Palmdale Road/Highway 395. This route is within unincorporated San Bernardino County and partially within the limits of the City of Adelanto. A more detailed description of the fiber optic routes can be found in Section 2.2, below. Refer to Figure 1 for the Study Area Regional Map.

2.2 PROJECT CHARACTERISTICS

As noted in the Introduction, the Project consists of several key components:

- *Lockhart Substation*: A new 220-kV substation is proposed to loop-in the existing Coolwater–Kramer No. 1, 220-kV transmission line and provide two 220-kV line positions to terminate two new 220-kV generation tie lines (gen-ties) owned by Mojave Solar LLC.

- *Transmission Lines*: The Project includes the construction of approximately 3,000 feet of new transmission line segments (composed of two line segments of approximately 1,500 feet each) connecting the Lockhart Substation to SCE's existing 220-kV transmission line. These two new lines would result in new segments of Lockhart–Kramer and Coolwater–Lockhart 220-kV transmission lines.

- *Generation Tie Line Connections ("gen-ties")*: The Project includes the connection between two gen-tie lines associated with the AMSP and the proposed Lockhart Substation. This work involves construction of two single spans of conductors between the Lockhart switchrack and AMSP-owned towers.

- *Distribution Line for Station Light and Power*: The Project includes a connection between an existing Hutt 12-kV distribution circuit and the existing Hutt Poletop Substation by replacing an existing pole and removing an existing pole located approximately 40 feet north of the proposed Lockhart Substation within the boundary of the AMSP. In addition, a range of approximately 200 to 400 feet of underground conduit would be installed from the replaced pole to the Lockhart Substation to provide a path for one of the two required sources of station light and power.

- *Telecommunications Facilities*: The Project includes the installation of new fiber optic communication cables between the Lockhart Substation and the Tortilla, Kramer, and Victor substations by means of stringing cable on existing poles, constructing new poles, placing segments of cable in existing underground conduit, and placing cable in new underground conduit. A total of approximately 85 miles of fiber optic cable is proposed for these three routes. The fiber optic cables provide diverse path routing of communications required for the AMSP interconnection, and provide communications redundancy at the two AMSP power blocks. Additional associated communications equipment is proposed within the various substations as noted further below.

Descriptions are provided below for the various Project elements, with additional information provided in Attachment 1 to this Analysis, the *Preliminary Project Description for SCE's Facilities Related to the Abengoa Solar Inc. Mojave Solar Project Interconnection*, prepared by SCE March 15, 2010. The detailed construction assumptions in Attachment 1 are referred to for purposes of this analysis. The description below and the environmental analysis in Sections 3.2 through 3.8 are organized by the four main study areas: 1) the Lockhart Substation and associated interconnections within the AMSP site and adjacent SCE easement; 2) the fiber optic cable proposed between the Lockhart Substation and the Tortilla Substation in Barstow; 3) the fiber optic cable proposed between the Lockhart Substation and the Kramer Substation to the west along Highway 395; and 4) the fiber optic cable proposed between the Kramer and Victor substations.

LOCKHART SUBSTATION AND INTERCONNECTION

The proposed Lockhart Substation would be a 220-kV switching station measuring approximately 450 feet by 542 feet and considered to be an "unattended" collector station (no power transformation). The station itself would be located within the boundary of the AMSP but surrounded by a wall or chain-link fence with two gates. The substation would be constructed with a six-bay 220-kV switchrack; one bay would be used to loop the SCE Coolwater to Kramer No. 1, 220-kV transmission line, and two bays would be used to terminate the two AMSP gen-ties. The three remaining bays would be available for future use. The Lockhart Substation would be initially equipped with two overhead 220-kV buses, seven 220-kV circuit breakers, 220-kV disconnect switches, one Mechanical Electrical Equipment Room (MEER), light and power transformers, station lighting, and a back-up generator. To accommodate the proposed Lockhart Substation within the AMSP property and to allow for future access to the substation, a transmission right-of-way corridor would also be provided to SCE along the southern boundary of the

AMSP, north of the existing SCE Coolwater–Kramer 220-kV corridor. Refer to Figure 2 for the location of the substation within the AMSP boundary and Figure 2 in Attachment 1 for substation details.

The proposed Lockhart Substation would be connected to the Coolwater–Kramer No. 1, 220-kV transmission line via loop-in transmission segments. The two loop-in line segments would create two new separate transmission lines: the Coolwater–Lockhart 220-kV transmission line and the Kramer–Lockhart 220-kV transmission line. Each transmission line segment into the Lockhart Substation would be approximately 1,500 feet long. The proposed loop-in of the existing Coolwater–Kramer No. 1, 220-kV transmission line would require approximately four double-circuit transmission structures to enter the Lockhart Substation. Either new tubular steel poles and/or lattice steel towers would be needed for the loop-in. Two of the 220-kV double-circuit structures would be placed just outside of the substation fence or wall but within the AMSP boundary. The other two structures would be used to re-route the Coolwater–Kramer No. 1, 220-kV transmission line into Lockhart Substation. The section of line connecting the existing Coolwater–Kramer No. 1, 220-kV transmission line to the first structure outside of Lockhart Substation may require a new right-of-way between SCE's existing right-of-way and the new Lockhart Substation facilities. Since preliminary design information is unavailable at this time, including engineered maps with right-of-way limits, it is assumed that existing utility rights-of-way would be used. To support the loop-in, one existing double-circuit transmission structure may need to be removed. The exact location of new and replaced towers will be determined during detailed engineering. Refer to Figures 4-1 and 4-2 in Attachment 1 for lattice steel and tubular steel pole renderings.

The proposed Lockhart Substation design would also involve bringing two 220-kV gen-tie segments into a 220-kV position. It is anticipated that there will be one Mojave Solar-owned double-circuit structure outside the Lockhart Substation to support connection of the two AMSP gen-ties. The Project would require a connection between the gen-ties from the AMSP dead-end structures to the appropriate 220-kV position inside the Lockhart Substation. The span needed for this connection is estimated to be up to 300 feet, depending on the location of the transmission line tower relative to the Lockhart Substation. Refer to Figure 2 in Attachment 1 for substation details, including the location of gen-tie lines.

The Project would also require station light and power. A distribution circuit out of the existing Hutt Poletop Substation would be required to provide light and power to the Lockhart Substation. The Project would require removal of two existing poles in the approximate location of the proposed substation and installation of a new distribution riser pole approximately 40 feet north of the proposed substation's northern fence. From this pole, a distribution 12-kV riser would be installed and approximately 200 feet of two 5-inch conduits would be installed to a new 12-kV station light and power rack location within the Lockhart Substation adjacent to the MEER. Portions of these facilities are also proposed to be used for installation of the required fiber optic cables into Lockhart Substation. These new overhead poles for light and power are located within the limits of the AMSP.

The proposed telecommunication facilities described below would require a fiber optic cable to be installed between the Lockhart Substation and the AMSP's Alpha and Beta Power facilities. This cable would be constructed within the limits of the AMSP site. The Project would also include new fiber optic multiplex equipment and channel equipment within the Lockhart Substation MEER.

LOCKHART TO TORTILLA SUBSTATION FIBER OPTIC LINE

The Project includes approximately 31 miles of new fiber optic cable to be installed between the proposed Lockhart Substation and the existing Tortilla Substation located to the southeast in Barstow. Approximately 1,000 feet of cable would be installed in an underground conduit within the limits of the Lockhart Substation/AMSP, transitioning to new overhead poles near the edge of the SCE transmission corridor to the south. The cable would require the construction of approximately 55 new poles between the Lockhart Substation and Harper Lake Road (Figure 3). These poles would be constructed within existing SCE right-of-way for the Coolwater–Kramer 220-kV transmission line. At the intersection with Harper Lake Road, the overhead line would transition to a new underground conduit for approximately 400 feet south on the west side of Harper Lake Road. The new underground trench would be located within a disturbed road right-of-way. From this point, the underground cable would transition back to the overhead line via a riser to existing overhead transmission line poles that parallel Harper Lake Road for approximately 5 miles south. The cable would be strung along these existing poles. This method, stringing the cable on existing transmission line structures, is proposed to continue between the intersection of Harper Lake Road/SR 58 all along SR 58 heading east, south on Summerset Road, east on Community Road, and south on Lenwood and Sun Valley roads until intersecting with an existing 33-kV transmission line located approximately one-third mile south of Main Street. The cable is proposed to be strung on the existing transmission line structures (called the Poco 33-kV line) for approximately 4.7 miles, then would continue to be strung on existing transmission line structures south on I Street. Where the overhead line intersects Bonanza Road, the cable is proposed to be strung on existing transmission line structures heading east along Bonanza Road until intersecting with the existing SCE Kramer–Tortilla 115-kV transmission line. The fiber optic cable would be strung on those existing structures until about 500 feet west of the Tortilla Substation, at which point it would transition to an existing underground conduit via a riser. The fiber optic cable would require a new telecommunications room within the Tortilla Substation and new fiber optic multiplex equipment and channel equipment. Refer to Figure 3 for the location of new poles, existing poles, and underground conduit for the fiber optic cable.

For purposes of this analysis, the following assumptions are made for impacts:

- New poles will be located within existing utility rights-of-way
- New poles will be between 18 and 24 feet in height and will consist of either wood or light-duty steel
- Footprints for new pole construction are assumed to be an area of approximately 2 square feet for permanent impacts and 34 square feet for temporary construction impacts
- New underground trenching will necessitate a maximum construction footprint of 20 feet in width
- Stringing activities and construction equipment will be located within existing utility rights-of-way

LOCKHART TO KRAMER SUBSTATION FIBER OPTIC LINE

Fiber optic cable between the Lockhart Substation and Kramer Substation commences with trenching within the substation site to install the cable in an underground conduit approximately 1,000 feet long until it reaches the overhead poles for the proposed substation light and power lines. These overhead poles, approximately 30 poles, are new poles proposed within the AMSP property between the substation and Lockhart Road to the north (Figure 4). From Lockhart Road, the fiber optic cable is proposed to be strung on existing overhead powerline structures for a distance of approximately 1.5 miles in a westerly direction until the intersection with Harper Lake Road. Proposed cable would be strung on existing overhead transmission line structures along the west side of Harper Lake Road until it intersects with the existing SCE transmission line right-of-way for the Lockhart 33-kV and Coolwater–Kramer 220-kV transmission lines. From this point, the cable would be strung on existing overhead structures within the existing right-of-way until just east of Highway 395. The cable would continue to be strung on existing overhead structures for another one-third mile south until the line intersects with the existing Kramer Substation. The overhead cable would transition to an underground conduit via a riser for approximately 2,000 feet until the conduit reaches the MEER within the substation. New fiber optic multiplex equipment and channel equipment would be required at the Kramer Substation. Refer to the bulleted items above under the Lockhart to Tortilla Substation line relative to fiber optic cable footprint assumptions. Installation of cable in existing conduit within the Kramer Substation would not require new trenching and activities would occur within the substation boundary. Refer to Figure 4 for the location of new poles, existing poles, and underground conduit.

KRAMER TO VICTOR SUBSTATION FIBER OPTIC LINE

Fiber optic cable connecting the Kramer Substation to Victor Substation would commence at the MEER within the Kramer Substation by installing cable in both a new underground conduit and existing underground conduit until it reaches the southern border of the station where it would transition to new overhead cable poles. While it is possible that the fiber optic cable between the Kramer Substation and Victor Substation can use existing poles for the majority of the route, additional analysis is underway by SCE to make that determination. For purposes of a worst-case analysis, it is assumed that for the first 19 miles heading south from the Kramer Substation, new poles will be erected for the fiber optic cable (Figure 5). It is assumed the new poles will be located within the existing transmission line rights-of-way, located on the west side of Highway 395. Approximately 525 poles would be required for this stretch of the route, with poles spaced approximately 190 feet apart. At approximately 19 miles south of Kramer Substation, the fiber optic cable would be strung on existing overhead power lines for approximately 9.5 miles until it transitions to a new underground conduit for 1,000 feet within Bellflower Street, a paved street that parallels Highway 395 to the west. Trenching would occur within an existing paved street until the cable would transition to existing overhead power lines via a riser and continue on the overhead power line poles for another 1,000 feet until the line intersects with Bartlett Avenue. The fiber optic cable would continue to be strung on existing overhead power line poles along Bartlett Avenue for approximately one-third mile until it intersects with Highway 395. The cable would continue on overhead poles on the west side of Highway 395 for another 5 miles south to Palmdale

Road, then head east across Highway 395 to the Victor Substation for a distance of approximately one-half mile. At the edge of the Victor Substation, the cable would transition via a riser to an existing underground conduit within the substation to the MEER. Refer to Figure 5 for the location of new poles, exiting poles, and underground conduit for the fiber optic cable. Refer to the bulleted items above under the Lockhart to Tortilla Substation line relative to fiber optic cable footprint assumptions. Installation of cable in existing conduit within the Victor and Kramer substations would not require new trenching and activities would occur within the station boundary. New trenching at the Kramer Substation would follow assumptions listed previously.

2.3 CONSTRUCTION METHODS AND ASSUMPTIONS

LOCKHART SUBSTATION AND INTERCONNECTION

Because the Lockhart Substation is proposed to be located within the boundaries of the AMSP, grading for the substation site would be included within the solar developer's overall grading design. Land disturbance areas and earth-moving quantities at the substation location were included within the AMSP AFC and analysis. However, construction assumptions for the substation, including materials and construction vehicles and personnel, are included in Tables 1 and 2 of Attachment 1.

Access to the substation site for both construction and operation would be gained through the AMSP internal road network from its main access on Harper Lake Road. This internal road network would be both paved and unpaved as identified in the AMSP AFC. A temporary staging yard, estimated to be approximately 0.5 to 1.5 acres, would be provided within the AMSP for the substation and interconnection construction. Refer to Attachment 1, Section 4.2.2 for information relative to what materials and equipment would be stored in the staging area.

Construction methodology for the new 220-kV transmission structures, removal of the existing 220-kV transmission structures, and stringing the 220-kV conductor are described in detail in Sections 4.2.4 through 4.2.6 and Tables 3 through 6 of Attachment 1. Construction of these facilities would take place within the boundaries of the existing AMSP or within the existing SCE 220-kV transmission line right-of-way. It should be noted that construction of the new structures may require a temporary concrete batch plant within the boundaries of the AMSP for purposes of footings. Potential impacts associated with that activity are addressed in the air quality and noise analyses. The ground-disturbance impacts associated with construction activities (land use, biological resources, etc.) are addressed in the AFC. Existing public roads and existing transmission line roads would be used as much as possible during construction of the transmission line elements of the Project. There could be new transmission line roads to access the new transmission line segments and towers; however, locations will not be identified until preliminary design is completed. Because preliminary design information is unavailable at this time, including engineered maps with right-of-way limits, it is assumed that existing rights-of-way and existing access roads will be used.

Construction assumptions for the proposed light and power distribution system are found in Table 7 of Attachment 1. The construction staging area for this Project element would be located within the limits of AMSP.

FIBER OPTIC LINES

SCE would utilize SCE's existing substations, SCE's Barstow Service Center, and the proposed Lockhart Substation as staging and laydown areas to support the installation of the telecommunications facilities required for this Project. SCE or contractor crews would use standard methods to construct the required fiber optic cables. Projected labor force and construction equipment estimates for installation of the fiber optic cables are provided in Table 9 of Attachment 1.

2.4 BEST MANAGEMENT PRACTICES AND DESIGN MEASURES

Mitigation measures, BMPs and design measures included in the Final Staff Assessment for the AMSP are applicable to the Lockhart substation and interconnection facilities within the boundary of the permitted project site. The CEC permit conditions would apply to the proposed substation and facilities onsite and are hereby incorporated by reference. Improvements proposed off-site, including interconnection facilities and the proposed fiber optic telecommunication lines outside of the AMSP site may require additional measures beyond those identified in the following sections, pending further environmental analysis conducted by other agencies pursuant to CEQA and NEPA.

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3.0 ANALYSIS OF SUBSTATION INTERCONNECTION AND COMMUNICATION FACILITIES

3.1 ENVIRONMENTAL ISSUES NOT SUBJECT TO FURTHER REVIEW

With the exception of the proposed telecommunication elements (i.e., fiber optic lines and additional equipment at the various substations), the Project elements are located within the limits of the AMSP, or immediately adjacent and south within existing utility easements. Potential impacts associated with the following subjects are anticipated to be less than significant due to implementation of mitigation measures identified in the AMSP AFC and CEC permit, as well as implementation of standard BMPs and construction measures that comply with LORS: Public Health, Soils, System Safety, Hazardous Materials, Waste Management, Water Resources, Worker Safety, and Geologic Hazards. In addition, the Project is expected to have less-than-significant impacts to Socioeconomics given that the workforce for this Project is substantially less than that of the AMSP and those impacts were determined to be less than significant.

3.2 BIOLOGICAL RESOURCES

ENVIRONMENTAL SETTING

The following biological resources analysis relies heavily on the AMSP AFC biological resources study (2009) and supporting documentation, including protocol-level special-status biological surveys that overlap with this Project. The analysis was supplemented by a windshield reconnaissance-level survey conducted on April 4 and 5, 2010, for the Project, and literature and database review, including the California Natural Diversity Database (CNDDB) (CDFG 2010), California Native Plant Society's (CNPS) online rare plant inventory, and web-based National Wetlands Inventory (NWI).

Vegetation Communities

Vegetation communities were classified based on Holland (1986) and follow those described in the AFC and AMSP Biological Technical Report (BTR) (EDAW 2009). When necessary, vegetation community names were assigned by qualified botanists using field characteristics that did not readily fit into the existing nomenclature. Descriptions of these vegetation communities are provided in the AMSP BTR (EDAW 2009). During the 2010 windshield survey, existing biological resources were documented and areas of biological special concern were identified. Changes in dominant species composition, observations of habitat quality, and notes on development of the landscape were recorded on aerial maps. Vegetation communities were digitized using a heads-up display running ArcGIS 9.3. Areas presented were not professionally surveyed and are used in this analysis for preliminary planning purposes only.

Special-Status Biological Resources

Project biologists queried the California Department of Fish and Game (CDFG) CNDDB (Rare Find Version 3.1.0; CDFG 2010) and CNPS Inventory of Rare and Endangered Plants (CNPS 2010). These resources were reviewed to determine historic occurrence of special-status plant and wildlife species and other natural resources within the vicinity of the Project area.

Special-Status Plant Species

Table 3.2-1 (Special-Status Plant Species) summarizes the CNPS listed species that were determined to have potential to occur in the Project area (Table 3.2-2). Three CNPS listed species (desert cymopterus [*Cymopterus deserticola*], CNPS List 1B.2; Mojave fish-hook cactus [*Sclerocactus polyancistrus*], CNPS List 4.2; and Mojave spineflower [*Chorizanthe spinosa*], CNPS List 4.2) were detected during the AMSP surveys and may occur in suitable habitat within the Project area. Sensitive vegetation communities were not observed during the April 2010 windshield survey.

Table 3.2-1. Special-Status Plant Species and Probability of Occurrence in the Project Area

Scientific Name	Common Name	Sensitivity Status	General Habitat	Probability of Occurrence
Abronia villosa var. *aurita*	chaparral sand-verbena	CNPS LIST 1B.1	Known to occur in chaparral, coastal scrub, and desert dunes or sandy areas	Low potential of occurrence within Project Area. No populations were observed in the AMSP Survey Area during 2008 botanical surveys.
Canbya candida	white pygmy-poppy	CNPS LIST 4.2	Known to occur in Joshua tree woodland, Mojave desert scrub, and pinyon/juniper woodland	Low potential of occurrence within Project Area. No populations were observed in the AMSP Survey Area during 2008 botanical surveys.
Cymopterus deserticola	desert cymopterus	CNPS LIST 1B.2	Found in Joshua tree woodland and Mojave desert scrub	Moderate to high potential of occurrence within the Project Area. Detected in the AMSP Survey Area during 2008 botanical surveys.
Delphnium recuravtum	recurved larkspur	CNPS LIST 1B.2	Known to occur in chenopod scrub, cismontane woodland, and valley/foothill grassland	Low potential of occurrence within Project Area. No populations were observed in the AMSP Survey Area during 2008 botanical surveys.
Eriophyllum mohavense	Barstow woolly sunflower	CNPS LIST 1B.2	Creosote bush scrub, desert playas, and desert saltbush scrub	Moderate to high potential of occurrence within Project Area. No populations were observed in the AMSP Survey Area during 2008 botanical surveys.
Loefingia squarrosa var. *artemisiarum*	sagebrush loeflingia	CNPS LIST 2.2	Desert dunes, great basin scrub, and sonorant desert scrub	Low potential of occurrence within Project Area. No populations were observed in the AMSP Survey Area during 2008 botanical surveys.
Mimulus mohavensis	Mojave monkeyflower	CNPS LIST 1B.2	Joshua tree woodland and Mojave desert scrub	Low potential of occurrence within Project Area. No populations were observed in the AMSP Survey Area during 2008 botanical surveys.
Sclerocactus polyancistrus	Mojave fish-hook cactus	CNPS LIST 4.2	Creosote bush scrub and Joshua tree woodland	Moderate to high potential of occurrence within Project Area. Detected in the AMSP Survey Area during 2008 botanical surveys.
Salicornia [Sarcocornia] utahensis	Utah glasswort	CNPS LIST 2.2	Known to occur along alkali playas and marshes	Low potential of occurrence within Project Area. Habitat does not occur within the Project Area.
Chorizanthe spinosa	Mojave spineflower	CNPS LIST 4.2	Atriplex scrub and Joshua tree woodland	Moderate to high potential of occurrence within Project Area. Detected in the AMSP Survey Area during 2008 botanical surveys.
California Native Plant Society (CNPS) List 1B.1 – Plants rare, threatened, or endangered in California and elsewhere; seriously endangered in California. List 1B.2 – Plants rare, threatened, or endangered in California and elsewhere; fairly endangered in California. List 2.2 – Plants rare, threatened, or endangered in California, but more common elsewhere; fairly endangered in California. List 4.2 – Plants of limited distribution (on CNPS Watch List); fairly endangered in California.				

Table 3.2-2. Special-Status Wildlife Species and Probability of Occurrence in the Project

Scientific Name	Common Name	Sensitivity Status	General Habitat	Probability of Occurrence
Reptiles				
Gopherus agassizii	desert tortoise	ESA: Threatened CESA: Threatened	Various desert scrubs and desert washes up to about 5,000 feet, but not including playas.	Moderate to high potential of occurrence within Project Area. Desert tortoise (DT) individuals were not detected during 2009 surveys for the AMSP Study Area; however, in 2008, a total of 35 DTs were encountered in the Biological Resources Survey Area (BRSA), with six observed on zone of influence (ZOI) transects for a total of 41 DT observations. No live DT were documented during the 2007 surveys of the Project Area, although one live DT was documented in the 1-mile buffer. Except for one roaming DT observed during reconnaissance surveys in 2006, no live DT were observed within the AMSP Study Area.
Birds				
Circus cyaneus	Northern harrier	CDFG: Special Concern Species	Occurs in grasslands and agricultural fields during migration and in winter.	Moderate to high potential of occurrence within Project Area. Two individuals of this species were observed in the AMSP Study Area within the 1-mile buffer, one in May 2007 and one in August 2007.
Buteo swainsoni	Swainson's hawk	CESA: Threatened	Migrant that breeds in North America and winters in South America. Forages in open grasslands, agricultural areas, sparse shrublands, and small open woodlands. Nests in scattered trees within grasslands, shrublands, or agricultural landscapes.	Moderate to high potential of occurrence within Project Area. One individual of this species was observed perched in the AMSP Study Area near the southern boundary in June 2007. Two other individuals were observed soaring in the AMSP Study Area above the 1-mile buffer in August 2007.
Falco mexicanus	prairie falcon	CDFG: Watch List	Forages in open grasslands, agricultural fields, and desert scrub. Prefers ledges on rocky cliffs for nesting.	Moderate to high potential of occurrence within Project Area. Two individuals of this species were observed soaring above the 1-mile buffer west of the AMSP Study Area in May 2007. One other individual was observed perched on utility poles and foraging in the active agricultural field in the AMSP Study Area in August 2007. Prairie falcons were also detected within the AMSP Study Area during 2008 and 2009.

Scientific Name	Common Name	Sensitivity Status	General Habitat	Probability of Occurrence
Athene cunicularia	Western burrowing owl	CDFG: Species of Special Concern	Found mainly in grassland and open scrub from the seashore to foothills. Strongly associated with ground squirrel burrows.	Moderate to high potential of occurrence within Project Area. In 2008, one western burrowing owl (WBO) was observed within the AMSP Study Area. One owl pellet was observed in the northwestern corner of the Project Area in 2008. In 2007, a pair of WBOs were observed; however, they were not observed during 2008 surveys. An unchained domestic dog was observed within this area, so the loss of the pair may have been due to dog predation, or the WBO may have moved. Reconnaissance surveys in 2006 resulted in detection of four WBOs within the AMSP Study Area.
Eremophila alpestris actia	California horned lark	CDFG: Species of Special Concern	Often occurs in fields, grasslands, shores, and tundra habitats.	Moderate to high potential of occurrence within Project Area. Suitable habitat for horned lark occurs throughout Project Area. California horned larks were detected in flocks throughout the AMSP Study Area in 2008 but were not mapped.
Toxostoma lecontei	Le Conte's thrasher	CDFG: Species of Special Concern	Inhabits areas with sparse desert scrub and uses cholla cactus for nesting.	Moderate to high potential of occurrence within Project Area. Suitable habitat for this species occurs throughout the Project Area. Le Conte's thrasher was observed in 2007 and 2009 in the AMSP Study Area.
Lanius ludovicianus	Loggerhead shrike	CDFG: Species of Special Concern	Occurs in semi-open country with utility posts, wires, and trees to perch on.	Moderate to high potential of occurrence within Project Area. Suitable habitat for loggerhead shrike occurs throughout the Project Area. Loggerhead shrikes were observed in the AMSP Study Area during 2007 and 2009.
Mammals				
Vulpes macrotis	Desert kit fox	CCR: Protected	Open desert, areas of desert scrub, grasslands, and sand dunes. Sandy and loamy soils.	Moderate to high potential of occurrence within Project Area. Two kit fox natal den sites were detected during 2009 DT surveys within the AMSP Study Area.

Scientific Name	Common Name	Sensitivity Status	General Habitat	Probability of Occurrence
Spermophilus mohavensis	Mohave ground squirrel	CESA: Threatened	Mojave desert scrub, alkali scrub, and Joshua tree woodland between 1,800 and 5,000 feet. Sandy to gravelly soils.	Moderate to high potential of occurrence within Project Area. In 2007, this species was trapped south of the Project Area within the 1-mile buffer, in Mojave creosote bush vegetation, which does not occur in the AMSP Study Area.
Taxidea taxus	American badger	CDFG: Species of Special Concern	Coastal sage scrub, mixed chaparral, grassland, oak woodland, chamise chaparral, mixed conifer, pinyon-juniper, desert scrub, desert wash, montane meadow, open areas, and sandy soils.	Moderate to high potential of occurrence within Project Area. A badger den was detected within the AMSP Study Area during reconnaissance surveys in 2006.
Sensitivity Status Key Federal Endangered Species Act (ESA) State California Code of Regulations (CCR) California Department of Fish and Game (CDFG) California Endangered Species Act (CESA)				

Special-Status Wildlife Species

Table 3.2-2 (Special-Status Wildlife Species) summarizes the federally, state, and CDFG species of special concern (SSC) that were determined to have potential to occur in the Project area. Special-status wildlife species for this Project are the Mojave desert tortoise (*Gopherus agassizii*), western burrowing owl (*Athene cunicularia*), and Mohave ground squirrel (*Spermophilus Mohevensis*).

Additional wildlife species considered for potential impacts include those observed during general wildlife surveys of the AMSP. These include Le Conte's thrasher (*Toxostoma lecontei*), loggerhead shrike (*Lanius ludovicianus*), prairie falcon (*Falco mexicanus*), and merlin (*Falco columbarius*). Descriptions of these species are provided in the AMSP BTR (EDAW 2009).

A total of 103 wildlife species were detected during general reconnaissance and protocol wildlife surveys in support of the AMSP BTR (EDAW 2009). These included two butterfly species, 12 reptile species, 73 bird species, and 16 mammal species. Similar to the AMSP study area, wildlife species that would commonly occur in this Project area include the zebra-tailed lizard (*Callisaurus draconoides*), side-blotched lizard (*Uta stansburiana*), turkey vulture (*Cathartes aura*), rock dove (*Columba livia*), red-tailed hawk (*Buteo jamaicensis*), horned lark (*Eremophila alpestris*), common raven (*Corvus corax*), sage sparrow (*Amphispiza belli*), Brewer's blackbird (*Euphagus cyanocephalus*), European starling (*Sturnus vulgaris*), coyote (*Canis latrans*), desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), Merriam's kangaroo rat (*Dipodomys merriami*), and white-tailed antelope squirrel (*Ammospermophilus leucurus*). There are no wildlife corridors documented within or near the Project (EDAW 2009). Although Harper Lake, located north of the Project, is a known stopover site for migratory birds when inundated, the lake does not currently receive adequate water to provide suitable conditions for migrating birds.

Wetlands and Waters

A search using the U.S. Fish and Wildlife (USFWS) wetlands online mapper resulted in several drainages crossing each Project component, including the Mojave River that crosses the Lockhart to Tortilla Substation line (USFWS 2010). However, no digital wetland data is available. No wetlands were observed during the 2010 windshield survey. A wetland delineation has not been conducted in portions of the Project area that are outside of the AMSP site.

Invasive Weeds

Similar to the AMSP, several invasive weeds occur in the Project area, largely as a result of anthropogenic development. Weeds observed during the 2010 windshield survey are tamarisk (*Tamarix ramosissima*), Russian thistle (*Salsola tragus*), and Saharan mustard (*Brassica tournefortii*). A weed survey has not been conducted in portions of the Project area that are outside of the AMSP site.

Lockhart Substation and Interconnection

Vegetation communities and other land cover types were mapped for the Project (Figure 6, Lockhart Substation to Tortilla Substation). The Project area includes the Lockhart Substation site footprint, transmission lines, gen-ties, distribution line for station light and power, and telecommunications facilities as described in Section 2.2, Project Characteristics. In general, the corridor for linear features includes a 100-foot-wide buffer. Table 3.2-3 summarizes the area and distribution of vegetation communities in terms of each Project component. Approximately 9.04 acres of fallow agriculture-ruderal habitat are within the Lockhart Substation and Interconnection study area (Table 3.2-3).

Table 3.2-3. Vegetation Communities: Area and Distribution

Vegetation Communities and Other Cover Types (Holland Code)	Lockhart Substation and Interconnection (Acres)	Lockhart to Tortilla Substation (Acres)	Lockhart to Kramer Substation (Acres)	Kramer to Victor Substation (Acres)
Desert Saltbush Scrub (36110)		311.98	198.76	61.41
Mojave Creosote Bush Scrub (34100)				8.26
Mojave Creosote Bush Scrub-Ambrosia dumosa dominant		97.7	90.85	518.80
Mojave Creosote Bush – Ambrosia dumosa – Atriplex Scrub			48.99	
Tamarisk Scrub (63810)		8.55		
Active Agricultural		39.18	9.17	
Fallow Agricultural-Ruderal	9.04	45.24	59.23	
Developed			15.73	45.08
Disturbed				22.75
Joshua Tree Woodland				1
Mojave Desert Wash Sandy Areas		11.3		
Mojave River		3.07		
Source: Developed by AECOM, April 2010				

The Lockhart Substation and Interconnection includes the Project elements on or adjacent to the station, including the transmission line loop in, gen-tie lines, and lines for station light and power. It is assumed that the gen-tie lines and station light and power lines are within the footprint of the AMSP.

The 2010 windshield surveys overlapped with portion of the AMSP site and confirmed that no appreciable changes have occurred on the AMSP site since the last survey in 2009 for the AMSP AFC. North of the proposed Lockhart Substation is predominantly fallow agricultural-ruderal habitat, mixed small patches of disturbed saltbush scrub habitat, and tamarisk windbreaks. This fallow agricultural-ruderal habitat is dominated by Russian thistle, Saharan mustard, and Mediterranean grass (*Schismus* *arabicus*). Disturbed desert saltbush scrub habitat is dominated by allscale (*Atriplex polycarpa*) and spinescale (*Atriplex spinifera*) with an increased abundance of nonnative herbaceous understory.

Along Lockhart Road heading west and then to the south along Harper Lake Road, vegetation is dominated by ruderal habitat interspersed with disturbed desert saltbush scrub and developed land. As documented in the AMSP AFC, no sign of desert tortoise, burrowing owl, or Mohave ground squirrel was located along this route during protocol surveys in previous years. No difference in habitat or potential disturbance was identified during this windshield survey.

CNDDB occurrences within 0.5 mile of this alignment include desert cymopterus, Barstow woolly sunflower (*Eriophyllum mohavense*), chaparral sand verbena (*Abronia villosa* var. *aurita*), American badger (*Taxidea taxus*), Mohave ground squirrel, and western burrowing owl.

Lockhart to Tortilla Substation Fiber Optic Line

Dominant vegetation communities and cover types within the Lockhart to Tortilla Substation fiber optic line corridor include 311.98 acres of desert saltbush scrub, 97.7 acres of Mojave desert creosote bush scrub ambrosia dumosa dominant, 45.24 acres of fallow agriculture-ruderal, 39.18 acres of active agriculture, 11.3 acres of Mojave desert wash sandy areas, 8.55 acres of tamarisk scrub, and 3.01 acres of the Mojave River (Table 3.2-3). The distribution of these cover types are described below and depicted in Figure 6, Lockhart Substation to Tortilla Substation.

This segment of fiber optic line leaves the Lockhart Substation within the AMSP footprint and heads west along the existing Kramer–Coolwater 220-kV transmission line utility corridor (Figure 6). The north side of this utility corridor section is characterized by disturbed desert saltbush scrub habitat. The south side is characterized by native Mojave desert creosote bush scrub dominated by creosote bush and white bursage (*Ambrosia dumosa*) habitat. In previous years along the south side, a desert tortoise was observed on two separate occasions and additional desert tortoise signs were also recorded.

Where the alignment intersects Harper Lake Road it then heads south for 400 feet of new underground cable. The vegetation along the 400-foot section is disturbed near the abandoned residential development adjacent to Harper Lake Road on the west side. After the underground section, the alignment continues south approximately 5 miles along Harper Lake Road. The vegetation here is predominantly relatively undisturbed native saltbush scrub habitat outside of the tortoise-proof fencing that follows both sides of Harper Lake Road. This habitat is characterized by *Atriplex* species including shadscale (*Atriplex confertifolia*), allscale, spinescale, winter fat (*Krascheninnikovia lanata*), horsebush (*Tetradymia canescens*), and creosote bush. On the inside of the Harper Lake Road fence, vegetation is highly disturbed and poor quality habitat.

At the Harper Lake Road junction with SR 58, the fiber optic alignment heads east along the north side of SR 58 for approximately 10 miles to Summerset Road. Vegetation is predominantly undisturbed desert saltbush scrub on north side of the tortoise-proof fence for approximately 5 miles. Along the western 5 miles of the SR 58 section, disturbed desert saltbush scrub and developed habitat are intermittently dispersed. At Summerset Road, the alignment turns south and follows adjacent fallow agricultural fields to Community Road where it turns east for approximately 2 miles to Lenwood Road. Abandoned and active agricultural fields are adjacent to Community Road until within one-quarter mile of Lenwood Road, where the habitat becomes predominantly sand dunes.

At Lenwood Road, the fiber optic alignment turns south for almost 3 miles. The habitat over the first 2 miles is dominated by sand dunes, areas of tamarisk, Russian thistle, several Atriplex and Brassicsus species, and the Mojave River. One-half mile north of west Main Street, the habitat becomes disturbed native vegetation, predominantly creosote, and commercial and residential development.

Beyond Lenwood Road, for 2,000 feet along Sun Valley Drive, disturbed native habitat continues south to the SCE Ordway Substation, where the alignment turns northeast and follows an existing SCE Poco 33-kV pole line for almost 5 miles. The habitat through this section is alternately disturbed native vegetation, predominantly creosote bush scrub, and residential development. At I Street, the alignment turns south through residential development mixed with disturbed native vegetation, crosses Interstate 15 (I-15), and continues through residential areas mixed with native vegetation to Bonanza Street, where it turns east on Bellflower.

After exiting the residential area off Bonanza Road, the alignment continues southeast along SCE's existing Kramer–Tortilla 115-kV right-of-way. The habitat here is disturbed creosote bush scrub with extensive off-highway vehicle (OHV) use and garbage dumping; this habitat type includes the area where the cable would be placed in an existing underground conduit. The alignment ends at the Tortilla Substation, which is graded and denuded.

CNDDB occurrences within 0.5 mile of this alignment include desert cymopterus, Barstow woolly sunflower, Mohave ground squirrel, and Le Conte's thrasher.

Lockhart to Kramer Substation Fiber Optic Line

Dominant vegetation communities and cover types within the Lockhart to Kramer Substation fiber optic line corridor include approximately 198.76 acres of desert saltbush scrub, 90.85 acres of Mojave desert creosote bush scrub ambrosia dumosa dominant, 48.99 acres of Mojave desert creosote bush-ambrosia dumosa-atriplex scrub, 59.23 acres of fallow agriculture-ruderal, 9.17 acres of active agriculture, and 15 acres of developed area (Table 3.2-3). The distribution of these cover types are described below and depicted in Figure 7, Lockhart Substation to Kramer Substation.

The initial portion of this fiber optic line occurs within the footprint of the AMSP as described above in the Lockhart Substation and Interconnection sub-section. From where this alignment turns south on Harper Lake Road, the alignment diverges from the established footprint of the AMSP (Figure 7). For 1 mile along Harper Lake Road, vegetation is characterized primarily by disturbed desert saltbush scrub, with a short section of developed residential property. Although not included in the footprint of the AMSP, the area surrounding this section of Harper Lake Road north of the residence had previously been surveyed for desert tortoise. No recent tortoise sign was found. The one-quarter mile of desert saltbrush scrub habitat south of the residence is similar to desert saltbrush scrub habitat on the east side of Harper Lake Road, which also had been surveyed in previous years without detecting any tortoise sign.

The fiber optic line turns west along the existing Kramer–Coolwater 220-kV transmission line utility corridor for approximately 12 miles to Highway 395 near Kramer Junction. Along this relatively undisturbed section of the fiber optic alignment, the habitat varies in dominant species. The lower elevation depressional areas are dominated by desert saltbush scrub characterized by *Atriplex* species and including shadscale (*A. confertifolia*), allscale, spinescale, winter fat (*Krascheninnikovia lanata*), horsebush (*Tetradymia canescens*), and creosote bush. Relatively higher elevation areas include Mojave creosote bush scrub with creosote bush and white bursage. Mojave desert wash scrub areas were composed of cheesebush (*Hymenoclea solsola*), Anderson's boxthorn (*Lycium andersonii*), and peachthorn (*Lycium cooperi*). Toward the western end of the alignment, within 2 to 3 miles of Highway 395, Joshua trees (*Yucca brevifolia*) become more numerous.

Once on the west side of Highway 395, the fiber optic alignment enters a highly disturbed area that is predominantly denuded of vegetation with an occasional creosote bush, and then heads south. The alignment crosses SR 58 near a truck stop parking area and subsequently enters into the Kramer Substation, which is denuded of vegetation.

CNDDB occurrences within 0.5 mile of this alignment include desert cymopterus, Barstow woolly sunflower, and Mohave ground squirrel.

Kramer to Victor Substation Fiber Optic Line

Dominant vegetation communities and cover types within the Kramer to Victor Substation fiber optic line corridor include approximately 61.41 acres of desert saltbush scrub, 8.26 acres of Mojave desert creosote bush scrub, 518.80 acres of Mojave desert creosote bush scrub ambrosia dumosa dominant, 45.08 acres of developed, 22.75 acres of disturbed, and 1 acre of Joshua tree woodlands (Table 3.2-3). The distribution of these cover types are described below and depicted in Figure 8, Kramer to Victor Substation.

From the substation at Kramer Junction, the alignment heads south parallel to the west side of Highway 395 following the existing utility corridor access road. For approximately 19 miles, the vegetation is predominantly undisturbed Mojave desert creosote bush scrub with white bursage habitat, interspersed with discrete patches of desert saltbush scrub and Joshua tree woodlands. For most of this segment, the habitat is comparatively undisturbed; the disturbance that does occur is primarily associated with access roads that traverse west from Highway 395.

Nineteen miles south of Kramer Junction, where the fiber optic alignment joins SCE existing structures for the remaining alignment distance, the habitat continues as described above until Bellflower Road. Here the alignment diverges from Highway 395 and continues along residential streets to Bartlett Avenue. At Bartlett Avenue, the alignment turns eastward along the residential street to Highway 395 and turns south again, paralleling the highway.

South of Bartlett Avenue, the alignment is dominated by mixed commercial and residential development with intermittent disturbed native vegetation. Approximately 0.5 mile south of Bartlett Avenue, there is little to no development on the west side of Highway 395 and the vegetation is disturbed desert creosote scrub, sparsely vegetated with creosote bush and white bursage. At the intersection with Palmdale Road, the alignment turns east. For 0.5 mile along Palmdale Road the habitat is disturbed, and continues for 1,200 feet where the proposed cable would be placed in an existing underground conduit the rest of the way to the Victor Substation.

CNDDB occurrences within 0.5 mile of this alignment include desert cymopterus, Barstow woolly sunflower, Mohave ground squirrel, and Le Conte's thrasher.

IMPACTS

Project-related activities would not result in significant direct impacts to sensitive vegetation communities because no sensitive vegetation communities occur in the Project area. All non-sensitive vegetation communities in the Project would be directly and permanently impacted (Table 3.2-4, Anticipated Vegetation Impacts).

Table 3.2-4. Vegetation Communities and Anticipated Impacts

Vegetation Communities and Other Cover Types (Holland Code)	Lockhart Substation and Interconnection		Lockhart to Tortilla Substation		Lockhart to Kramer Substation		Kramer to Victor Substation	
	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
Desert Saltbush Scrub (36110)	0	0	0.04 acre	>0.01 acre 110 sq ft	0	0	0.07 acre	>0.01 acre 178 sq ft
Mojave Creosote Bush Scrub	0	0	0	0	0	0	0.02 acre	>0.01 acre 52 sq ft
Mojave Creosote Bush Scrub-Ambrosia dumosa dominant	0	0	0.23 acre	0	0	0	0.32 acre	0.02 acre
Fallow Agricultural-Ruderal	0	5.61 acres	0	0	0.04 acre	>0.01 acre (60 sq ft)	0	0
Developed	0	0	0.18 acres	0	0	0	0.46 acre	0
Source: Developed by AECOM, April 2010								

No significant indirect impacts to native vegetation communities are anticipated as a result of Project-related activities because these effects would be reduced to a level that is less than significant by impact avoidance, minimization, and mitigation measures. Potential indirect impacts could occur as a result of grading activities, however. Ground-disturbing activities could adversely affect vegetation communities off site by altering adjacent vegetation boundaries and creating disturbed areas that are more conducive to invasion by exotic species. The introduction and invasion of exotic species could potentially reduce native population growth, dispersal, and recruitment. Estimates for temporary construction impacts were included for new poles and new trenching; however, the exact location of new poles and specific trenching specifications have yet to be determined as part of preliminary engineering.

Lockhart Substation and Interconnection

Construction of the Lockhart Substation and Interconnection elements would permanently impact approximately 5.61 acres of fallow agriculture-ruderal habitat (Table 3.2-4). Potential impacts to biological resources within the Lockhart Substation and a majority of the interconnection facilities are described in the AMSP AFC. This area is in poor condition and is low-quality habitat for any species of special concern. This is also true of the area just south of the AMSP boundary into the existing transmission corridors. Potential impacts to this segment of the Project are similar to those described in the AMSP AFC.

Lockhart to Tortilla Substation Fiber Optic Line

Approximately 0.18 acre of developed area would be temporarily impacted from 400 feet of new trenching (Table 3.2-4). Approximately 0.23 acre of Mojave creosote bush scrub-*Ambrosia dumosa* habitat would be temporarily impacted from 500 feet of trenching where there is existing underground cable. Approximately 0.04 acre of desert saltbrush scrub would be temporarily impacted from the installation of 55 new poles. Temporary construction impacts associated with cable stringing are expected to be minor; however, these will be assessed once preliminary engineering identifies equipment locations.

Approximately 110 square feet (less than 0.01 acre) of desert saltbrush scrub would be permanently impacted as a result of the installation of 55 new poles. The remaining majority of this line would not result in direct permanent impacts to habitat since the cable would be strung on existing poles.

For the portion of this alignment that overlaps the AMSP Study Area, potential impacts to biological resources within this area are described in the AMSP AFC. Several elements of the Project could potentially affect biological resources, including construction-related noise disturbance, short-term habitat loss and disruption of movement, long-term habitat loss and modification, and potential spread of noxious and invasive plant species. These effects are addressed in the AMSP AFC, and similar general avoidance and minimization measures would be implemented for this Project. Project-specific measures would be determined once preliminary engineering identifies equipment locations.

The potential for special-status plant species occurrence in the Project area is summarized in Table 3.2-1. No protocol-level special-status biological surveys have been conducted for the majority of this alignment, and special-status plant presence is unknown. Preconstruction surveys for special-status plant species in the unsurveyed portion of all alignments would likely be necessary.

The potential for special-status wildlife species to occur in the Project area is summarized in Table 3.2-2. There were observations of desert tortoises along or immediately south of the Kramer–Coolwater 220-kV transmission line during surveys in previous years. Desert tortoise habitat exists in desert saltbush scrub scattered along the existing utility corridor from Harper Lake Road to SR 58, to the intersection of Harper Lake Road and SR 58, east to Summerset Road. There is tortoise-proof fence along this section of the alignment. As the habitat becomes increasingly more developed and disturbed approaching

Summerset Road and the remaining stretches preceding the Tortilla Substation, the likelihood of encountering a desert tortoise is significantly reduced.

High levels of human activity, habitat loss, degradation, and fragmentation are considered significant issues in the western Mojave Desert (BLM 2005). Because Mojave desert scrub habitat may be used sporadically by transient desert tortoise or Mohave ground squirrel, the loss of habitat for these special-status species as a result of the Project would likely be mitigated as a requirement for the Project.

Lockhart to Kramer Substation Fiber Optic Line

Approximately 0.02 acre of fallow agriculture-ruderal habitat would be temporarily impacted from construction of 30 new poles required for this stretch of the route (Table 3.2-4). Approximately 0.02 acre of fallow agriculture-ruderal habitat would be temporarily impacted from 1,000 feet of new trenching (Table 3.2-4). Approximately 60 square feet (less than 0.01 acre) of fallow agriculture-ruderal habitat would be permanently impacted from construction of 30 new poles within the Lockhart to Kramer Substation line (Table 3.2-4). These impacts are limited to the 30 new poles and 1,000 linear feet of trenching within the limits of the AMSP.

The remainder of this segment of the Project would result in temporary cable stringing impacts within existing utility transmission line corridors and underground trenching within the limits of the existing developed substations. Potential impacts along this alignment effectively begin from Harper Lake Road heading west along the existing Kramer–Coolwater 220-kV transmission line corridor. The vegetation communities along this 12-mile section are relatively undisturbed and intact. The likelihood of desert tortoise encounter is supported by the data presented in the AFC, which documents a healthy desert tortoise population to the north of this utility corridor near the AMSP. The likelihood of desert tortoise encounter is considered comparatively high here, given the relatively remote location of this utility corridor and relative absence of definitive human-influenced mortality factors that often reduce population densities.

Once the alignment approaches the Kramer Junction intersection of highways and the developed substation, the desert tortoise population density is likely to be lower, effectively reducing the likelihood of a desert tortoise encounter.

Similar to the Lockhart Substation to Kramer Substation line, even the temporary disturbance of Mojave desert scrub habitat as a result of cable stringing on existing poles would likely be mitigated as a requirement for the Project to offset temporary impacts on special-status species.

Kramer to Victor Substation Fiber Optic Line

Approximately 0.32 acre of Mojave creosote bush scrub-*Ambrosia dumosa*, 0.07 acre of desert saltbrush scrub, and 0.02 acre of Mojave creosote bush would be temporarily impacted from construction of 525 new poles, required for this stretch of the route (Table 3.2-4). Areas of Joshua tree woodlands would likely be avoided. Approximately 0.02 acre of developed area would be temporarily impacted from

1,000 feet of new trenching (Table 3.2-4). The remainder of this segment of the Project would result in temporary cable stringing impacts within existing utility transmission line corridors.

Approximately 0.02 acre of Mojave creosote bush scrub-*Ambrosia dumosa*, 178 square feet (less than 0.01 acre) of desert saltbrush scrub, and 52 square feet (less than 0.01 acre) of Mojave creosote bush habitat would be permanently impacted from construction of 525 new poles.

The potential for special-status plant species occurrence in the Project area is summarized in Table 3.2-1. No protocol-level special-status biological surveys have been conducted for the majority of this alignment, and special-status plant presence is unknown. Preconstruction surveys for special-status plant species in the unsurveyed portion of the alignment will likely be necessary.

The habitat from south of Kramer Junction is higher quality desert tortoise habitat and is relatively less affected by human activity than portions of more urban development that begins just south of Bellflower Street. This entire stretch parallel to Highway 395 of comparatively undisturbed habitat could support low-density tortoise populations. Where access roads traverse west off of Highway 395, there is a higher occurrence of human impact and vehicular mortality to tortoises. Populations are not likely to be much more than low-density and may have a high mortality rate due to the proximity of the area to Highway 395.

Once the alignment reaches the residentially developed area from Bellflower Street south to the Victor Substation, the likelihood that a desert tortoise population persists is lower. Probability of tortoise encounter is considerably lower along this stretch, with tortoise populations possibly near extirpation from human activity in or near the remaining patches of native desert vegetation.

Because Mojave creosote bush scrub-*Ambrosia dumosa* dominant, Mojave creosote bush, and desert saltbrush scrub habitats exist in the Project area and may be used sporadically by transient desert tortoise or Mohave ground squirrel, the loss of these habitats would likely be mitigated as a requirement for the Project.

IMPACT MINIMIZATION MEASURES

In addition to implementation of mitigation measures outlined in Section 5.3 of the AFC (i.e., for the Lockhart Substation and Interconnection elements), standard monitoring practices employed for desert tortoise protection are recommended along the proposed fiber optic alignments. The size of a work crew and number of pieces of machinery used may be relevant in determining whether a single biological monitor is sufficient in an area of higher risk for desert tortoise encounters. The standard desert tortoise protection practices outlined by USFWS often include the following:

- Biological monitor on site during all construction activities
- Environmental education for all workers on site prior to any work being conducted
- Clearance surveys in all areas where work will occur no more than 24 hours prior to construction

- Protection of all vegetation not within the scope necessary for construction clearing
- Speed limit for all vehicles along Project access roads
- Designated turning areas in non-vegetated areas
- Checking underneath all vehicles and equipment prior to moving them
- Appropriate trash containment, disposal, and removal
- Cleanup of any hazardous waste spillage
- New pole structures fitted with anti-perching raven devices

Based on the potential presence for several special-status biological resources in addition to the desert tortoise in the Project area, additional minimization measures would be implemented similar to those stipulated in Section 5.3 of the AMSP AFC. These include biological-resource-specific avoidance, minimization, and mitigation strategies.

3.3 CULTURAL RESOURCES

ENVIRONMENTAL SETTING

Cultural Resources

Prehistory

Prehistoric human settlement patterns in the Mojave Desert have been influenced by environmental change. Major climatic periods influenced prehistoric spatial settlement patterns and resource exploitation. In the terminal Pleistocene (circa 18,000 to 10,000 years ago), conditions in the Mojave Desert were relatively cool and wet, and although variable, the early Holocene (circa 10,000 to 7,500 years ago) remained, generally, cooler and moister than today. The middle Holocene (circa 7,500 to 4,000 years ago) saw a much warmer and drier climate than that of modern times, and the climate became moderately cooler and wetter during the late Holocene (circa 4,000 years ago to present), with punctuated periods of drought (Sutton et al. 2007).

Chronologies for the Mojave Desert have been proposed by a number of researchers (Basgall 2000; Bettinger and Taylor 1974; Lanning 1963; Rogers 1939; Sutton 1996; Wallace 1962, 1977; Warren 1980, 1984; Warren and Crabtree 1986; Sutton et al. 2007). There continues to be considerable discussion about each of these chronologies and the dates assigned to the various stages. None of the recent chronologies, however, differ in critically significant respects from the Warren and Crabtree (1986) chronology, which forms the basis for the following summary.

Lake Mojave (circa 12,000–7000 B.P.)

The Lake Mojave period is considered to be one of extreme environmental change, where the relatively cool and moist conditions of the terminal Wisconsin geological period changed to the drier and warmer climate of the Holocene. The artifact assemblages considered typical of the period include fluted points, leaf-shaped points, and long-stemmed, narrow-shouldered points of the Lake Mojave series, as well as crescents, abundant bifaces, and various large, well-made scrapers and other flake tools. York (1995) states that the use of obsidian is relatively common, with the majority of the material derived from the Coso source. Milling equipment is rarely found at Lake Mojave sites.

From the available evidence, it appears that Lake Mojave period groups had settlement patterns focused on pluvial lake shorelines (Hester 1973; Warren 1991; Willig 1988; York 1995). Tool assemblages are consistent with a subsistence system based on hunting, particularly of large game (Cleland and Spaulding 1992; Kelly and Todd 1988; Warren 1986), but not exclusive of other smaller mammals and reptiles (Basgall 1990; Simms 1988; Warren 1990; Willig and Aikens 1988; York 1995).

Pinto Period (circa 7000–4000 B.P.)

Increasingly arid conditions occurred during the middle Holocene. Warren (1984) sees this as the beginning of cultural adaption to extreme desert conditions. There is an ongoing debate on whether the central Mojave was abandoned at this time (Donnan 1964; Kowta 1969; Wallace 1962) or whether occupation continued (Jenkins 1987; Jenkins and Warren 1984; Susia 1964; Sutton 1996; Tuohy 1974; Warren 1984) but with changes in population density, subsistence practices, and technology (Warren 1986). The artifact assemblages associated with this period include Pinto points; heavy-keeled scrapers; choppers; small, flat milling stones; and manos (Warren 1986). Warren (1986) suggests that the population moved to the desert margins and oasis sites such as water holes, springs, and streams where the occupations tended to be temporary and seasonal.

Gypsum Period (circa 4000–1500 B.P.)

The Gypsum period corresponds to the onset of late Holocene neoglacial cooling, sometimes referred to as the Little Pluvial. In the Mojave, this was a time of increased effective moisture and was marked by a significant increase in the occupation of the area, especially new streams (Elston 1982; Sutton 1996). The artifact assemblage diversified, including several projectile point types (Elko Eared and Corner-notched, Gypsum Cave and Humboldt Concave Base), increased use of manos and metates, and the introduction of new technologies such as the mortar and pestle and the bow and arrow. In addition, evidence of contact with other cultural areas, such as the California coast, is indicated by Haliotis and Olivella shell beads (Warren 1986). Warren (1984) also suggests that mesquite processing was first exploited during this period and that the greater productivity of this period, coupled with the refinement of hunting and seed processing technologies, increased the ability of the region to support increased population growth (Warren 1986).

Saratoga Springs Period (circa 1500–750 B.P.)

The Saratoga Springs period is one of strong regional developments according to Warren (1986). The artifactual assemblage is characterized by Eastgate and Rose Spring projectile points in the northwestern and northeastern areas, while to the south along the tributaries of the Colorado River, Anasazi influence is seen in Cottonwood and Desert side-notched projectile points and the introduction of paddle-and-anvil brown and buff ceramics (Lyneis 1989). Subsistence appears to rely more heavily on small fauna such as rabbit and tortoise and less on deer (Warren 1986). There is an intensified use of vegetal resources as evidenced by the high frequencies of ground and battered stone, and the milling assemblages contain larger numbers of nonportable, expedient milling slabs and utilized handstones (Basgall and Hall 1992).

Late Prehistoric Period (circa 750–200 B.P.)

It has been suggested that Numic-speaking Paiute and Shoshone groups entered and occupied the area at this time (Bettinger and Baumhoff 1982; Fowler 1972; Miller 1986; Warren and Crabtree 1986), based on a widely distributed artifact assemblage that included Desert Side-notched points and brownware ceramics and linguistic evidence.

Ethnographic Background

Ethnographic evidence suggests that the Vanyume, a subgroup of the Serrano Indians (Hopa 1980; Macko et al. 1993) were the prehistoric occupants of the region. By 1900, the group was largely extinct as a result of pressures from the Euroamerican settlement. Although little is known of the Vanyume

(Bean and Smith 1978; Strong 1929), it is believed that they primarily occupied the areas around the Mojave River where water and plant resources were available.

In addition to the Vanyume, this portion of the Mojave Desert was visited by members of several native groups. Sutton et al. (2007) indicate the Project area to be marginal to three groups: the Serrano (Vanyume), the Kitanemuk, and the Desert Kawaiisu. As Earle (2003) discusses in his study of native use and occupation of the Fort Irwin area, the Central Mojave Desert has been reportedly exploited by people from a number of groups, including the Chemehuevi/Southern Paiute, Mohave, and perhaps the Desert Kawaiisu.

Historical Background

Regional History

As early as the 1770s, when the Spanish explorers came through the area using existing Native American trails, the region began to play a large role in the development of a western transportation corridor. Most who wished to travel into or out of southern California passed through the Barstow area. This travel route remained a major link between Los Angeles and points east until the railroad arrived in the desert in the 1880s.

Development in the area was directly connected to the arrival and growth of the railway lines. The Southern Pacific Railroad tracks reached Waterman Junction (later named Barstow) in 1882. Southern Pacific selected Calico Junction (now known as Daggett) for its depot, telegraph office, and eating establishment (Moon 1980). The arrival of the Southern Pacific Railroad contributed to a growing number of miners, merchants, and professionals in the area (Keeling 1976). In addition, the discovery of silver and borax in the Calico mines drove the construction of branch railroads.

As the influence of the railroad declined, Route 66, which runs through downtown Barstow, brought visitors to the area via automobile. The popularity of the automobile and the construction of the Interstate Highway System contributed to the growth of the area and transformed Barstow into a transportation hub.

Agriculture in California

The following information is taken from *A Historic and Archaeological Context for Agricultural Properties in California and Water Conveyance Systems in California* created by the California Department of Transportation (Caltrans) (2000, 2007). These contexts provide the framework for identifying rural development in California.

Agricultural production has always had a strong role in the development of California. However, it was large-scale agricultural production that had the greatest impact on the political, environmental, and economic prognosis of the state (Pincetl 1999). The event that officially gave rise to large-scale agriculture in California was the discovery of gold in 1848 and the subsequent Gold Rush. This brought a wave of entrepreneurial settlers looking to make a new life and means to an income, and bringing experimental ideas for agricultural production (Caltrans 2007).

This coincided with the end of the Mexican/American War and the passage of large tracts of land from the previous rancho pattern of ownership into new hands (Caltrans 2007). The subdivision of large tracts of land for private ownership was facilitated again through the Homestead Act of 1862. The Mojave Desert, which encompasses parts of San Bernardino, Riverside, Inyo, and Kern counties, has a climate and geomorphic characteristics that made access to water and agricultural development challenging. Regardless, the region became a primary producer of alfalfa early on.

As an indirect result of the AMSP, SCE proposes to construct the Lockhart Substation and associated facilities to interconnect the AMSP to the Coolwater–Kramer 220-kV line and various substations in the region. The new Lockhart Substation is proposed to be located within the footprint of the AMSP site, as is the associated generation tie line connections and the distribution line for the substation's light and power. However, a portion of the interconnection to the 220-kV line, the proposed "transmission line loop," would be located partially outside the limits of the AMSP boundary and within the existing SCE right-of-way for the Kramer to Coolwater 220-kV line. Additionally, the proposed telecommunication system between the Lockhart Substation and the various substations in the region would require new fiber optic cables.

A records search was conducted by qualified AECOM archaeologists between April 5 and April 12, 2010, at the San Bernardino Archaeological Information Center (SBAIC) of the California Historical Resources Information System (CHRIS). The search included a 1-mile buffer around the proposed Lockhart Substation and Interconnection, Lockhart to Tortilla Substation Fiber Optic Line, Lockhart to Kramer Substation Fiber Optic Line, and Kramer to Victor Substation Fiber Optic Line. For the purpose of impact analysis, AECOM considered resources within the boundaries of the proposed Lockhart Substation and a 300-foot-wide corridor centered along the proposed linear fiber optic alignments.

Lockhart Substation and Interconnection

A total of 25 cultural resources have been identified in the 1-mile-wide records search area. In addition to resources on file at SBAIC, a number of sites recently identified by AECOM during field survey for the AMSP have been recorded within the Lockhart Substation and Interconnection, some of which have not yet been filed at CHRIS.

One resource and one isolate are present within the Lockhart Substation and Interconnection APE. These consist of a storage building and an isolated scraper.

Primary Number	Trinomial	Age	Date Recorded or Last Updated	Description
Temporary # MI-P-235		P	AECOM (2010)	Isolate; scraper
P-36-021011		H	AECOM (2010)	Storage Building

No resources within the Lockhart Substation and Interconnection have been determined as eligible for listing on the National Register of Historic Places (NRHP). The Office of Historic Preservation Directory of

Properties in the Historic Property Data File for San Bernardino County does not list any historic properties within the Lockhart Substation and Interconnection.

Lockhart to Tortilla Substation Fiber Optic Line

A total of 144 cultural resources have been identified in the 1-mile-wide records search area. In addition to resources on file at SBAIC, a number of sites recently identified by AECOM during field survey for the AMSP project have been recorded within the Lockhart to Tortilla Substation Fiber Optic Line records search area, some of which have not yet been filed at CHRIS.

Seventeen resources and three isolates fall within 150 feet of the Lockhart to Tortilla Substation Fiber Optic Line. The majority of the documented cultural resources within the 300-foot-wide corridor consist of historic sites related to transportation and infrastructure activity such as roads, railroads, and transmission lines, and farming activities such as structures, wells, and refuse scatters. Prehistoric resources consist primarily of lithic scatters and quarries. One resource consisting of both prehistoric and historic components is also present.

Primary Number	Trinomial	Age	Date Recorded or Last Updated	Description
Temporary # MI-P-235		P	AECOM (2010)	Isolate; scraper
P-36-02910	CA-SBR-02910	H	2009	NRHP-E-OHP-3926; National Old Trails Highway and Monument
P-36-03677	CA-SBR-03677	P	1981	Lithic quarry, Jasper
P-36-06346	CA-SBR-06346	P	1989	Small lithic scatter
P-36-06693H	CA-SBR-06693H	H	2001	NRHP-E-94-028; Atchison, Topeka, and Santa Fe Mojave (AT&SF) Railroad line built in 1883
P-36-06793H	CA-SBR-06793H	H	2000	AT&SF Railroad (current and historic)
P-36-07429		H	AECOM (2010)	Debris scatter/historic occupation
P-36-10317H	CA-SBR-10317H	H	2007	Transmission line, 33-kV, constructed in 1918
P-36-10318H	CA-SBR-10318H	H	1993	Telecommunication line
P-36-12690	CA-SBR-12364	P	2006	Lithic reduction/Lithic scatter with one core
P-36-12693		H	2006	Isolate; can and ammunition shell
P-36-13951	CA-SBR-12740H	H	2007	Ruins of a structure
P-36-13952	CA-SBR-12741H	H	2007	Historic well and water conveyance system
P-36-13954	CA-SBR-12743H	H	2007	Refuse scatter
P-36-13959H	CA-SBR-12748H	H	2007	Historic dirt road
P-36-21011		H	AECOM (2010)	Storage building
P-36-21012		H	AECOM (2010)	Farming and residential complex
P-36-21099		H	2010	Refuse scatter and decomposing asphalt
P-36-2291/H	CA-SBR-2291/H	M	2001	Cobble test quarry area and refuse dump
P-36-61679		P	1989	Isolate; secondary flake

Two resources within the Lockhart to Tortilla Substation Fiber Optic Line corridor, the Atchison, Topeka, and Santa Fe Mojave Railroad line (P-36-6693H) and the National Old Trails Highway and Monument (P-36-2910) have been determined as eligible for listing on the National Register of Historic Places.

The Office of Historic Preservation Directory of Properties in the Historic Property Data File for San Bernardino County does not list any historic properties within the Lockhart to Tortilla Substation Fiber Optic Line corridor.

Lockhart to Kramer Substation Fiber Optic Line

A total of 173 cultural resources have been identified in the 1-mile-wide records search area. In addition to resources on file at SBAIC, a number of sites recently identified by AECOM during field survey for the AMSP have been recorded within the Lockhart to Kramer Substation Fiber Optic Line records search area, some of which have not yet been filed at CHRIS.

Eleven resources and 11 isolates fall within 150 feet of the Lockhart to Kramer Substation Fiber Optic Line. The majority of the documented cultural resources within the 300-foot-wide corridor consist of historic sites related to farming activities such as structures, wells, and refuse scatters; transportation and infrastructure activity such as roads, railroads, and transmission lines; and historic isolates. Prehistoric resources consist of three lithic isolates.

Primary Number	Trinomial	Age	Date Recorded or Last Updated	Description
Temporary # MI-P-213		P	AECOM (2010)	Isolate; flake
P-36-06148H	CA-SBR-06148H	H	1993	Historic debris scatter, cans (500 to 600), trash pit, glass fragments
P-36-06556		H	AECOM (2010)	Farming and residential complex
P-36-06558		H	AECOM (2010)	Ranching, farming, commercial, and residential complex
P-36-06572H	CA-SBR-06572H	H	1989	Trash scatter, primarily modern but with some historics
P-36-06693H	CA-SBR-06693H	H	2001	NRHP-E-94-028; Atchison, Topeka, and Santa Fe Mojave Railroad line built in 1883
P-36-07545H	CA-SBR-07545H	H	2000	U.S. Highway 395
P-36-10316H	CA-SBR-10316H	H	2008	NRHP-E-94-030; transmission line, Kramer–Victor 115-kV, constructed 1913
P-36-20996	CA-SBR-13528H	H	AECOM (2010)	Debris scatter/historic occupation
P-36-21003	CA-SBR-13535H	H	AECOM (2010)	Debris scatter/historic occupation
P-36-21009		H	AECOM (2010)	Residential buildings
P-36-21010		H	AECOM (2010)	Wells/water conveyance system
P-36-61699		H	0	Isolate; condensed milk can (1935–1945)
P-36-61709		H	1989	Isolate; hole in cap can
P-36-61710		H	1989	Isolate; hole in cap can
P-36-61711		H	1989	Isolate; hole in cap can and sanitary can
P-36-61712		P	1993	Isolate; modified flake tool
P-36-61713		P	1993	Isolate; secondary flake

Primary Number	Trinomial	Age	Date Recorded or Last Updated	Description
P-36-62046		H	1989	Isolate; aqua glass insulator
P-36-62061		H	1993	Isolate; matchstick filler hole can
P-36-62062		P	1993	Isolate; flake
P-36-62063		H	1993	Isolate; 5-gallon gasoline can

Two resources within the Lockhart to Kramer Substation Fiber Optic Line corridor, the Atchison, Topeka, and Santa Fe Mojave Railroad line (P-36-6693H) and the Kramer–Victor 115-kV Transmission Line (P-36-10316H) have been determined as eligible for listing on the National Register of Historic Places.

The Office of Historic Preservation Directory of Properties in the Historic Property Data File for San Bernardino County lists one historic property, U.S. Highway 395 (P-36-07545H), within the Lockhart to Kramer Substation Fiber Optic Line corridor.

Kramer to Victor Substation Fiber Optic Line

Results of the SBAIC records search indicate that 388 cultural resources have been identified in the 1-mile-wide records search area.

Thirty-five resources and 61 isolates fall within 150 feet of the Kramer to Victor Substation Fiber Optic Line. The majority of the documented cultural resources within the 300-foot-wide corridor consist of historic sites related to transportation and infrastructure activity such as roads and transmission lines, and residential activities such as refuse scatters. There are 36 historic isolates. Prehistoric resources consist primarily of lithic scatters. There are 25 prehistoric isolates. Four multi-component resources consisting of prehistoric lithics and historic refuse scatters are also present.

Primary Number	Trinomial	Age	Date Recorded or Last Updated	Description
P-36-02257H	CA-SBR-02257H	M	1993	Lithic scatter with tools, bifaces, projectile points, and matchstick filler hole can
P-36-04020H	CA-SBR-04020H	H	1989	Household refuse disposal site, glass, ceramics, cans
P-36-04021H	CA-SBR-04021H	H	1989	Historic refuse scatter
P-36-04022/H	CA-SBR-04022/H	M	2006	Lithic scatter with a core and historic trash scatter with hole in cap can, shell button, and glass
P-36-07206	CA-SBR-07206	P	1992	Lithic scatter with eight cores
P-36-07208	CA-SBR-07208	P	1992	Lithic scatters with cores
P-36-07210	CA-SBR-	P	2006	Lithic scatter with six cores
P-36-07543	CA-SBR-07543	P	1993	Lithic scatter
P-36-07544H	CA-SBR-07544H	M	1993	Diffused lithic quarry; historic shaft and can scatter
P-36-07546H	CA-SBR-07546H	M	1993	Lithic scatter with one core, can and glass fragments
P-36-07547	CA-SBR-07547	P	1993	Final biface production, core, one biface fragment, tertiary bifacial thinning flakes
P-36-07548H	CA-SBR-07548H	H	1993	Scatter of tin cans

Primary Number	Trinomial	Age	Date Recorded or Last Updated	Description
P-36-07549	CA-SBR-07549	P	1993	Lithic scatter
P-36-07665H	CA-SBR-07665H	H	1993	Historic can scatter
P-36-07666/H	CA-SBR-07666/H	M	1993	Lithic reduction/lithic scatter and tin cans
P-36-07747H	CA-SBR-07747H	H	1993	Possible homestead site; trash scatter
P-36-07994H	CA-SBR-07994H	H	1994	1950s roadside stand and trash scatter
P-36-09509H	CA-SBR-09509H	H	1998	Can scatter
P-36-09597	CA-SBR-09597	P	1998	Lithic scatter
P-36-09598	CA-SBR-09598	P	1998	Lithic scatter
P-36-09813	CA-SBR-09813	P	1998	Lithic deposit of 20 flakes, two biface fragments, and a blade
P-36-10633H	CA-SBR-10633H	H	1999	Historic rock alignment
P-36-12465	CA-SBR-12257H	H	2006	Three building foundations
P-36-12469	CA-SBR-12261	P	2006	Sparse lithic scatter of 161 debitage, 12 tools, and five cores
P-36-12470	CA-SRB-12262	P	2006	Lithic scatter with two modified flake tools
P-36-12471		P	2006	Isolate; flake
P-36-12472		P	2006	Isolate; core
P-36-12959	CA-SBR-12434	P	2005	Lithic scatter
P-36-12961	CA-SBR-12436	P	2005	Lithic scatter
P-36-13895	CA-SBR-12711H	H	2007	Historic refuse deposit (cans and glass)
P-36-13897	CA-SBR-12713H	H	2007	Historic domestic refuse scatter (cans, glass, ceramics, household debris)
P-36-61220		P	1988	Isolate; core
P-36-61222		H	1989	Isolate; hole in cap cans
P-36-61225		H	1989	Isolate; three cans, including one fish tin
P-36-61226		H	1989	Isolate; five hole in cap cans
P-36-61227		H	1989	Isolate; five cans (three hole in cap and two sanitary)
P-36-61253		H	1989	Isolate; sun colored amethyst (SCA) bottle glass fragments
P-36-61254		H	1989	Isolate; hole in cap can
P-36-61255		H	1989	Isolate; SCA glass fragment, milk can, stoneware cracked sherds, paint cans, fish tin
P-36-61256		H	1989	Isolate; SCA glass fragment, sanitary cans, glass fragments, oval sardine can, beverage can
P-36-61257		H	1989	Isolate; small scatter, hole in cap can, meat tin, milk tin, SCA glass, tobacco tin
P-36-61258		H	1989	Isolate; hole in cap can
P-36-61259		H	1989	Isolate; two steel I beams cut off and set in concrete
P-36-61260		H	1989	Isolate; hole in cap can and milk tin
P-36-61262		H	1989	Isolate; SCA glass fragment
P-36-61263		H	1989	Isolate; fragments of aqua glass
P-36-61264		H	1989	Isolate; SCA rectangular bottle 1916–1929
P-36-61716		H	1989	Isolate; hole in cap can
P-36-61717		H	1989	Isolate; bottle glass 1929–1954

Primary Number	Trinomial	Age	Date Recorded or Last Updated	Description
P-36-61718		H	1989	Isolate; two hole in cap cans, bottle glass fragments
P-36-61719		H	1989	Isolate; two hole in cap cans
P-36-61720		H	1989	Isolate; sanitary cans, milk cans, two 5-gallon cans, rectangular gallon cans
P-36-61721		H	1989	Isolates; cone top cans >1935
P-36-61722		H	1989	Isolate; SCA glass fragments
P-36-61723		H	1989	Isolate; small of glass fragments, whiteware sherds, corrugates fasteners
P-36-61724		H	1989	Isolate; SCA glass fragments
P-36-61728		P	1989	Isolate; secondary flake and hole in cap can
P-36-61729		P	1989	Isolate; secondary flake
P-36-61733		P	1992	Isolate; cobble and flake
P-36-62021		H	1989	Isolate; hole in cap can
P-36-62022		H	1989	Isolate; hole in cap can
P-36-62023		P	1989	Isolate; eight flakes, single lithic reduction site
P-36-62024		P	1989	Isolate; two flakes and a core
P-36-62025		H	1989	Isolate; can scatter, 36 cans and ceramic fragments
P-36-62026		H	1989	Isolate; can (solder seam)
P-36-62027		P	1989	Isolate; flake
P-36-62028		H	1989	Isolate; hole in cap can
P-36-62029		P	1989	Isolate; one core and one flake
P-36-62030		P	1989	Isolate; a primary flake
P-36-62031		H	1989	Isolate; three hole in cap cans and one steel beverage can
P-36-62032		H	1989	Isolate; a hole in cap can – milk
P-36-62033		P	1989	Isolate; secondary flake
P-36-62034		P	1989	Isolate; four primary flake
P-36-62035		H	1989	SCA bottle glass fragments
P-36-62036		H	1989	Isolate; hole in cap can
P-36-62037		P	1989	Isolate; secondary flake
P-36-62038		P	1989	Three secondary flakes and shatter
P-36-62039		H	1989	Isolate; two hole in cap cans, solder seam milk tins
P-36-62040		P	1989	Isolate; one piece of shatter
P-36-62043		P	1989	Isolate; edge modified flake
P-36-62044		P	1989	Isolate; flake
P-36-62070		P	1993	Isolate; interior flake and core
P-36-62071		P	1993	Isolate; biface thinning flake
P-36-62192		H	1989	Isolate; SCA bottle glass fragments
P-36-62193		P	1990	Isolate; biface thinning flake
P-36-62199		P	1993	Isolate; core and secondary flake
P-36-62201		H	1993	Isolate; matchstick filler hole can

Primary Number	Trinomial	Age	Date Recorded or Last Updated	Description
P-36-62202		P	1993	Isolate; two secondary flakes
P-36-62203		P	1993	Isolate; secondary flake and interior flake
P-36-62204		P	1993	Isolate; secondary flake
P-36-62205		P	1993	Isolate; two secondary flakes with two shatters
P-36-64102		H	1998	Isolate; brown "ANACIN" bottle 1937–1967
P-36-04019H	CA-SBR-04019H	H	1993	Trash scatter; glass, ceramic, cans
P-36-07545H	CA-SBR-07545H	H	2000	U.S. Highway 395
P-36-07431H	CA-SBR-07431H	H	2006	Kramer–Ransburg Wagon Road
P-36-10316H	CA-SBR-10316H	H	2008	NRHP-E-94-030; Transmission line; Kramer–Victor 115-kV, constructed 1913

One resource within the Kramer to Victor Substation Fiber Optic Line corridor, the Kramer–Victor 115-kV Transmission Line (P-36-10316H), has been determined as eligible for listing on the National Register of Historic Places.

The Office of Historic Preservation Directory of Properties in the Historic Property Data File for San Bernardino County lists one historic property, U.S. Highway 395 (P-36-07545H), within the Kramer to Victor Substation Fiber Optic Line corridor.

Paleontology

As noted in Section 5.9 of the AFC, due to the nature of the fossil record, paleontologists cannot know either the quality or the quantity of fossils present in a given geologic unit prior to natural erosion or human-caused exposure. Therefore, in the absence of surface fossils, it is necessary to assess the sensitivity of rock units based on their known potential to produce scientifically significant fossils elsewhere within the same geologic unit, or a unit representative of the same depositional environment. Paleontological sensitivity is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, past history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. The Society of Vertebrate Paleontology's "Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources" define three categories of paleontological sensitivity (potential) for sedimentary rock units: high, low, and undetermined.

- High Potential. Rock units from which vertebrate or significant invertebrate fossils or suites of plant fossils have been recovered and are considered to have a high potential for containing significant nonrenewable fossiliferous resources. These units include, but are not limited to, sedimentary formations and some volcanic formations that contain significant nonrenewable paleontologic resources anywhere within their geographical extent and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils and (b) the importance of recovered evidence for new and significant paleontological data.

- Low Potential. Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low potentials for yielding significant fossils. Such units will be poorly represented by specimens in institutional collections.

- Undetermined Potential. Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossiliferous potentials. Metamorphic and granitic rock units (as opposed to sedimentary rock units) do not yield fossils and therefore have no potential to yield significant nonrenewable fossiliferous resources.

California is naturally divided into 12 geomorphic provinces, each distinguished from one another by having unique topographic features and geologic formations, with one of the provinces being the Mojave Desert. The Mojave Desert is an elevated alluvial plain located on a wedge-shaped fault block bounded by the San Andreas and Garlock fault zones to the southwest and north, respectively. The western Mojave Desert, the study area for the Project, is characterized by three major rock groups: a pre-Tertiary granitoid batholiths; Tertiary-age sedimentary and volcanic rocks mostly of terrestrial origin and consisting of conglomerates, sandstones, shales, carbonates, tuffs and breccias, lava flows, and basaltic and rhyolitic plugs; and Quaternary alluvial, fluvial, and playa, or lake bed, deposits.

Refer to the matrix below for a list of the formations that underlie each of the main study areas:

Lockhart Substation Interconnection and Lockhart to Tortilla Substation	Lockhart Substation to Kramer Substation	Kramer Substation to Victor Substation
Qal	Qal	Qal-Qc
Qc	Qc	Qc
Qs	Qal-Qc	Mc
Oco		Oco
Me		Mv

Qal = Alluvium, Qc = Pleistocene nonmarine, Qs = dune sand, Mc = undivided Miocene nonmarine,
Qco = Non-glacial deposits, Mv = Pre-cretaceous metavolcanic rocks

Some of these formations are classified as having high potential for encountering fossils, including the older Quaternary, Qoa formations.

IMPACTS

Cultural Resources

Adverse effects to historic properties occur:

> …when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a

> manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. … Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5[a][1]).

The following summary of potential impacts to cultural resources is considered a conservative analysis due to the fact that preliminary engineering is not yet available for the specific location of Project features such as new overhead poles, project staging and laydown areas, and access roads. A 300-foot area of potential effect was covered for the "impact" zone for purposes of identifying resources within proximity to the proposed alignments and Project elements. However, the area of potential effect will be refined and reduced based on future preliminary engineering, which is expected to substantially reduce the number of resources potentially impacted.

Lockhart Substation and Interconnection

The proposed Lockhart Substation and Interconnection has the potential to impact one cultural resource whose NRHP eligibility has not been determined. Isolates are not considered significant resources. Any areas of the Lockhart Substation and Interconnection that have not undergone intensive pedestrian survey must be surveyed in order to identify and record cultural resources that may be impacted by the Project.

Lockhart to Tortilla Substation Fiber Optic Line

The proposed Lockhart to Tortilla Substation Fiber Optic Line has the potential to impact 17 cultural resources whose NRHP eligibility has not been determined, and two NRHP-eligible historic properties. Isolates are not considered significant resources. Any areas of the Lockhart to Tortilla Substation Fiber Optic Line that have not undergone intensive pedestrian survey must be surveyed in order to identify and record cultural resources that may be impacted by the Project.

Lockhart to Kramer Substation Fiber Optic Line

The proposed Lockhart to Kramer Substation Fiber Optic Line has the potential to impact 11 cultural resources whose NRHP eligibility has not been determined, and two NRHP-eligible historic properties. Isolates are not considered significant resources. Any areas of the Lockhart to Kramer Substation Fiber Optic Line that have not undergone intensive pedestrian survey must be surveyed in order to identify and record cultural resources that may be impacted by the Project.

Kramer to Victor Substation Fiber Optic Line

The proposed Kramer to Victor Substation Fiber Optic Line has the potential to impact 35 cultural resources whose NRHP eligibility has not been determined, and one NRHP-eligible historic property. Isolates are not considered significant resources. Any areas of the Kramer to Victor Substation Fiber Optic Line that have not undergone intensive pedestrian survey must be surveyed in order to identify and record cultural resources that may be impacted by the Project.

Native American Coordination

As part of the future CEQA/NEPA analysis based on preliminary engineering, a list of Native American contacts from the Native American Heritage Commission (NAHC) will be requested and an ongoing contact program will be initiated with the tribes identified by NAHC in addition to those tribes previously identified as part of the AMSP, including with the following:

- AhaMaKav Cultural Society, Fort Mojave Indian Tribe
- Chemehuevi Reservation
- Fort Mojave Indian Tribe (this is separate from the first group)
- Kern Valley Indian Council
- Morongo Band of Mission Indians
- Ramona Band of Cahuilla Mission Indians
- San Fernando Band of Mission Indians
- San Manuel Band of Mission Indians
- Serrano Band of Indians
- Monache Intertribal Association

Paleontology

Due to the potential to encounter paleontological resources within the study area, it is recommended that a full literature and records search be completed prior to construction. The anticipated impacts and mitigation measures identified in the AFC for the AMSP would also apply to the Lockhart Substation, the interconnection, and the new poles within the AMSP and along the SCE corridor, since those elements fall within the AMSP study area boundary. New foundations and new pole construction will not require significant excavation, so the likelihood of encountering paleontological resources associated with those activities is considered low. New trenching proposed for fiber optic cable along Lockhart Road, or within the Lockhart Substation or existing substations, is assumed to be relatively shallow (36 inches); however, the potential does exist to encounter resources at 3 feet. Due to the potential for fossil resource discoveries, implementation of measures such as proper planning, employee training, and professional paleontologist monitoring in areas of high paleontological sensitivity would ensure that fossils that may be encountered would not be adversely impacted (destroyed), rendering them permanently unavailable.

IMPACT MINIMIZATION MEASURES

Cultural Resources

Avoidance and preservation of cultural resources is always preferred. Through careful design efforts, the Project could avoid some or all of the identified cultural resources. Sites that are avoided will not require any additional testing or assessment. If avoidance is not possible, those sites that may be impacted by the construction and maintenance of the Project may require further investigation to determine whether they are historic properties eligible for listing in the NRHP. In the interest of resource preservation, any destructive testing should occur only when the Project design process is well developed, and the various stakeholders have been consulted.

1. A Project-specific testing plan should be written prior to any further research. Testing at the identified sites should include site relocation, confirmation of boundary mapping, and limited subsurface testing. The subsurface tests should be designed to define the horizontal and vertical limits of the sites, and to collect samples of the cultural and ecological materials necessary to characterize and assess the significance of the sites. Any additional mitigation recommendations would be guided by the results of this testing phase.

2. The potential for impacts from the Project may be minimized by implementing standard operating procedures during construction and operation, including requiring construction and operation personnel to remain within approved areas, instituting cultural briefings for all personnel working on the Project, and ensuring that access roads and staging areas are located away from known cultural resources.

Paleontology

1. Conduct a site-specific records and literature search and identify those areas within the Project study area with high potential for encountering fossils. This analysis will be based on specific footprint information for new pole foundations and trenching locations, as defined in the preliminary engineering for the Project.

2. Prior to the start of any Project-related construction (defined as construction-related vegetation clearing, ground disturbance and preparation, and site excavation activities), SCE or the contractor will ensure that a paleontological resource specialist is available for field activities and prepared to implement the conditions of certification. The designated paleontological resource specialist will be responsible for implementing all the paleontological conditions of certification and for using qualified personnel to assist in this work.

3. Prior to the start of construction, a Paleontological Resource Monitoring and Mitigation Plan will be prepared by a paleontological resource specialist. The plan will identify general and specific measures to minimize potential impacts to sensitive paleontological resources. The Project paleontological resource specialist will implement the Paleontological Resource Monitoring and Mitigation Plan, as needed.

Prior to the start of construction, the Paleontological Resource Specialist will prepare a staff training program that will address the potential to encounter paleontological resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources.

3.4 LAND USE

ENVIRONMENTAL SETTING

The Land Use analysis for the Project focuses on the Project's compatibility with existing and planned land uses, and the Project's consistency with any other applicable local, state, and federal land use plans, ordinances, and policies. The Project is located partially within the existing AMSP boundary and primarily stays within the confines of established utility corridors and existing substations. Limited sections of the Project require construction of new fiber optic poles or underground trenching; however, these sections are also located within existing utility easements. The following analysis is organized by the four main study areas: the proposed Lockhart Substation and Interconnection, and the three fiber optic cable routes between the Lockhart Substation and existing substations.

Lockhart Substation and Interconnection

Existing Land Use. The Lockhart Substation and portions of the interconnection are located entirely within the boundaries of the AMSP site. AFC Section 5.7.8 addresses the existing land use setting and potential conflicts with existing land uses for the AMSP, which includes the area where the Lockhart Substation is proposed, as well as portions of the interconnection to the 220-kV utility corridor. The Project study area and the area surrounding the AMSP site consists primarily of open space, agriculture, rural residential, designated habitat conservation areas, and a solar power plant (located immediately northwest of the AMSP boundary). An abandoned building and dirt roads that were used historically for access to agricultural fields exist in the location of the Lockhart Substation. The elements of the Project outside the limits of the AMSP include the proposed replacement towers and interconnection transmission lines that are proposed to connect the substation to the existing SCE 220-kV transmission line located directly south of the AMSP boundary. The land uses to the south of the AMSP consist of existing utility corridors and associated transmission lines and structures. A dirt road parallels the study area to the south. Open space and limited agricultural land uses continue south of the dirt road. The closest residence is approximately 1.5 miles west of the proposed Lockhart Substation. Refer to Figure 2 for existing land uses around the Lockhart Substation.

Planned Land Uses. The proposed substation and interconnection facilities fall within the jurisdiction of the County of San Bernardino. The proposed Lockhart Substation and some of the interconnection facilities are in an area designated by the County General Plan Land Use map as Rural Living (RL). The portion of the interconnection facilities stretching south and outside the limits of the AMSP fall within the General Plan Land Use designation of Resource Conservation (County of San Bernardino 2007). Refer to Figure 5.7-2 of the AFC for the planned land use map for the substation and vicinity.

The land proposed for the substation and interconnection facilities are not subject to any Habitat Conservation or Natural Community Conservation Plan, nor are they within the boundaries of any wildlife preserve or critical habitat area. These areas are located to the south, east, and west of the Project site.

The proposed Lockhart Substation and interconnection elements are not located on land designated as Prime Farmland (State of California, Department of Conservation 2008). As noted in Section 5.7 of the AFC, land designated as Prime Farmland and Farmland of Statewide Significance are found within the AMSP boundary, but farther to the northwest of the proposed Lockhart Substation (Figure 5.7-3a in the AFC). However, it is important to note that this designation is a byproduct of irrigation occurring in one remaining crop circle. This farmland is not protected by the County by agricultural zoning, Williamson Act, or any other conservation mechanism. The Farmland is an isolated parcel that is a remnant of the alfalfa farming in the Harper Dry Lake Area. Farming has almost completely ceased on the Project site, the study area, and the surrounding lands due to the unsustainability of continued groundwater withdrawal.

In addition to the County General Plan, the Project study area is subject to the U.S. Department of Agriculture Bureau of Land Management (BLM) West Mojave Plan (WEMO 2005), which supersedes the California Conservation Area Plan of 1980. Section 3.6.1 of the West Mojave Plan provides guidelines for energy projects. The plan states that “all new linear utilities must be located within a utility corridor. The intent of the corridors is to provide a delivery system network that meets public needs in a manner that minimizes the proliferation of widely separated rights-of-way by encouraging the joint use of corridors for utilities.” Guidelines for utility construction such as “minimizing the number of separate rights-of-way by utilizing existing rights-of-way, avoiding sensitive resources, and conforming to local plans” are also included in West Mojave Plan. The West Mojave Plan identifies conservation areas for protection; however, the proposed Lockhart Substation and interconnection facilities are not located in proximity to or within any of these conservation areas.

The WEMO classifies BLM-managed land in the study area and surrounding areas as “L – Limited Use,” under the multiple-use land use classification system. The “L” classification protects sensitive, natural, scenic, ecological, and cultural resource values. The WEMO plan designates Harper Dry Lake as an Area of Critical Environmental Concern (ACEC). It is located approximately 0.12 mile east of the AMSP boundary and approximately 1 mile from the proposed Lockhart Substation. (Refer to Figure 5.3-b in the AFC for the location of the ACEC.)

Lockhart to Tortilla Substation Fiber Optic Line

Existing Land Use. The Lockhart to Tortilla Substation Fiber Optic Line falls with the limits of unincorporated San Bernardino County, as well as a portion of the incorporated City of Barstow for the southern portion of the route nearing Tortilla Substation. The proposed overhead fiber optic line between the Lockhart Substation and Harper Lake Road follows an existing utility corridor for 33-kV and 220-kV lines. Existing land uses along this stretch are similar to those described previously for the substation site, primarily that of open space, agriculture, and rural residential. The nearest residence to this segment is situated approximately 260 feet to the west, west of Harper Lake Road. Existing land uses adjacent to the remainder of the route, south, include residential, retail, open space, industrial, prime farmland, and agriculture. The proposed fiber optic line would be strung on existing transmission line poles for a majority of this route, so the existing land use consists of utility easements, transmission structures, and line. The majority of the route is adjacent to open space or agricultural land uses, as shown in Figure 3. Residential, retail, commercial, and industrial land uses are found primarily within the limits of the City of Barstow and mostly to the south of Main Street. Some residential uses can be found scattered along SR 58, Summerset Road, Community Road, and Lenwood Road to the north of Main Street. Residential land uses are predominant along I Street and Bonanza Road near the Tortilla Substation.

Planned Land Use. The northern portion of this route was covered under the Lockhart Substation and Interconnection discussion above, and was covered in the study area for the AMSP. The proposed new overhead poles along the existing 220-kV transmission line fall within areas designated for Rural Living and Conservation. As the route heads south along Harper Lake Road, the land use designation changes to Open/Non-developed and then residential farther east along SR 58. The southern portion of this fiber optic route falls within the incorporated City of Barstow. According to the City General Plan Land Use map (City of Barstow 1997), the existing transmission line corridors that will be used to route the cable traverse through a number of land use types: desert living/specific plan, specific plan, general commercial, recreational opportunity, neighborhood residential, railroad industrial, general industrial, and visitor-serving commercial. These land uses are consistent with the planned land use designations of the County of San Bernardino, shown in Figure 9.

Areas designated as Prime Farmland by the State of California border small sections of the fiber optic line, northwest of the City of Barstow. Refer to Figure 9 for the location of Prime Farmlands in proximity to the fiber optic route.

Lockhart to Kramer Substation Fiber Optic Line

Existing Land Use. Existing land uses along the Lockhart to Kramer Substation Fiber Optic Line include mostly open space with limited agriculture and scattered rural residential uses. The entire route is either located within the limits of the AMSP site or within existing utility easements. The majority of this route follows the existing Lockhart 33-kV and Coolwater–Kramer 220-kV transmission line corridors in a vast area of undeveloped desert open space (Figure 4). As the route nears Highway 395, a mix of retail, commercial, and limited residential exists along the highway corridor. The intersection of SR 58 and Highway 395 includes service stations, restaurants, and other retail to serve motorists using these transportation corridors. The route enters the Kramer Substation, an industrial land use that blends with the urban land uses at the crossroads.

Planned Land Use. Refer to the description of planned land use in Section 5.7 of the AFC for the portion of the fiber optic cable proposed through the AMSP property. According to the County of San Bernardino General Plan land use map, the planned land use designations along a majority of the route consists of open/non-developed, with limited residential and mixed uses planned near the intersection of SR 58 and Highway 395. In addition, the designation of Military abuts the Kramer Substation to the south. Refer to Figure 10 for planned land uses along this route.

The Lockhart to Kramer Substation fiber optic Line does not cross any areas designated for conservation or protection under the WEMO.

A small area of land designated as Prime Farmland and Farmland of Statewide Importance exists adjacent to the proposed fiber optic cable within the limits of the AMSP. This area is described above under the Lockhart Substation discussion for land use.

Kramer to Victor Substation Fiber Optic Line

Existing Land Use. Existing land use along a majority of the Kramer to Victor Substation fiber optic line consists of open space and Highway 395, marked only by the presence of the three existing electric transmission line corridors that the fiber optic cable is proposed to be within. These corridors are situated in and adjacent to open space consisting of desert habitat and rolling terrain to the west. Open space abuts the highway and the cable corridor for more than half of this route's distance. As the route nears the southern half, the open space gives way to more urban land uses, including residential, retail, commercial, and light industrial. The proposed cable route passes through mixed uses and residential communities until crossing into the Victor Substation.

Planned Land Use. According to the County of San Bernardino General Plan land use map, the northern portion of the route is designated as open/non-developed and transitions to a mix of land uses in the southern half, including general commercial, heavy industrial, institution/government, light industrial, military, other retail/service, residential, transportation, and urban mixed. A portion of the study area crosses into the City of Adelanto. The planned land uses are consistent with the County designations. The Kramer Substation and the northern section of the fiber optic route crosses into Edwards Air Force Base. Refer to Figure 11 for planned land uses along this route.

This portion of the Project does not cross into any designated conservation areas or areas of critical concern, pursuant to WEMO.

There are no areas designated as Prime Farmland within or adjacent to the proposed Kramer to Victor Substation Fiber Optic Line.

IMPACTS

Lockhart Substation and Interconnection

Construction associated with the Lockhart Substation poses no new land use impacts to the Project area beyond what was addressed in the AFC land use analysis. Land use impacts from the AMSP were found to be less than significant after mitigation. All construction activities will take place within the AMSP site boundary or within existing utility corridor boundaries immediately to the south of the substation. While the interconnection elements extend south of the AMSP into BLM lands and land designated as Resource Conservation, the facilities will not be located within a sensitive area defined in the WEMO and the improvements will be within and consistent with the existing utility corridor structures, line, and improvements. The proposed facilities would be compatible with the proposed AMSP improvements, supporting the operation of that facility. No new land use impacts are identified for this element of the Project.

The County has stated that electric infrastructure is essential to serve growth and development in the County and allows electrical power generation in the Rural Living zone with a Conditional Use Permit.

Lockhart to Tortilla Substation Fiber Optic Line

Land use impacts associated with the Lockhart to Tortilla Substation are projected to be minimal and less than significant. The proposed fiber optic cable, whether installing new poles, using existing poles, or trenching, would all take place within existing utility corridor easements or within the existing Tortilla Substation boundary. Construction would include the installation of new overhead and underground fiber optic lines and associated poles. Construction would not adversely affect the current land use in the area due to the fact that existing utility corridors, transmission poles, and substation boundaries would be used and the proposed cable infrastructure would be compatible with the existing utility uses. Areas of the utility corridor in proximity to lands designated as Prime Farmland would not result in impacts to agricultural lands since improvements would remain within the existing corridors. No impacts to WEMO are expected. This segment of the Project would not conflict with existing or planned land uses.

Lockhart to Kramer Substation Fiber Optic Line

Land use impacts associated with the Lockhart to Kramer Substation fiber optic line are projected to be minimal and less than significant. This segment of the Project is located partially within the AMSP boundary (e.g., the 30 new poles between the substation and Lockhart Road and the use of existing poles heading toward Harper Lake Road) where land use impacts were addressed and found to be less than significant after mitigation. The improvements within the AMSP for this Project are compatible with the AMSP facility and support its operation. A majority of this line uses existing poles where the new cable would be compatible with the existing utility land use, and the easements are designated on planned land use maps. Proposed trenching at the Kramer Substation would be within the existing substation boundary, so this improvement would be compatible with that land use, an industrial use per the San Bernardino County General Plan.

Kramer to Victor Substation Fiber Optic Line

Land use impacts associated with the Kramer to Victor Substation Fiber Optic Line are projected to be minimal and less than significant. This segment of the Project would be located entirely within the boundaries of existing utility easements and would be considered a compatible land use. A short segment of new trenching is proposed within Bellflower Street; however, this would only result in short-term construction impacts, such as minor traffic detours, and noise and air quality impacts. The cable installation would not change the use of that street over the long term. Trenching proposed within the Kramer and Victor substation boundaries would also be considered a short-term impact, but would not conflict with the operations of those facilities and ultimately would support the telecommunications operations.

This proposed fiber optic line, including the construction of 525 new poles, would not conflict with Edwards Air Force Base, since the poles would be located within existing transmission line corridors and are dwarfed by the existing 220-kV towers along this route.

No areas of Prime Farmland have been identified within the Kramer to Victor section of the Project. This segment of the fiber optic line would not conflict with WEMO.

IMPACT MINIMIZATION MEASURES

Constructing the Project within existing utility corridors, substation boundaries, and the AMSP property contribute toward avoiding land use conflicts and impacts. Areas where existing utility corridors, transmission poles, and substations can be used results in using these infrastructure facilities and land uses to their full potential. Only minimal construction is required to install the fiber optic cables needed to implement the telecommunications system between the various substations. No additional mitigation measures are required for land use impacts, beyond the mitigation measures specific to the AMSP property identified in Section 5.7 of the AFC.

3.5 AIR QUALITY

ENVIRONMENTAL SETTING

The air quality setting for the Project can be described regionally and locally. The Project is located within the western portion of San Bernardino County, within the Mojave Desert Air Basin (MDAB). As described in Section 5.2.1.3 of the AMSP AFC, MDAB is an assemblage of mountain ranges interspersed with long broad valleys, with a dry-hot desert climate. Air quality regulations in the MDAB are provided by the Mojave Desert Air Quality Management District (MDAQMD); an analysis of compliance with laws, ordinances, regulations, and statutes (LORS) is presented in Section 5.2.5 of the AMSP AFC and would apply to this Project. Local air quality is based on proximity of sensitive air quality receptors to local air pollution sources (e.g., traffic congested roadways and intersections). Sensitive air quality receptors include structures that house children, the elderly, and persons with preexisting respiratory or cardiovascular illness (i.e. schools, hospitals, and nursing homes).

Lockhart Substation and Interconnection

The proposed substation site is located in a remote area approximately 5.5 miles northeast of the intersection of SR 58 and Harper Lake Road in the County of San Bernardino. There are no sensitive air quality receptors located in proximity to the Project site.

Lockhart to Tortilla Substation Fiber Optic Line

The Lockhart to Tortilla Line is located partially within the AMSP boundary, and within the right-of-way of existing transmission line corridors all the way to the Tortilla Substation in the City of Barstow. There are residential areas adjacent to this route, primarily in the developed areas surrounding Barstow; however, no sensitive air quality receptors are identified directly on the route.

Lockhart to Kramer Substation Fiber Optic Line

The Lockhart to Kramer Line is located partially within the AMSP property, as well as within existing transmission line corridors all the way to Kramer Substation. Most of this utility corridor is in a remote desert area of the County, with the exception of the far west end that traverses near retail, commercial, and industrial uses. No sensitive air quality receptors are located in proximity to this line.

Kramer to Victor Substation Fiber Optic Line

The Kramer to Lockhart Line is located along Highway 395, partially within an undeveloped portion of the County. There are residential areas adjacent to this route, primarily in the southern one-third of the alignment as the corridor nears Adelanto and the Victor Substation. In particular, as the route leaves the Highway 395 corridor, it travels through some residential neighborhoods; however, no sensitive air quality receptors are found along this route.

IMPACTS

The Project components (i.e., substation, interconnection, and fiber optic lines) would generate air pollutant emissions, primarily from facilities construction and, to a lesser degree, from the operation and maintenance of the constructed facilities. Construction activities would generate temporary (short-term) emissions as fugitive dust emissions (particulate matter) from earth-moving activities and as exhaust emissions from the operation of construction equipment and vehicles. Exhaust emissions may include carbon monoxide (CO); ozone (O_3) precursors; nitrogen dioxide (NO_2); sulfur dioxide (SO_2); lead (Pb); and particulate matter, which is subdivided into two classes based on particle size: fine particles ($PM_{2.5}$) and inhalable particles (PM_{10}). Operation of the constructed facilities would generate minor stationary and mobile exhaust emissions from operation and maintenance of the proposed facilities (i.e., substation and fiber optic lines).

The potential air pollutant emissions that would be generated by the Project have been assessed qualitatively, in a programmatic manner, identifying the anticipated impacts of the emissions and providing a list of programmatic measures to reduce the impact of Project emissions generated. Project construction emissions would be generated primarily from the construction on the substation site and associated transmission and fiber optic lines (e.g., earth-moving activities and facility installation). The construction emissions are not anticipated to be substantial and not to exceed MDAQMD CEQA significance thresholds, as identified in Table 5.2-8 in the AMSP AFC. Project operational emissions are anticipated to be negligible, as the constructed substation emissions would be limited to emergency generators and occasional maintenance, as with installed overhead fiber optic lines.

In addition to regional impacts, localized air quality impacts of CO and toxic air contaminants (TACs) were also considered.

Signalized intersections of unacceptable levels of service (LOS) are considered for localized CO impacts, where Project traffic contributes to the unacceptable LOS condition. The proximity of human receptors to these intersections is the concern. Project-generated traffic would primarily be temporary, short-term construction traffic; traffic from Project operations would be negligible since the substation would be un-staffed and the interconnection and fiber optic cables would only require periodic maintenance. Project traffic is not anticipated to be substantial enough to result in increasing delays at intersections. The AMSP is projected to generate substantially more construction traffic than this Project, and its traffic impacts were found to be less than significant. Therefore, the Project would not have the potential to result in localized CO impacts.

As previously stated in the AMSP AFC, TACs of concern include diesel exhaust PM (diesel PM), asbestos, and lead. The principal TAC of concern for the proposed Project is diesel PM, which would result from diesel construction equipment and vehicles. The primary concern for diesel PM is sensitive receptors in proximity to high concentrations of diesel vehicle operation, such as construction sites, interstate highways, distribution centers, bus stations, or port facilities. The linear Project construction areas (e.g., fiber optic line corridors) cover an extensive corridor area along roadways. However, a substantial use of diesel equipment and vehicles is not anticipated along the Project routes. The nonlinear Project facilities (e.g., the substation) would be located away from sensitive air quality receptors. There are sensitive air quality receptors such as residential recreational areas in proximity to the proposed alignments. However, fiber optic line installation would be temporary and short-term (approximately 1 year), of short duration in one location (1 to 2 days), and would cease after construction is completed. Overall, the diesel PM emissions generated from Project construction equipment and mobile sources are not anticipated to subject sensitive receptors to adverse levels of diesel PM emissions.

Lockhart Substation and Interconnection

The substation and interconnection would generate air pollutant emissions primarily from facility site construction (i.e., substation and transmission lines) and linear facilities installation (i.e., fiber optic line); minor emissions would be generated from the post-construction operation and maintenance of the constructed substation. Construction activities would include site grading, facility installation, paving, and landscaping. Project emissions from the substation and interconnection are not anticipated to be substantial, and anticipated to be less than applicable MDAQMD CEQA significance thresholds, identified in Table 5.2-8 in the AMSP AFC.

Construction of new 220-kV transmission structures to replace the existing 220-kV transmission structures may require the installation and operation a temporary concrete batch plant within the boundaries of the AMSP for purposes of footings for the new transmission structures. The installation and removal of a temporary batch plant would generate temporary, short-term construction emissions of fugitive dust and exhaust from construction equipment and vehicles. Operation of the plant would generate temporary, short-term exhaust emissions from the operation of the plant's gas-powered mechanical equipment for the generation of concrete for the footings.

Lockhart to Tortilla Substation Fiber Optic Line

The Project includes the installation of approximately 85 miles of new fiber optic communication cables between the Lockhart Substation and the Tortilla, Kramer, and Victor substations by means of stringing cable on existing poles, construction of new poles, placement of segments of cable in existing underground conduit, and placement of cable in new underground conduit.

The Lockhart to Tortilla line includes approximately 31 miles of new fiber optic cable to be installed aboveground on existing and new poles, except for approximately 1,000 feet of cable that would be installed in an underground conduit. The overhead cable would require the construction of approximately 55 new poles; overhead cable would be strung on the existing and proposed poles. Since the line would be located in existing utility rights-of-way along existing roadways, off-road construction vehicle travel is anticipated to be minor. Ground-disturbing activities from 1,000 feet of trenching for underground cable and excavation for the footings of 55 new poles would generate fugitive dust, and construction equipment and vehicle exhaust.

Lockhart to Kramer Substation Fiber Optic Line

The Lockhart to Kramer line includes approximately 1.5 miles of new fiber optic cable to be installed aboveground on existing and new poles, except for approximately 1,000 feet of cable that would be installed in an underground conduit. The overhead cable would require the construction of approximately 30 new poles; overhead cable would be strung on the existing and proposed poles. Since the line would be located in existing utility rights-of-way along existing roadways, off-road construction vehicle travel is anticipated to be minor. Ground-disturbing activities from 1,000 feet of trenching for underground cable and excavation for the footings of 30 new poles would generate fugitive dust, and construction equipment and vehicle exhaust.

Kramer to Victor Substation Fiber Optic Line

The Kramer to Victor line includes approximately 35 miles of new fiber optic cable to be installed aboveground on existing and new poles, except for approximately 1,000 feet of cable that would be installed in an underground conduit. The overhead cable would require the construction of approximately 525 new poles; overhead cable would be strung on the existing and proposed poles. Since the line would be located in existing utility rights-of-way along existing roadways, off-road construction vehicle travel is anticipated to be minor. Ground-disturbing activities from 1,000 feet of trenching for underground cable and excavation for the footings of 525 new poles would generate fugitive dust, and construction equipment and vehicle exhaust.

IMPACT MINIMIZATION MEASURES

Construction-related emissions would be dependent on the following factors:

- Total site acreage and the maximum acreage to be disturbed in any single day.
- Moderate site preparation required prior to construction of the substation, pole foundations, support structures, and other Project site features.
- Construction activity duration annually.

Construction-related activities and emissions at the Project site are consistent with activities and emissions encountered at any construction site. Compliance with the provisions of the following necessary construction permits will generally result in minimal site emissions: 1) grading permit; 2) SWPPP requirements (construction site provisions); 3) use permit; 4) building permits; and 5) MDAQMD ATC permits, which will require compliance with the provisions of all applicable fugitive dust rules that pertain to the site construction phase.

The Project is not anticipated to result in construction or operational emissions that lead to significant air quality impacts; therefore, no mitigation measures are required.

3.6 NOISE

ENVIRONMENTAL SETTING

The Project is located within the western portion of San Bernardino County, in remote areas, and in the surrounding areas of the City of Barstow. Noise regulations in the Project area are provided by the County. A regulatory compliance analysis (LORS) is presented in Section 5.8.3 of the AMSP AFC and would apply to this Project.

Lockhart Substation and Interconnection

The Lockhart Substation site and some of the associated interconnection facilities are proposed to be located within the limits of the AMSP. The proposed site is approximately 450 by 542 feet, and is private land located in a remote area approximately 5.5 miles northeast of the intersection of SR 58 and Harper Lake Road in the County of San Bernardino. There are no noise-sensitive receptors located in proximity to these facilities.

Lockhart to Tortilla Substation Fiber Optic Line

The Lockhart to Tortilla line is located partially within the AMSP boundary and mostly along existing transmission line corridors all the way to Tortilla Substation in the City of Barstow. There are noise-sensitive receptors located in proximity to the southern portion of this alignment; there are residential areas adjacent to this route, primarily in the developed areas surrounding Barstow.

Lockhart to Kramer Substation Fiber Optic Line

The Lockhart to Kramer line is located partially within the AMSP but mostly along existing transmission line corridors all the way to Kramer Substation. Most of this route is in remote areas of the County with the exception of the far west end of the route that traverses a mixed-use retail/commercial zone near Highway 395/SR 58.

Kramer to Victor Substation Fiber Optic Line

The Kramer to Victor line is located mostly along Highway 395 in an undeveloped portion of the County. The route does traverse a more urban setting for the southern one-third of the alignment, crossing partially through residential neighborhoods that would be considered noise-sensitive land uses.

IMPACTS

The Project would generate noise above ambient levels from construction of the substation and interconnection facilities, and installation of the telecommunication cables. Construction noise would include the operation of construction equipment and vehicles at the proposed construction sites, and the transport of construction materials and workers as vehicle trips to and from the Project sites.

Construction would generate temporary noise levels from construction equipment and vehicles during support demolition, site grading activities, conveyance line and pole installation, substation construction, and surface paving. Construction along the communication line routes would occur on weekdays from 7 a.m. to 7 p.m.; thus, construction noise from line activity would be temporary and short term (less than 1 workday) at any one location along the route. Construction of site facilities (i.e., substation) would be over a longer term (approximately 1 year) at the substation site.

Noise impacts from construction are a function of the noise generated by equipment, the location and sensitivity of nearby land uses, and the timing and duration of the noise-generating activities. Potential impacts to noise-sensitive receptors from construction noise would be limited to receptors in proximity to site facilities and conveyance line routes. Construction would occur on weekdays between 7 a.m. and 7 p.m. and would not disturb typical weeknight sleep when in proximity to housing receptors. Daytime receptors such as schools and hospitals could be temporarily subjected to and affected by construction noise, including instantaneous maximum noise levels and/or noise levels averaged over time and duration depending on the type of construction (conveyance line or site facility) and proximity to receptors.

The construction equipment required for this Project is anticipated to be typical (e.g., no pile drivers or rock blasting), but may include pavement breakers along roadways for underground lines or pole footings. Typical construction equipment for the Project options is estimated to generate maximum noise levels of short duration not to exceed 90 A-weighted decibels (dBA) at 50 feet, or average levels of approximately 80 dBA equivalent sound level (L_{eq}) at 50 feet. Without intervening topography or structures, these levels would attenuate over distance at a conservative rate of approximately 6 dBA per doubling of distance (i.e., 80 dBA at 50 feet would attenuate to approximately 74 dBA at 100 feet, and approximately 68 dBA at 200 feet, etc.).

Project construction noise is not anticipated to be substantial and would not exceed San Bernardino County and CEQA significance thresholds, as identified in Section 5.8.3 of the AMSP AFC. Project operational noise is anticipated to be negligible, as the constructed substation noise would be limited to emergency generators and occasional operation and maintenance visits, as with installed overhead fiber optic cables.

The San Bernardino County Noise Ordinance does not limit construction noise levels. Many jurisdictions, such as the County of San Diego, have established 75 dBA L_{eq} averaged over 8 hours as an acceptable daytime construction noise limit at the property line of a residence. Approximately 100 feet from Project construction areas would experience average construction noise levels attenuated to less than 75 dBA L_{eq} (averaged over 1 hour), which many municipal jurisdictions have adopted as an acceptable construction noise level. However, receptors within this distance would be subject to maximum instantaneous construction noise levels of up to 85 dBA, which could be disturbing to receptor activities such as concentration for office or classrooms, or convalescing at hospitals. More distance from the construction activities would further attenuate construction noise, thereby lessening the disturbance.

The possible concrete batch plant located at the substation site would generate noise from its temporary installation and operation. Due to its remote location, the plant's construction and operation would not result in noise impacts to sensitive receptors. In addition, the batch plant's operation would be limited to weekday, daytime operation per the County Noise Ordinance. Concrete batch plant operations generate noise levels in the range of mid-70 dBA at 100 yards, depending on design specifications of the plant. Truck traffic transporting materials to the plant (e.g., aggregate) generates additional noise levels, which can be of concern depending on the truck route. However, the batch plant and truck route would not be located in proximity to noise-sensitive receptors.

After construction, the proposed facilities would generate noise from operations and maintenance activities (i.e., substation), which may increase ambient noise levels in proximity to the constructed facilities. Operational noise would be generated continuously (24 hours per day, 7 days per week) from site facilities operation and regular maintenance; any associated vehicle trips to the operational facilities are anticipated to be minor and primarily maintenance related. The effect of operational noise levels on receptors would be based on the proximity of sensitive receptors; typically, site facilities are remote from receptors.

Potential construction and operational noise impacts to protected noise-sensitive wildlife are addressed in Section 3.2.

Construction-noise exposure to sensitive receptors along the corridors would be of relatively short duration (approximately 1 to 2 days) at each receptor. Therefore, the combined noise impact of overlapping utility routes at a receptor would be several noise events of short duration staggered over the overall construction period for all of the Project sites.

The operational noise exposure of the constructed facilities to sensitive receptors would be negligible, as there are no noise-sensitive receptors in proximity to the operational site facilities (i.e., substation). The communication lines would not generate operational noise except for maintenance activities, including emergency repair.

Lockhart Substation and Interconnection

The substation and interconnection would generate noise primarily from facility site construction (i.e., substation and interconnection elements) and linear facilities installation (i.e., fiber optic cable); minor noise would be generated from the post-construction operation and maintenance of the constructed substation. Construction activities would include site grading, facility installation, paving, and landscaping. Project noise from the substation and interconnection are not anticipated to be substantial, and anticipated to be less than and not to exceed any County or CEQA significance thresholds, as identified in Table 5.8.3 in the AMSP AFC. Noise-sensitive receptors are not located in proximity to the site to be affected by construction noise.

Construction of new 220-kV transmission structures to replace the existing 220-kV transmission structures may require the installation and operation a temporary concrete batch plant within the boundaries of the AMSP for purposes of footings for the new transmission structures. The installation and removal of a temporary batch plant would generate temporary, short-term construction noise. Operation of the plant would generate temporary, short-term noise from the operation of the plant's gas-powered mechanical equipment for the generation of concrete for the structure footings.

Lockhart to Tortilla Substation Fiber Optic Line

The Lockhart to Tortilla line includes approximately 31 miles of new fiber optic cable to be installed aboveground on both existing and new poles, except for approximately 1,000 feet of cable that would be installed in both a new underground conduit along Harper Lake Road and an existing underground conduit near the Tortilla Substation. The overhead cable would require the construction of approximately 55 new poles between the Lockhart Substation and Harper Lake Road. Construction noise from stringing cable on existing poles would be less than noise from trenching and new pole construction. As noted for the substation and interconnection activities above, typical construction equipment for the Project is estimated to generate maximum noise levels of short duration not to exceed 90 dBA at 50 feet, or average levels of approximately 80 dBA L_{eq} at 50 feet. Trenching uses typical construction equipment. At 100 feet, these levels would attenuate below typical levels of significance (75 dBA L_{eq}). Since the County does not establish construction noise level limits, trenching activities of the Project would not result in a significant noise impact, but would generate temporary short-term noise levels that could be a nuisance to the receptors nearest the trenching activities.

Since the line would be located in existing utility rights-of-way along existing roadways, off-road construction vehicle travel is anticipated to be minor.

Lockhart to Kramer Substation Fiber Optic Line

The Lockhart to Kramer line includes approximately 1.5 miles of new fiber optic cable to be installed aboveground on new poles within the AMSP boundary, and another 1,000 feet of cable that would be installed in an underground conduit, also within the AMSP. The overhead cable at this location would require the construction of approximately 30 new poles. The majority of this line would involve stringing cable on existing overhead utility poles, limiting the construction noise impacts to stringing equipment. The majority of this alignment is within existing utility rights-of-way in remote areas away from noise-sensitive receptors. Ground-disturbing activities from 1,000 feet of new trenching for underground cable within the AMSP property and excavation for the footings of 30 new poles within the AMSP boundary would generate typical construction noise levels. The stringing and installation of fiber optic cable on existing poles would generate lower noise levels associated with equipment and installation vehicles. Refer to the typical noise levels, above, under both the substation and Lockhart to Tortillas fiber optic line.

Kramer to Victor Substation Fiber Optic Line

The Kramer to Victor line includes approximately 35 miles of new fiber optic cable to be installed aboveground on existing and new poles, except for approximately 1,000 feet of cable that would be installed in an underground conduit within Bellflower Street and underground conduits within the Victor and Kramer substations. The overhead cable would require the construction of approximately 525 new poles along existing utility rights-of-way and along existing roadways. Construction activities for the excavation of 1,000 feet of trenching for the underground cable in Bellflower Street would result in typical construction noise; however, the addition of equipment for pavement cutting could elevate noise levels by 5 to 10 dBA L_{eq}. However, the County does not have a dBA limit, so no significant impacts are anticipated. The stringing and installation of fiber optic cable on existing poles would generate fairly low noise levels, as noted above.

IMPACT MINIMIZATION MEASURES

This analysis indicates that no additional noise control features or mitigation measures are needed beyond the Project's compliance with all applicable noise and vibration LORS for both operation and construction. The Project is not anticipated to produce significant adverse noise impacts on people within the affected area, directly, indirectly, or cumulatively.

3.7 TRAFFIC AND TRANSPORTATION

ENVIRONMENTAL SETTING

The regional traffic and transportation setting for the Project study area consists of a few main highways and interstates and a number of smaller arterials, collector streets, residential streets, and dirt roads, mostly associated with agriculture or off-road vehicle recreational use. As shown in Figure 1, I-15, Highway 395, and SR 58 are the three main regional transportation corridors in the study area and are described in detail in Section 5.13 of the AFC. Smaller roads in proximity to the four main Project areas are summarized below.

Lockhart Substation and Interconnection

Primary access to the proposed Lockhart Substation site is from SR 58, Harper Lake Road, and a dirt utility road that travels east from Harper Lake Road along the southern side of the AMSP. SR 58 is a regional state highway connecting the City of Bakersfield and the City of Barstow and is designated a two- to four-lane state highway. Traffic counts conducted in April 2009 as part of the AFC indicate that the existing average daily trips (ADT) on SR 58 is approximately 12,000 trips per day, with trucks comprising approximately 36 percent of the daily traffic. Access is also possible from the north via Lockhart Road, which also intersects with Harper Lake Road. Traffic volumes on Harper Lake Road are considered low, 250 trips per day in 2009, and volumes on Lockhart Road are extremely low due to the rural nature of this road. The dirt utility road is used mostly for transmission line maintenance or access to nearby agricultural fields.

Lockhart to Tortilla Substation Fiber Optic Line

In addition to the roads mentioned under the Lockhart Substation, this fiber optic route follows along Summerset Road, Community Road, Lenwood Road, Sun Valley Road, I Street, and Bonanza Road. Existing LOS counts were not collected for these roadways. Construction access to the existing transmission line rights-of-way would occur along these roads and existing utility access roads.

Lockhart to Kramer Substation Fiber Optic Line

The fiber optic route for the Lockhart to Kramer Substation line follows along Lockhart Road, Harper Lake Road, and a dirt utility road, and crosses Highway 395 and SR 58 at the very western end of the route. Refer to previous descriptions of Lockhart Road, Harper Lake Road, Highway 395, and SR 58. These roads would provide the primary access routes for construction vehicles and equipment; however, construction vehicles are not expected to use Highway 395 for pulling cable on the existing line over that stretch of the fiber optic route. Access would be from the west or east on existing dirt or paved roads in the vicinity.

Kramer to Victor Substation Fiber Optic Line

The primary access to the proposed fiber optic line construction would be from existing dirt utility roads on the west side of Highway 395. SCE owns and maintains the dirt utility access roads along this entire north/south corridor. Highway 395 would, however, be used to access some of the dirt roads for at least the northern 20 to 25 miles of the route south from the Kramer Substation. As the route nears the community of Adelanto, local streets would be used for construction vehicles, including Bellflower Street, Bartlett Avenue, and Palmdale Road.

IMPACTS

Tables 1 through 9 in Attachment 1 identify the construction equipment, crew projections, and construction durations for the various elements of Project construction. The AFC traffic and transportation analysis for the AMSP evaluated the potential for impacts to local and regional highways, routes, and roads for the construction of the AMSP facilities. The assumptions in that analysis for the workforce and vehicular trips associated with that construction effort were substantially greater than the projections for the Lockhart Substation, interconnection, and telecommunications construction effort, and the study concluded that short-term construction traffic from the AMSP construction would not result in a significant impact to local roads and highways. For comparison, the AMSP projected a maximum workforce of 1,162 personnel on a peak day during the construction phase, whereas the substation workforce would be approximately 14 personnel on any given day. For the construction of the interconnection, the workforce would vary from between four and 16 personnel on any given day depending on the task at hand. The fiber optic line construction would require an average of four personnel for each of the three segments. No long-term significant impacts are projected. The Lockhart Substation would be an un-staffed facility; no personnel would be assigned to the station for daily operations. Routine maintenance would require periodic trips to the station or to check on fiber optic lines and interconnection lines, but traffic associated with those trips is considered negligible.

IMPACT MINIMIZATION MEASURES

No significant traffic impacts are projected as a result of the Lockhart Substation, interconnection, and telecommunications construction. Construction vehicles will comply with all local, state, and federal LORS, as identified in Table 5.13-21 of the AFC.

3.8 VISUAL RESOURCES

ENVIRONMENTAL SETTING

Lockhart Substation and Interconnection

The Project's substation and interconnection facilities are located primarily within the boundaries of the AMSP. While the substation was not called out specifically in the plans for the plant, it was assumed that the overall AMSP would result in the construction and operation of a solar electric-generating plant, an industrial facility in terms of land use type. Refer to Section 5.15 of the AMSP AFC for a description of the affected environment and existing visual setting of the plant site where the substation is proposed, as well as the immediate surroundings, which include the location of interconnection to the existing SCE 220-kV transmission lines south of the plant boundary. The proposed location of the substation and interconnection is presently a disturbed, open space area that was historically used for agriculture. An abandoned structure is present within the substation site. Refer to Figure 15, Photo 1. Photo Key Maps for all photos referenced in this section are found in Figures 12 to 14. The site is relatively flat and bound by existing dirt roads to the west and south, and existing electric transmission line corridors south of the substation where the interconnection is proposed. Existing transmission lines and towers dominate the view around the substation site. The overall visual setting can be described as rural, agricultural, open space marked by east/west electric transmission line corridors. No significant visual resources are located in proximity to the substation site and the site is not within the view of any parks, monuments, or areas with sensitive viewsheds.

Section 5.15 of the AFC also identifies the various LORS specific to visual impacts in the study area. The substation and interconnection facilities are located in unincorporated San Bernardino County, on both private lands and within an existing SCE utility easement. Visual impact guidance was obtained by reviewing the County's General Plan for visual and aesthetics-related goals or policies; however, the analysis in Section 5.15 relies on CEQA's criteria for visual resource impacts, the guidelines used by CEC for CEQA compliance. The substation and interconnection elements are not located on federal lands and, thus, no federal regulations would apply. This Project is also not located on state lands; however, as noted in Section 5.15, SR 58, located approximately 7 miles south of the Project, is designated an Eligible State Scenic Highway under the California Scenic Highway Program . A highway may be identified as eligible for listing as a State Scenic Highway if it offers travelers scenic views of the natural landscape, largely uninterrupted by incongruent development. Eligible routes advance to officially designated status when the local jurisdiction adopts ordinances to establish a scenic corridor protection program and receives approval from the California Department of Transportation (Caltrans). However, as noted in Section 5.15, the existing solar plant that is adjacent and northwest of the AMSP is not visible from SR 58, approximately 7 miles to the south, so it can be concluded that the proposed Lockhart Substation would likewise not be visible from SR 58. The proposed Lockhart Substation and interconnection facilities are not within the viewshed of any state park.

A number of San Bernardino County General Plan elements and development codes are addressed in Section 5.15 of the AMSP AFC specific to visual or aesthetic resources and including such related issues as dark skies, night lighting, glare, screening, height limitations, and landscaping. Refer to Tables 5.15-2 and 5.15-3 of the AMSP AFC for the applicable provisions and codes (LORS) that would apply to the proposed Lockhart Substation, interconnection facilities within and adjacent to the AMSP, and the proposed fiber optic cables.

Lockhart to Tortilla Substation Fiber Optic Line

Refer to the setting above for the description of the visual setting on and around the Lockhart Substation. The new poles and overhead fiber optic line is proposed within existing electric transmission line corridors that parallel a dirt road between Lockhart Substation and Harper Lake Road. As shown in Photos 2 and 3 (Figure 15), two 220-kV transmission lines with steel lattice towers parallel the road on either side and a 33-kV transmission line with wood H-frame poles line the road to the north. The transmission lines are the predominant visual reference point along this portion of the route. This route is bound mostly by open space and limited agriculture to the north and south.

As the route heads south along Harper Lake Road, the proposed fiber optic cables would be strung on existing transmission line poles on the west side of the road, with the exception of where 400 feet of underground conduit would be required where the route turns south on Harper Lake Road. This area is described as a disturbed road shoulder between a rural road and a residential/farm property to the west. Refer to Photos 4 and 5 in Figures 15 and 16. This stretch of the route down to SR 58 can be described visually as rural, open space with the existing transmission line the predominant feature next to the road. Refer to Photo 6 in Figure 16 for a view of the existing overhead lines along Harper Lake Road.

Where the route turns and heads east along SR 58, the Hinkley Substation is the primary visual focus since it is the only structure in the vicinity and is surrounded by open space. Refer to Photo 7 in Figure 16. The proposed fiber optic line would be strung on existing transmission line poles paralleling SR 58, a similar view to that along Harper Lake Road. Most of this route can be described as flat terrain, abutted on both sides of road by open space, agriculture, and rural residential toward the east end of this segment. The existing poles along Summerset Road (Photo 8, Figure 16), Community Road, and Lenwood Road (Photo 9, Figure 17) traverse through similar, flat terrain, with the addition of more rural residential uses on either side of the roads. The route continues south crossing railroad tracks and Main Street, the main thoroughfare into Barstow.

As the existing overhead line crosses south of Main Street along Sun Valley Drive and then northeast, the visual setting consists of more of mixed land uses, including commercial, residential, and light industrial land uses, followed by medium density residential land uses along I Street and Bonanza Road, until the existing overhead line, the 115-kV Kramer–Tortilla transmission line, traverses through an open space field in a southeast direction to the Tortilla Substation. The substation and existing overhead line are situated in the middle of an open space field surrounded by residential communities to the west and north. Open space continues to the south and southeast beyond the station. Refer to Photos 10 and 11 in Figure 17 for the Tortilla Substation and existing poles proposed to be used to route the new fiber optic cable. No significant visual resources exist along the Lockhart to Tortilla Substation fiber optic line.

Lockhart to Kramer Substation Fiber Optic Line

New poles for overhead fiber optic cable are proposed within the AMSP to link the Lockhart Substation with the Kramer Substation. The new poles are located within the AMSP between the substation and Lockhart Road to the north. The route continues west along Lockhart Road, where cable is proposed to be strung on existing transmission poles. The existing visual setting and resources in and around the AMSP were described in Section 5.15 of the AFC, as noted previously. The setting consists of fairly level terrain that was historically used for agriculture, marked only by dirt roads crossing the site. The cable would be strung on existing poles along Harper Lake Road. The visual setting along this segment of the route is described as a rural country road surrounded by open space, agriculture, and scattered residences. The cable is proposed to be strung along existing poles between Harper Lake Road and just west of Highway 395, a corridor that includes the SCE 220-kV structures and lines and the Lockhart 33-kV structures and line, described previously and shown in Photos 2 and 3 as they near the proposed Lockhart Substation. This segment of the fiber optic cable route is described visually as vast desert open space marked only by the existing transmission structures and line and dirt roads crisscrossing the corridor. The route on the west side of Highway 395, heading to the Kramer Substation, is described as more of a retail, industrial setting, since the crossroads of Highway 395 and SR 58 are surrounded by service stations, restaurants, and the Kramer Substation. The existing overhead transmission line is not the dominant visual feature near this intersection. The cable would continue south connecting with the Kramer Substation, a large facility, depicted in Photo 12, Figure 17. No significant visual resources exist along the Lockhart to Kramer Substation fiber optic line.

Kramer to Victor Substation Fiber Optic Line

As noted above, the Kramer Substation is a dominant feature at the crossroads of SR 58 and Highway 395; however, this industrial land use is located near an intersection with a number of retail and commercial land uses that are strategically located to provide services to motorists passing through the Mojave Desert, including fuel stations and restaurants. As such, the substation is not considered a visual distraction given the nature of this intersection. The proposed fiber optic cable between Kramer and Victor substations would follow within the rights-of-way of three existing transmission line corridors that parallel the west side of Highway 395. These three existing transmission lines are prominent in the view of motorists driving along this stretch of the highway. Views to the west are interrupted by the existing transmission structures and line since the corridors are close to the highway's western right-of-way. Refer to Photos 13 and 14 in Figure 18 for a depiction of the three existing transmission corridors and associated structures and line. The existing structures include large steel lattice towers for two of the transmission lines and single wood poles for the third transmission line. The existing visual setting between the Kramer Substation and three-quarters of this alignment south consists of undeveloped open space with varying topography, but mostly gently rolling slopes and knolls with elevations generally ranging from 2,477 to 3,281 feet above mean sea level within about one-quarter mile of the west side of the highway. The terrain to the east is relatively flat, with fairly long-distance views easterly across the desert. At approximately 5.4 miles south of the Kramer Substation, the three existing corridors bend westerly to route around one of the higher knolls. The transmission towers and lines are not visible from Highway 395 for approximately 1 mile.

As the corridor nears the community of Adelanto (Figure 4), retail, commercial, light industrial, and residential land uses become more evident along both sides of the highway. The proposed fiber optic line would transition from new poles to existing poles that continue along the west side of the highway, turning slightly westerly along Bellflower Street and through commercial and then residential land uses. The existing transmission line poles follow along the east side of Bellflower Street until a transition to underground trenching is required within this street, just south of Lee Avenue. Refer to Photo 15 in Figure 18 for the visual setting of where the underground cable conduit is proposed. This area consists of medium to high-density residential land uses on both sides of the street, so the visual character of this segment is described as more urban, with existing utility poles a common feature that blend in with the setting. The cable is proposed to transition back to overhead line south to Bartlett Avenue where the existing poles head east toward Highway 395. This area continues to be characterized as urban with more retail and commercial uses as the poles near the intersection of Highway 395. This visual setting of retail and commercial urban land uses continues south and all along the highway corridor until the existing poles intersect with Palmdale Avenue Road and head east to the Victor Substation. The existing overhead poles and line for this southern portion of the alignment are not prominent visual features and tend to blend into the urban setting.

The Victor Substation, a large substation similar to the Kramer Substation, is set easterly away from Highway 395 but still within a fairly urban setting between the retail and commercial uses along the highway and residential communities to the east. The substation is a prominent visual feature along this stretch of Palmdale Road. Refer to Photo 16 in Figure 18 for a depiction of the Victor Substation.

IMPACTS

Lockhart Substation and Interconnection

The proposed Lockhart Substation and associated interconnection elements are located within a remote, rural area of the Mojave Desert and mostly within the limits of the proposed AMSP, addressed for visual impacts in Section 5.15 of the AFC. The elements that extend beyond the AMSP boundary connect to a large east/west utility corridor that contains large lattice towers, wooden utility poles, and overhead transmission lines. The addition of the substation to the AMSP and the interconnection elements are not projected to result in significant visual impacts. The proposed facilities are consistent with the proposed solar power-generating plant and the adjacent solar power-generating facility to the northwest. The substation structure would not exceed the heights of proposed AMSP facilities and the station and interconnection elements are not located in an area considered to have sensitive visual features. The connection to the existing 220-kV transmission line would not result in a substantive visual alteration since existing towers would be replaced with similar structures and transmission lines would be consistent with the visual setting of the large east/west transmission corridor.

Lockhart to Tortilla Substation Fiber Optic Line

A total of 55 new poles are proposed to be installed between the Lockhart Substation and Harper Lake Road to hold the new fiber optic cables. The new poles would be located within an existing transmission line corridor that currently maintains three other transmission lines (two 220-kV lines and a 33-KV line). The addition of the new poles would not substantially alter the existing visual setting of this corridor. The proposed mono-poles would be equal to or lower in height to the existing wooden transmission poles and substantially smaller in scale than the existing 220-kV towers. The corridor is located in a rural, remote area of the desert with limited opportunities for views toward this corridor, other than Harper Lake Road, a rural north/south road. The addition of the new poles would not significantly alter the visual setting for this segment of the Project.

The proposed 400 feet of underground cable would require some short-term construction impacts (soils piles, construction equipment, etc.); however, the visual setting over the long term would not change. The cable is proposed to be located within the dirt shoulder of Harper Lake Road and would not be visible.

From the transition to overhead line on Harper Lake Road all the way southeast to the Tortilla Substation, the new fiber optic cable is proposed to be strung on existing utility poles. The addition of the fiber optic cable is not projected to alter the visual setting of this entire route. A small segment of cable would be installed in existing underground conduit, directly west of the Tortilla Substation. Short-term construction effects, such as soils piles and equipment, would not be considered a significant visual impact due to the distance from the existing residential communities and the fact that this would be short term. Since the cable is underground, long-term impacts to the existing visual setting are not expected.

No significant visual impacts are expected with the installation of fiber optic cable between the proposed Lockhart Substation and existing Tortilla Substation.

Lockhart to Kramer Substation Fiber Optic Line

The 30 new poles within the AMSP site boundary would not significantly alter the visual setting of the proposed solar facility. The poles would be used to string fiber optic cable and station light and power lines. The poles would blend in with the other elements of the AMSP, which is considered an industrial land use. After transitioning from new poles to existing poles along Lockhart Road, the fiber optic cable is proposed to be strung on existing overhead lines all the way west to the Kramer Substation. The addition of new fiber optic cable on existing utility poles is not expected to change the visual setting of the existing transmission corridors. The cable would transition into existing underground conduit at the Kramer substation, which would not result in a visual change to the substation site. No significant visual impacts are projected for the Lockhart to Kramer Fiber Optic Line.

Kramer to Victor Substation Fiber Optic Line

The new and existing underground conduit within the Kramer Substation falls within the existing Kramer Substation. The underground cable would not alter the existing industrial facility and visual setting. A total of 525 new poles are proposed to be installed from the Kramer Substation south for approximately 20 miles to carry the new fiber optic cable. As noted under existing setting, the poles would be located within the limits of the existing utility corridors that parallel Highway 395 to the west. These existing lattice towers and line dominate the viewshed along the highway. The addition of new mono-poles along-side the much larger steel lattice towers would not result in a significant change to the visual setting. No significant visual impacts are projected with the installation of new fiber optic line and poles.

None of the Project elements would result in a significant change to the overall visual setting or character of the study area. None of the elements would affect a scenic vista, and none of the elements would substantially alter any scenic resources, including trees, rock outcroppings, historic buildings, or state scenic highways.

None of the Project elements would result in sources of substantial light or glare that would impact day or nighttime views, with implementation of design features noted in Section 2.4.

IMPACT MINIMIZATION MEASURES

No significant visual impacts are anticipated with implementation of the substation interconnection and fiber optic lines. The following measures may be considered for minimizing impacts during further environmental analysis:

1. Overhead transmission line tubular steel poles (TSPs) associated with the interconnection elements could be painted light-gray or the galvanized steel could be dulled. Insulators could be made of materials that do not reflect or refract light. and conductors could be non-specular; that is, they could be treated at the factory to dull their surfaces to reduce their potential to reflect light.

2. All construction-related operations at the construction laydown areas will be kept clean and tidy. SCE or the construction contractor should remove construction debris promptly at regular intervals, not to exceed 2 weeks at any one location.

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4.0 CONCLUSIONS

Chapter 3 of this Analysis describes the potential impacts of the proposed Lockhart Substation, interconnection elements, and 85 miles of proposed fiber optic cable necessary for system telecommunications. This study was undertaken to inform CEC and the general public of the potential direct and indirect effects of this Project, a Project that is considered a forseeable action associated with the AMSP. The Project analysis was based on a general description of required facilities, as noted previously, and included as Attachment 1 to this Analysis. Anticipated environmental impacts were identified and measures to minimize potential effects are recommended. It is projected that environmental impacts associated with this Project will be less than significant with implementation of mitigation measures identified herein and anticipated as part of further environmental analysis that may be required to comply with both CEQA and NEPA for the communication upgrades, once preliminary design information is available.

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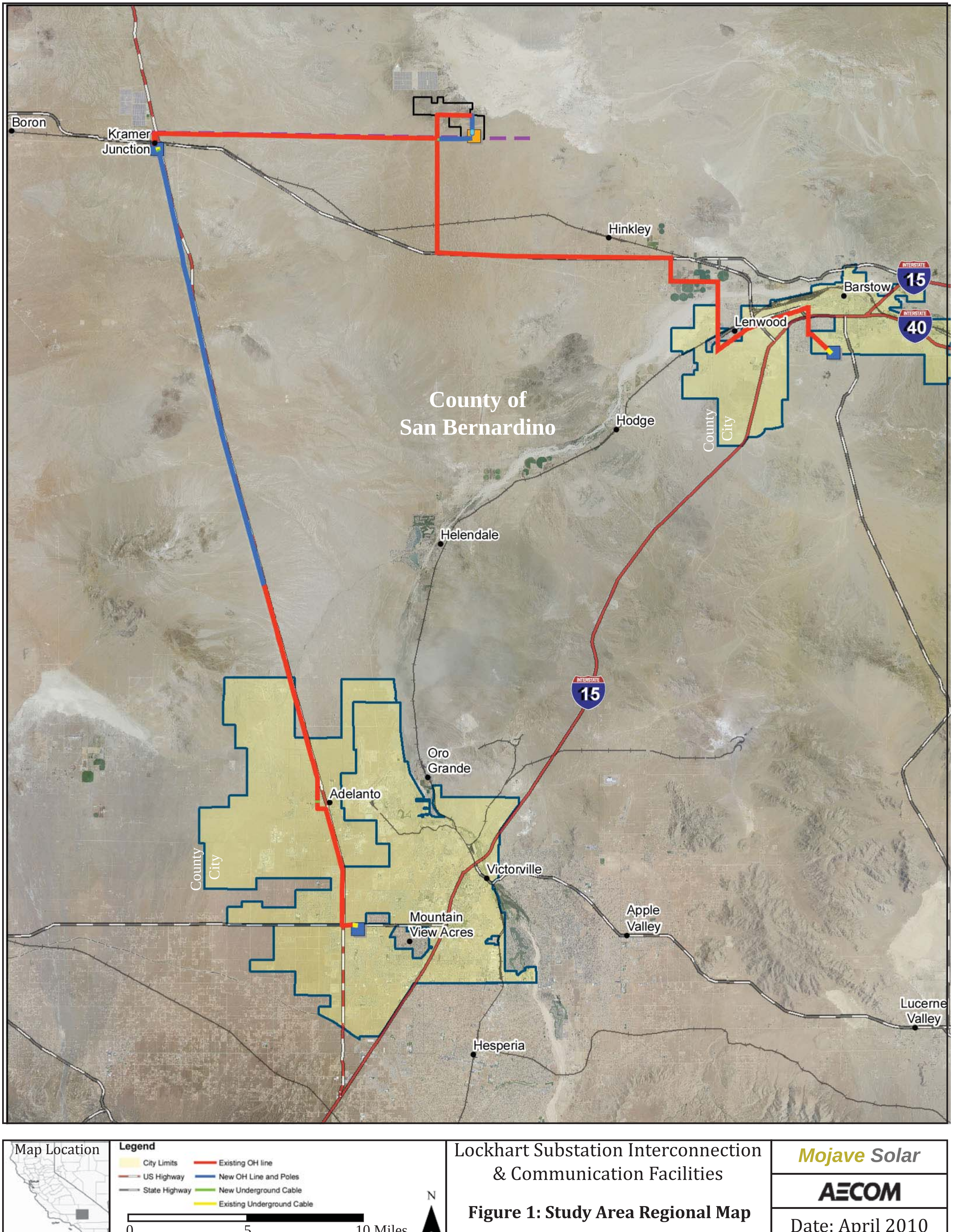
FIGURES



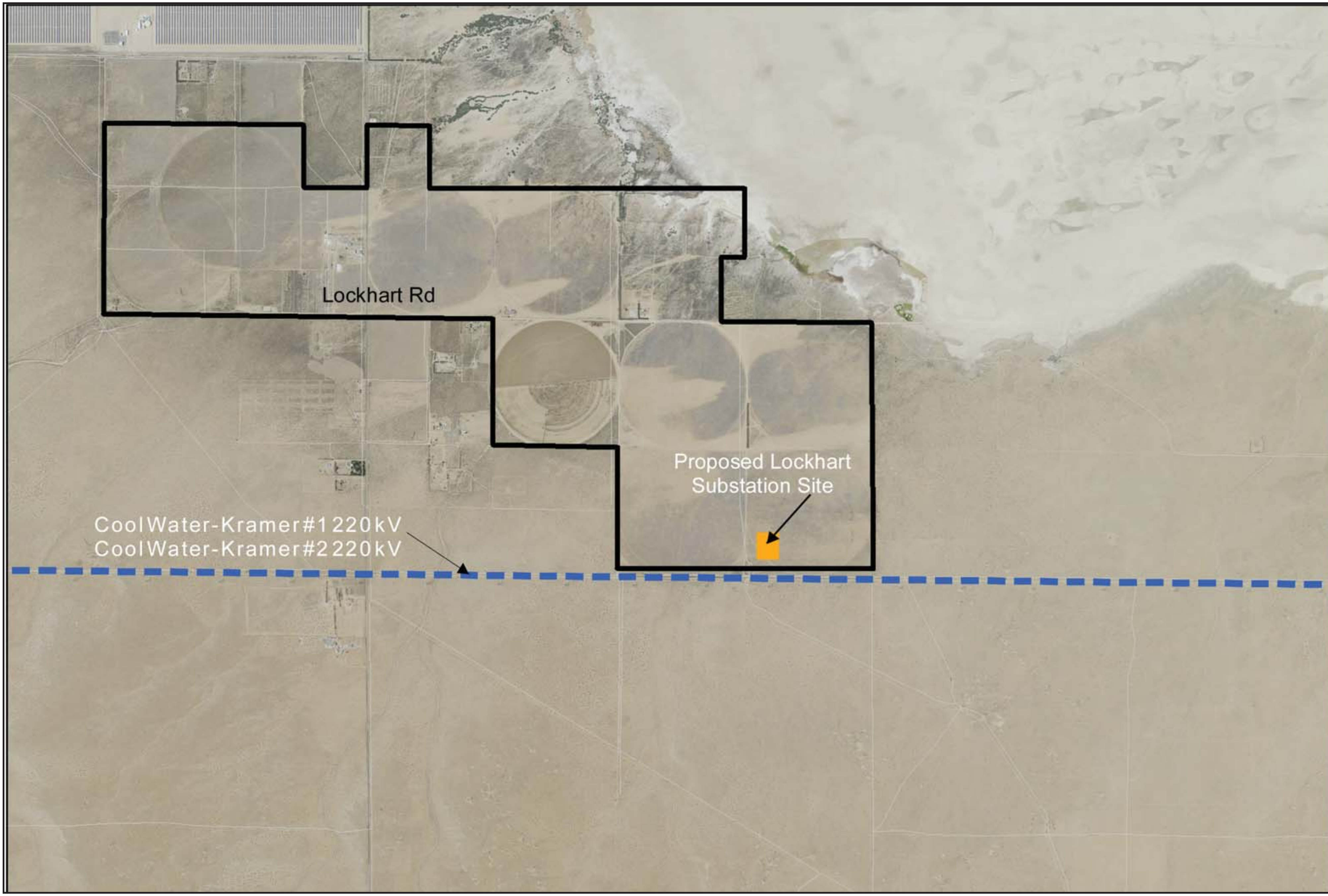
Lockhart Substation Interconnection & Communication Facilities

Figure 1: Study Area Regional Map

Mojave Solar

AECOM

Date: April 2010



Map Location

Legend

- Proposed New SCE Lockhart Substation Site
- Existing 220kV Transmission Lines (SCE, 2009)
- Mohave Solar (Abengoa Solar Inc.) Plant Site

0 1/2 1 Mile

N

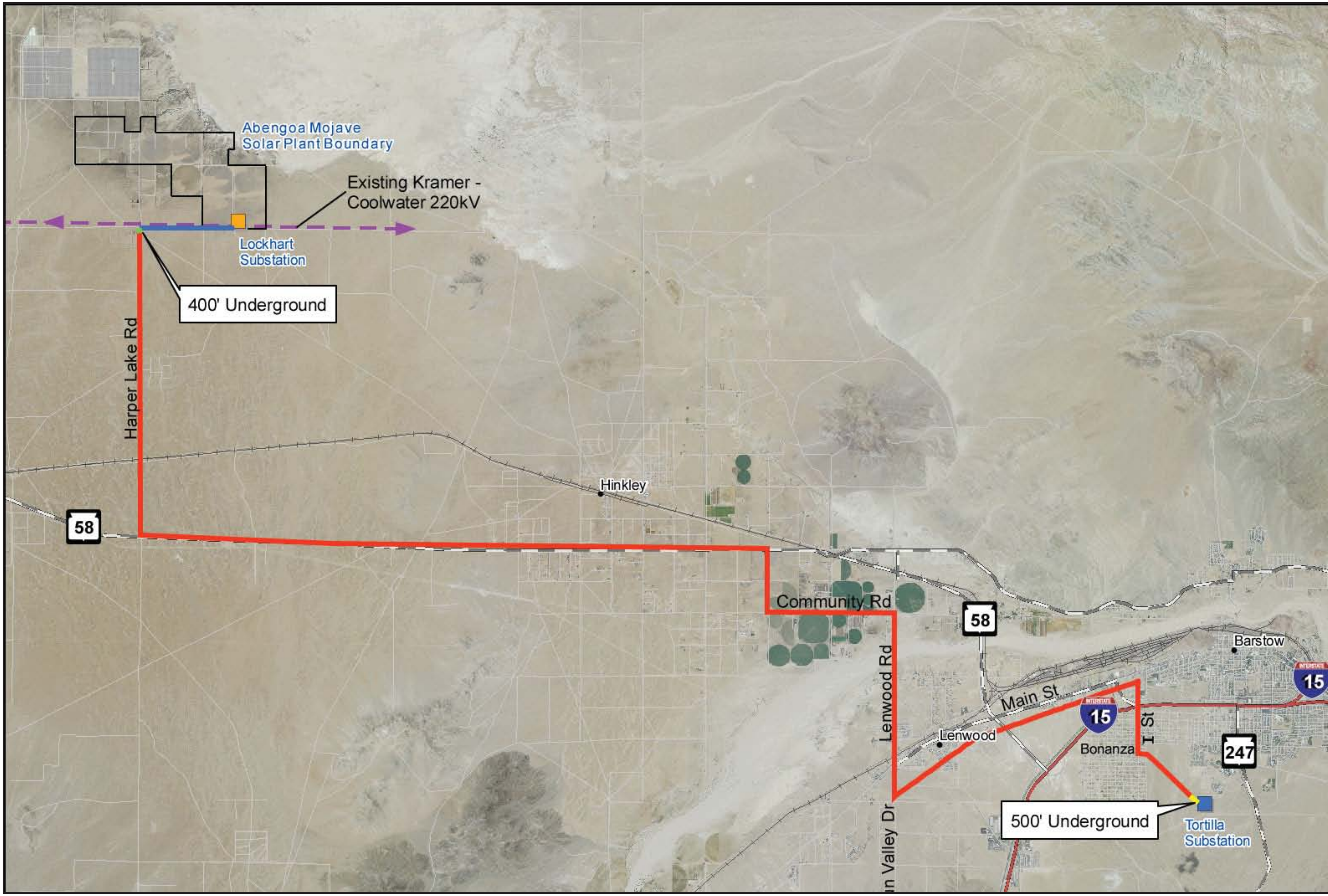
Lockhart Substation Interconnection & Communication Facilities

Figure 2: Lockhart Substation and Interconnection Map

Mojave Solar

AECOM

Date: April 2010



Map Location

Legend

- New OH Line and Poles
- Existing OH Line
- Existing Underground Cable
- New Underground Cable
- Existing Substation
- Proposed Substation

0 2 4 Miles

N

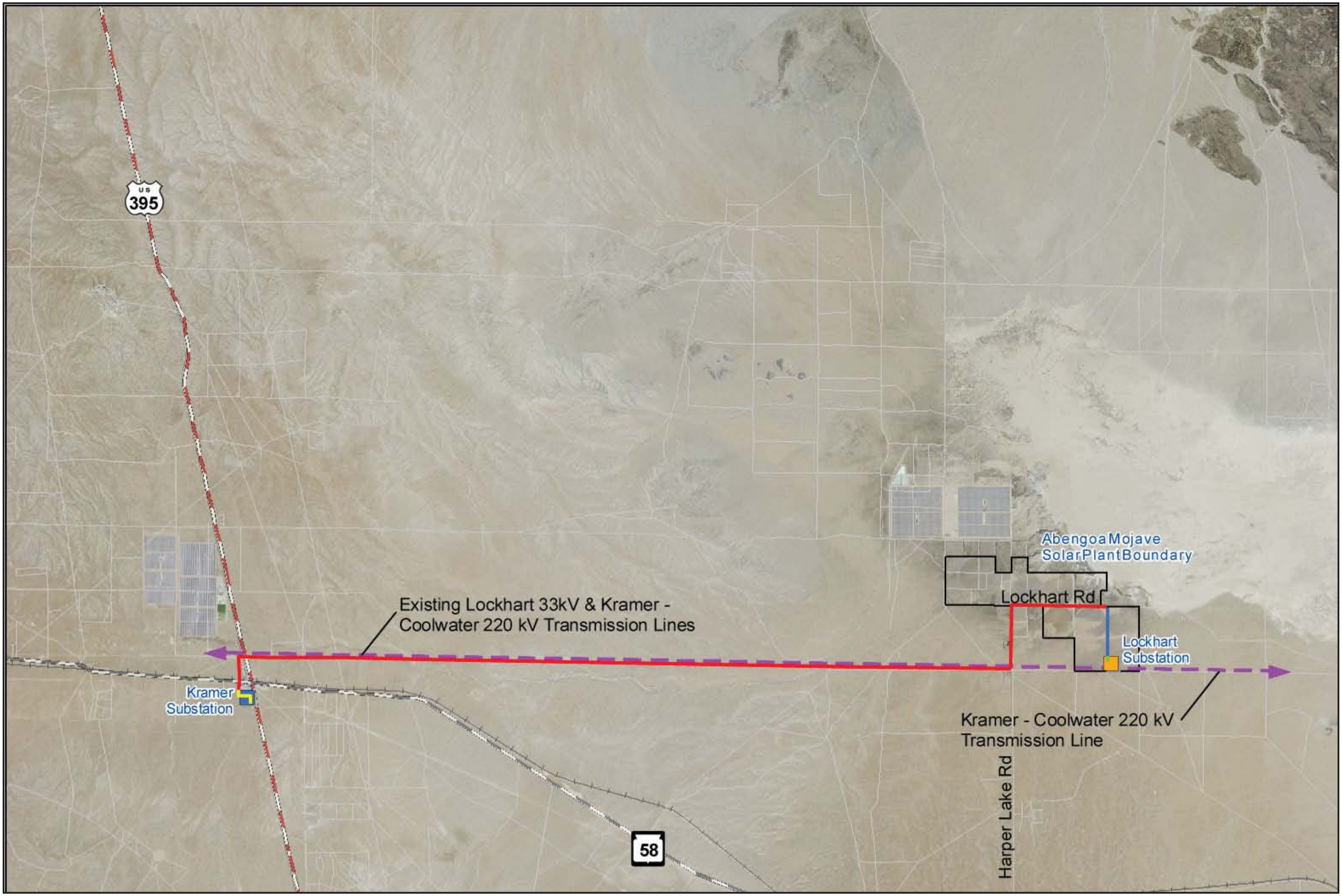
Lockhart Substation Interconnection & Communication Facilities

Figure 3: Lockhart to Tortilla Substation Fiber Optic Line

Mojave Solar

AECOM

Date: April 2010



Map Location

Legend

- New OH Line and Poles
- Existing OH Line
- Existing Underground Cable
- New Underground Cable
- Existing Substation
- Proposed Substation

0 2 4 Miles

N

Lockhart Substation Interconnection & Communication Facilities

Figure 4: Lockhart to Kramer Substation Fiber Optic Line

Mojave Solar

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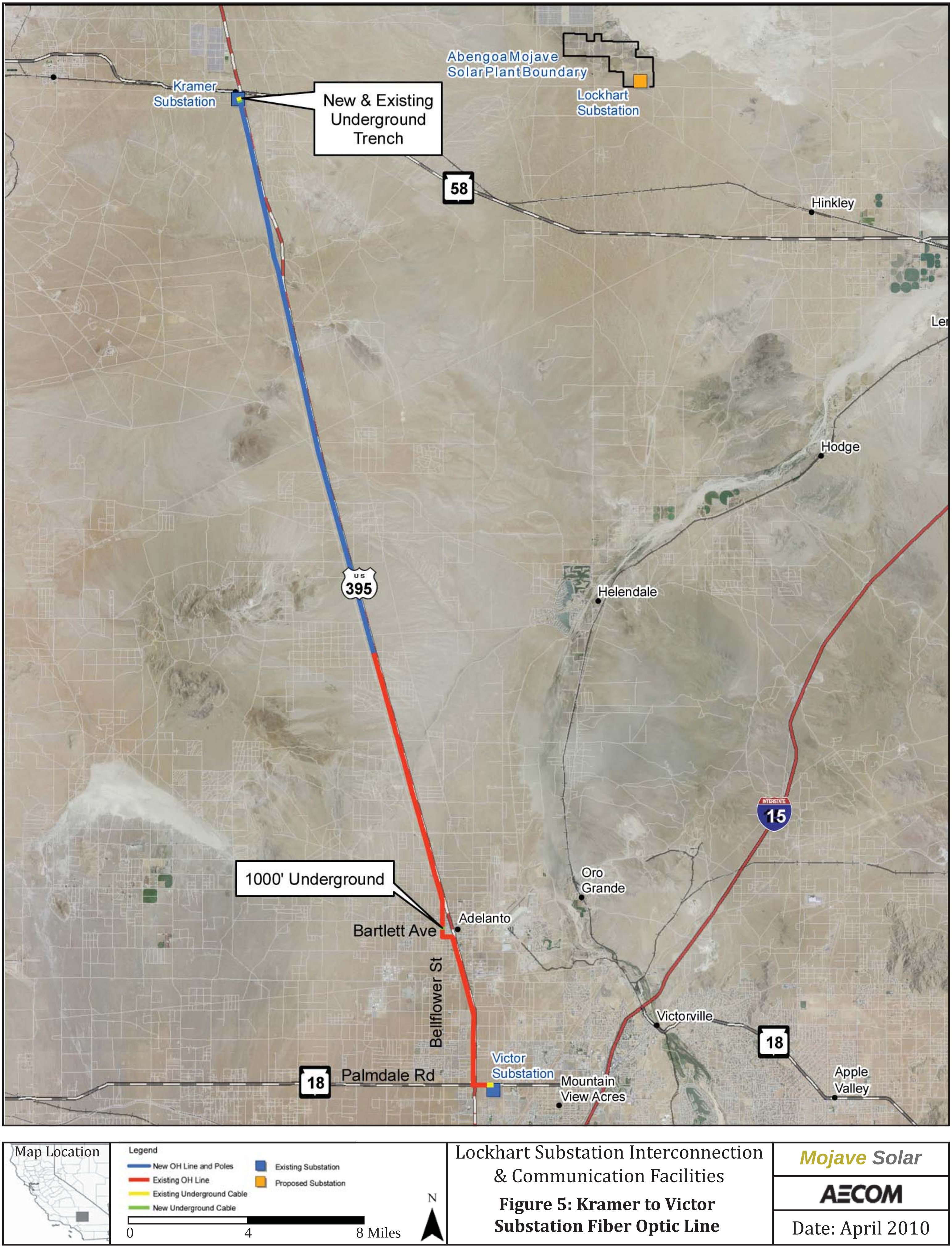
Date: April 2010



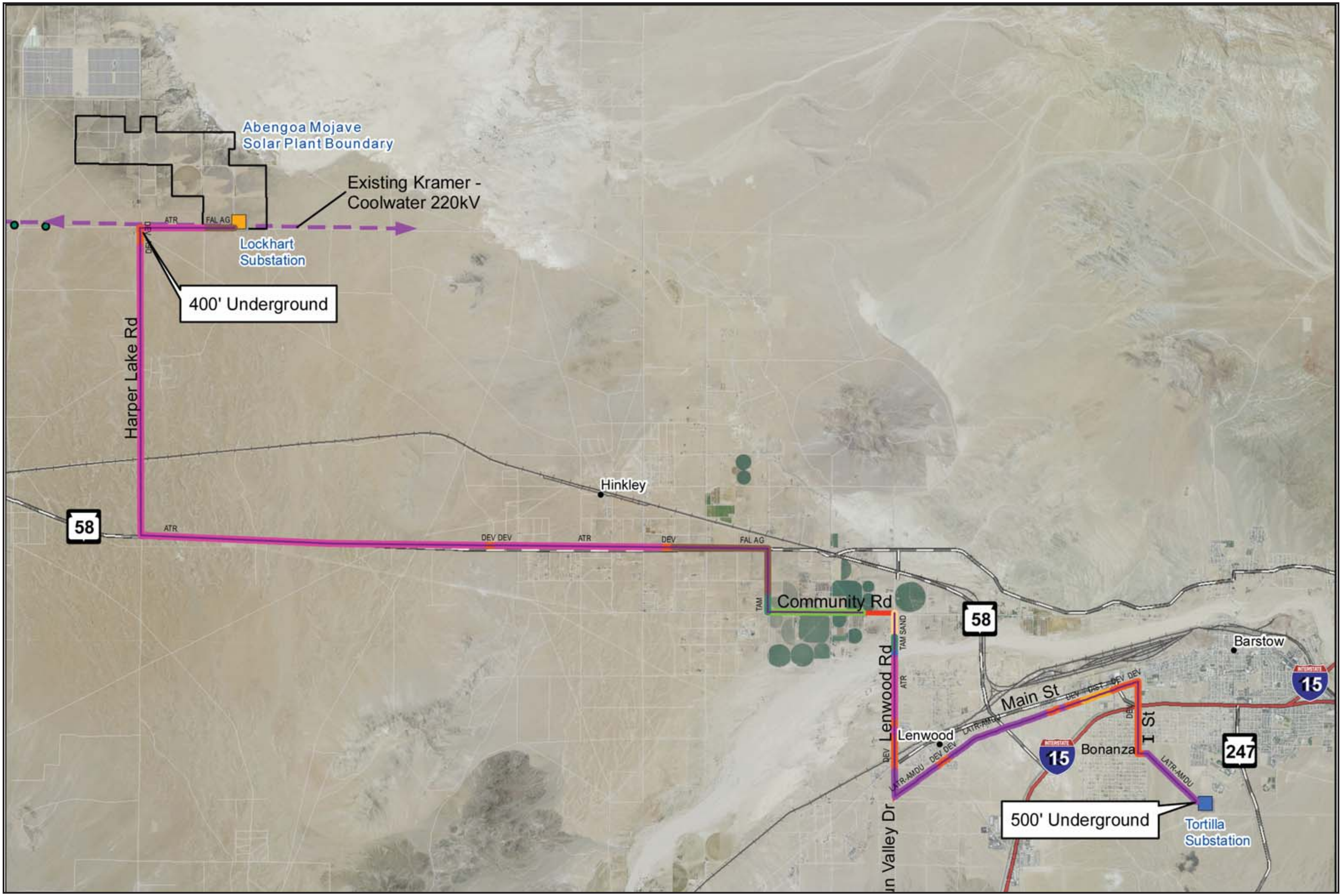
Lockhart Substation Interconnection & Communication Facilities

Figure 5: Kramer to Victor Substation Fiber Optic Line

Mojave Solar

AECOM

Date: April 2010



Map Location

Legend

Vegetation Community/Cover Type

- Developed (DEV)
- Disturbed (DIS)
- Active Agricultural (AG)
- Fallow Agricultural (FAL AG)
- Mojave Creosote Bush Scrub-Ambrosia dumosa dominant (LATR-AMDU)
- Desert Saltbush Scrub (ATR)
- Tamarisk Scrub (TAM)
- Sand
- Mojave River
- Joshua Trees (JOSH)

0 2 4 Miles

N

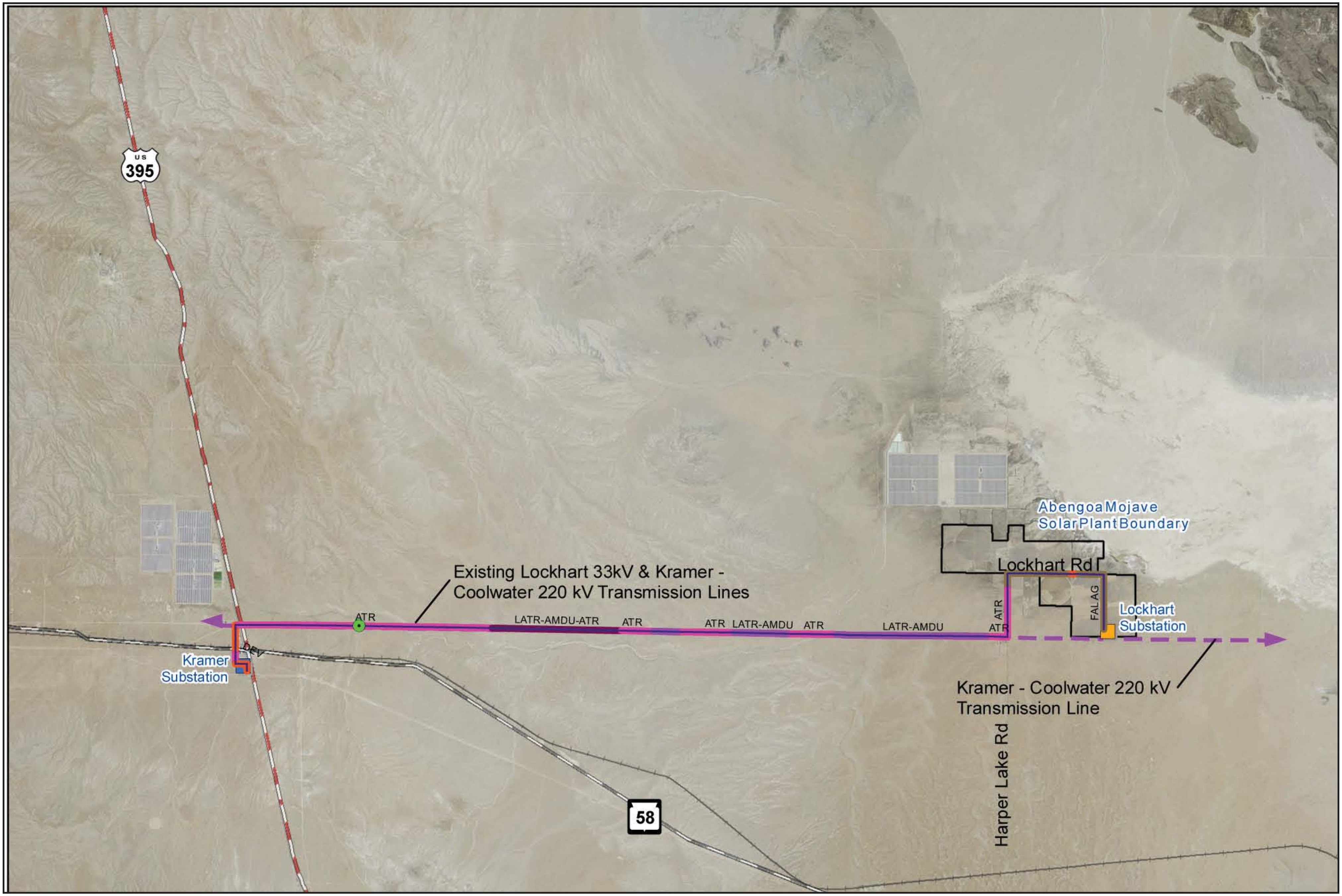
Lockhart Substation Interconnection & Communication Facilities

Figure 6: Lockhart to Tortilla - Existing Vegetation Map

Mojave Solar

AECOM

Date: April 2010



Map Location

Legend

Vegetation Community/Cover Type

- Developed (DEV)
- Fallow Agricultural (FAL AG)
- Mojave Creosote Bush Scrub-Ambrosia dumosa + Atriplex spp. (LATR-AMDU-ATR)
- Mojave Creosote Bush Scrub-Ambrosia dumosa (LATR-AMDU)
- Desert Saltbush Scrub (ATR)
- Joshua Trees (JOSH)

0 2 4 Miles

N

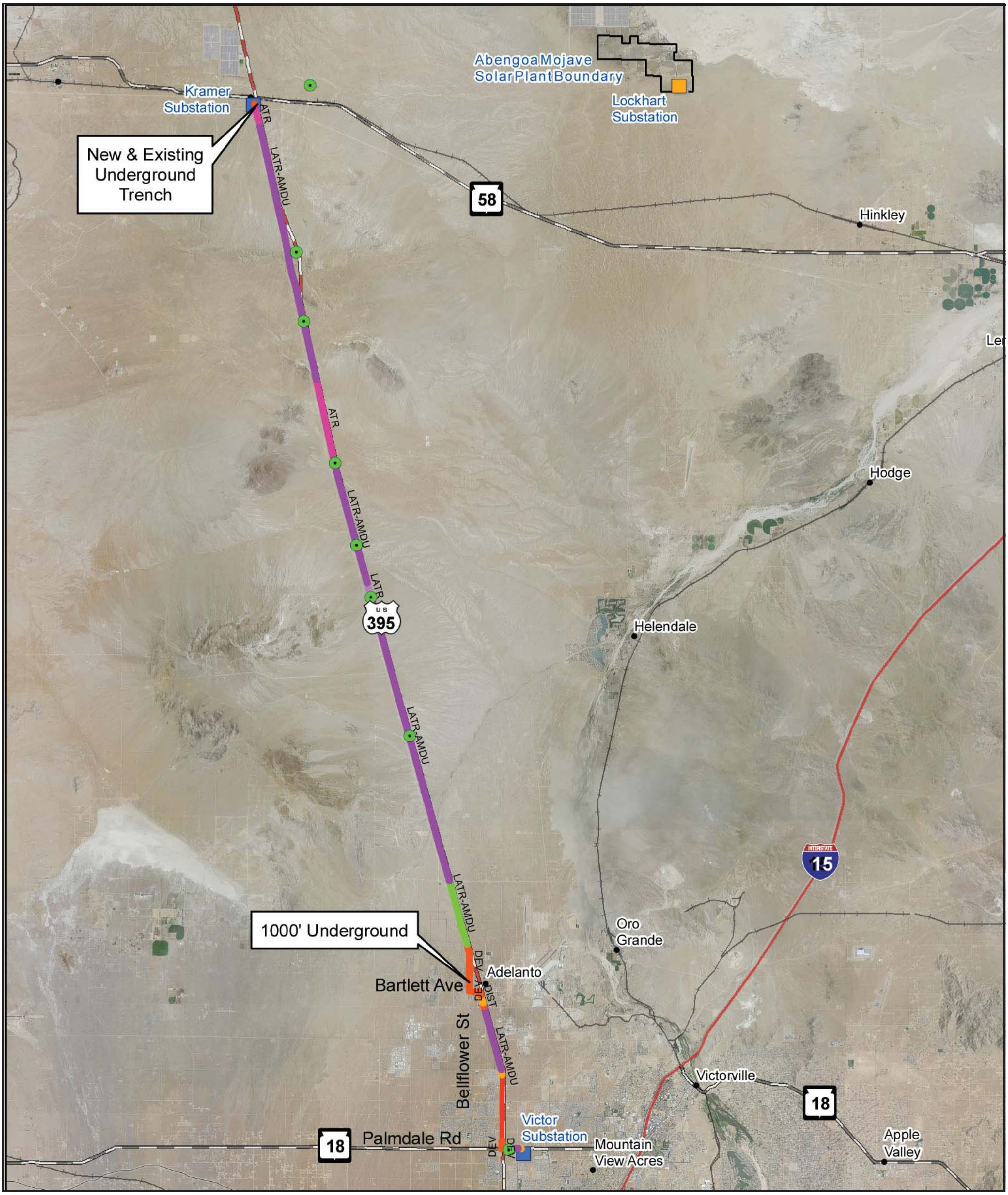
Lockhart Substation Interconnection & Communication Facilities

Figure 7: Lockhart to Kramer - Existing Vegetation Map

Mojave Solar

AECOM

Date: April 2010



Map Location

Legend

Vegetation Community/Cover Type

- Developed (DEV)
- Disturbed (DIS)
- Mojave Creosote Bush Scrub-Ambrosia dumosa dominant (LATR-AMDU)
- Mojave Creosote Bush Scrub (LATR)
- Desert Saltbush Scrub (ATR)
- Joshua Trees (JOSH)
- Joshua Trees (JOSH)

N

0 4 8 Miles

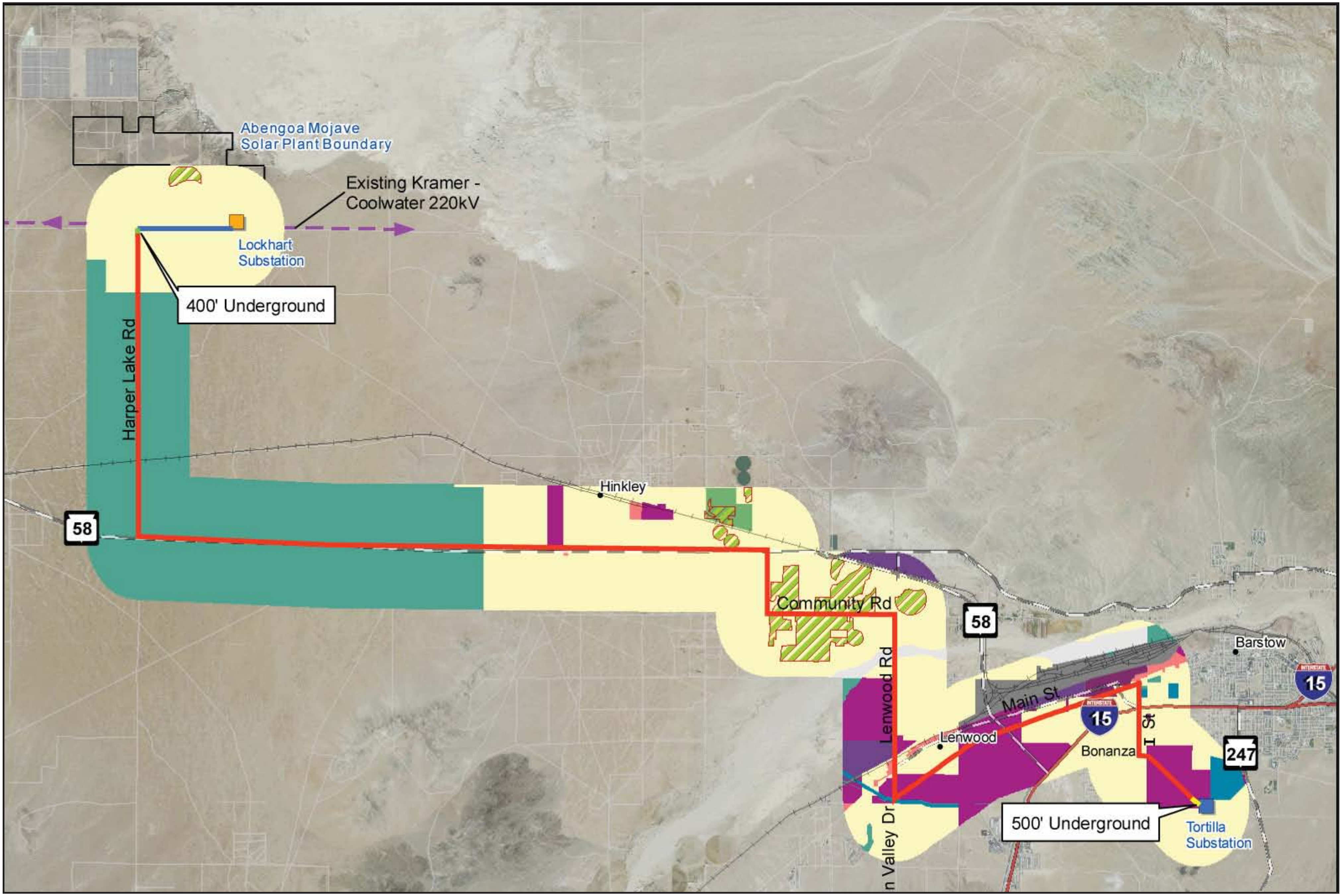
Lockhart Substation Interconnection & Communication Facilities

Figure 8: Kramer to Victor - Existing Vegetation Map

Mojave Solar

AECOM

Date: April 2010



Map Location

Prime Farmland

Planned Land Use

AGRICULTURE	GEN. INDUSTRIAL	RESIDENTIAL
GEN. COMMERCIAL	INSTITUTIONS/GOVERNMENT	TRANSPORTATION
	OPEN-NONDEV	URBAN MIXED
	OTHER RETAIL/SERVICE	UTILITIES

0 2 4 Miles

N

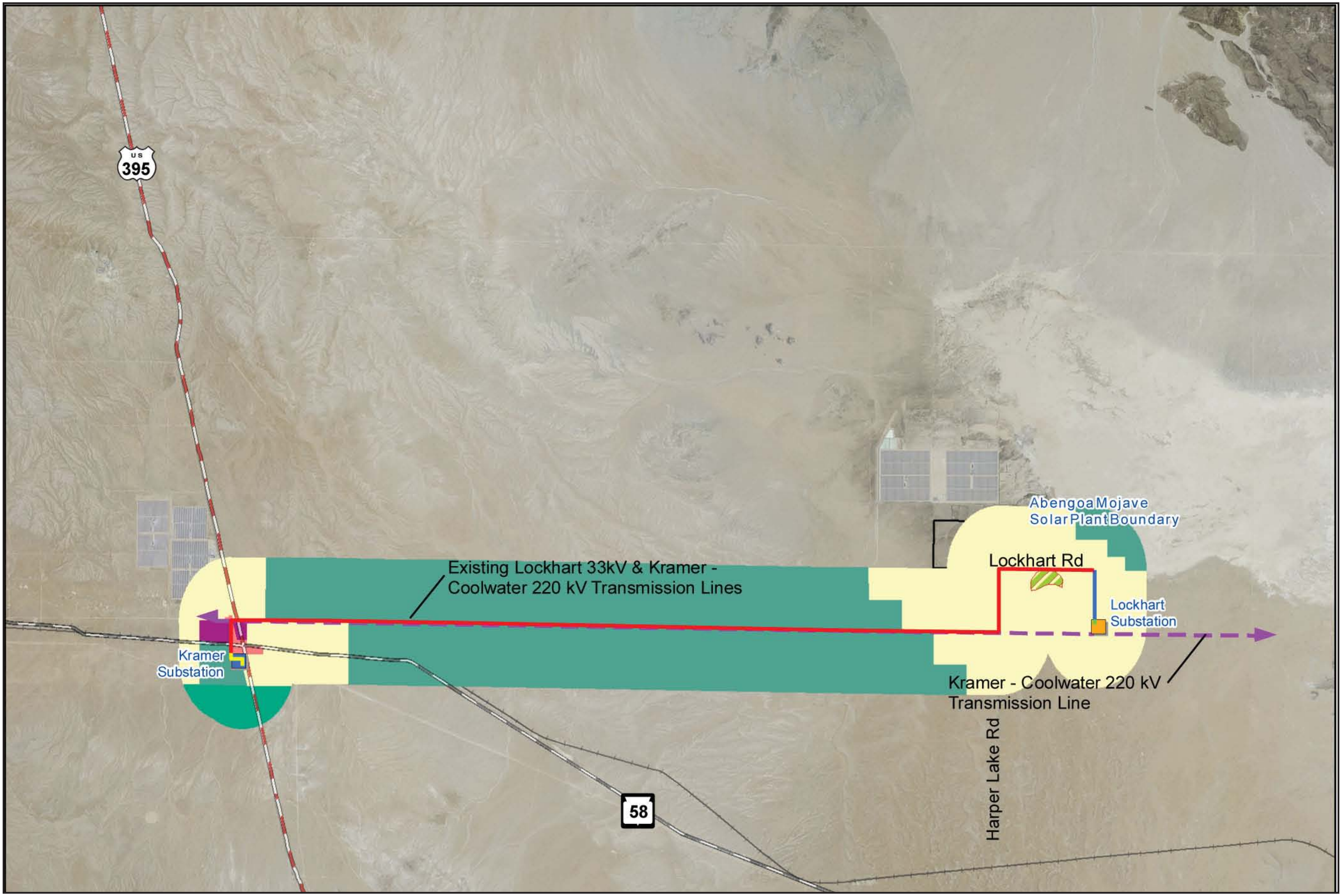
Lockhart Substation Interconnection & Communication Facilities

Figure 9: Lockhart to Tortilla - Planned Land Use & Prime Farmlands

Mojave Solar

AECOM

Date: April 2010



Map Location

Prime Farmland

Planned Land Use

AGRICULTURE
GEN. COMMERCIAL
GEN. INDUSTRIAL
INSTITUTIONS/GOVERNMENT
OPEN-NONDEV
OTHER RETAIL/SERVICE
RESIDENTIAL
TRANSPORTATION
URBAN MIXED
UTILITIES

0 2 4 Miles

N

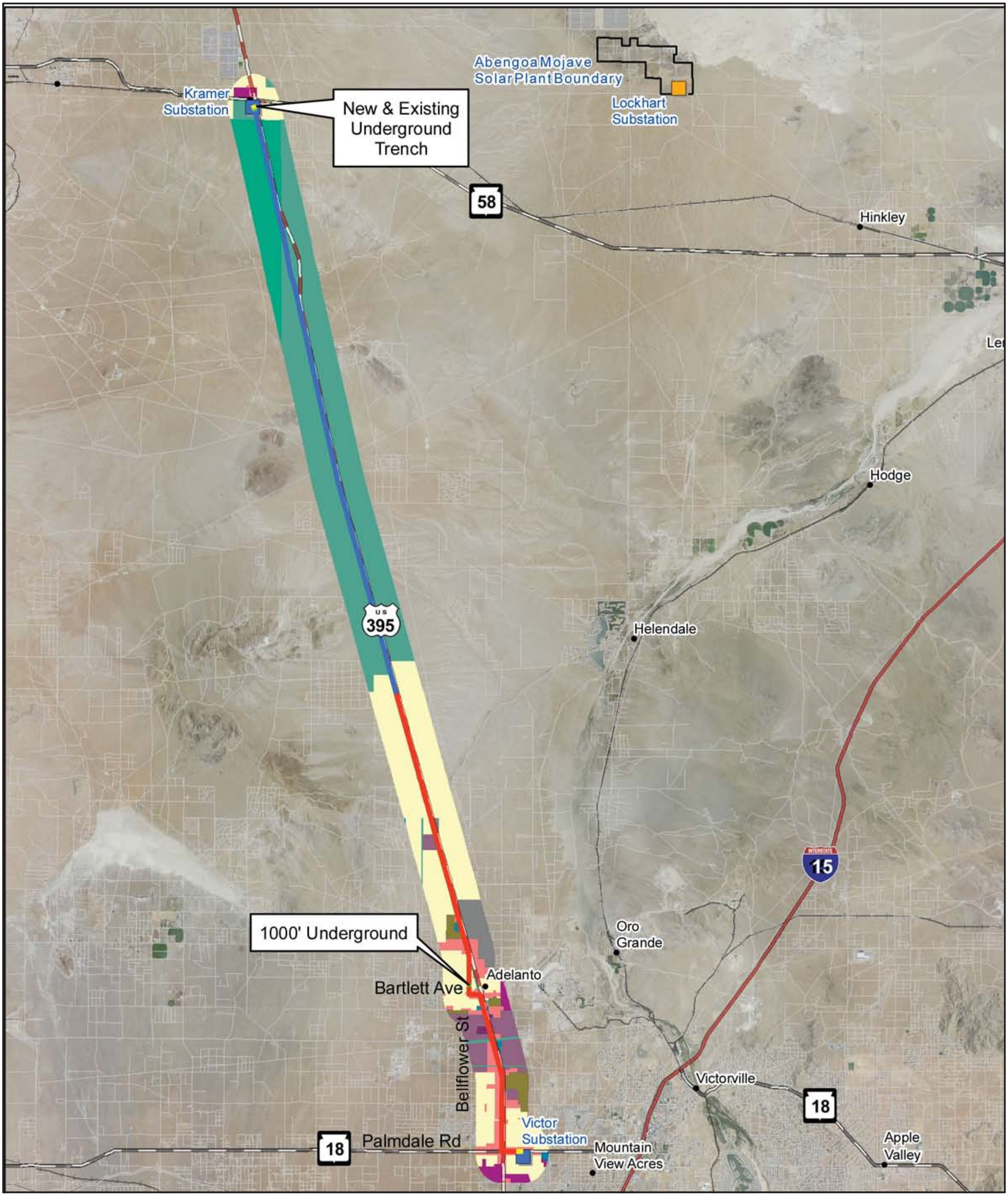
Lockhart Substation Interconnection & Communication Facilities

Figure 10: Lockhart to Kramer - Planned Land Use & Prime Farmlands

Mojave Solar

AECOM

Date: April 2010



Planned Land Use: GEN. COMMERCIAL; HEAVY INDUSTRIAL; INSTITUTIONS/GOVERNMENT; LIGHT INDUSTRIAL; MILITARY; OPEN-NONDEV; OTHER RETAIL/SERVICE; RESIDENTIAL; TRANSPORTATION; URBAN MIXED

0 4 8 Miles

N

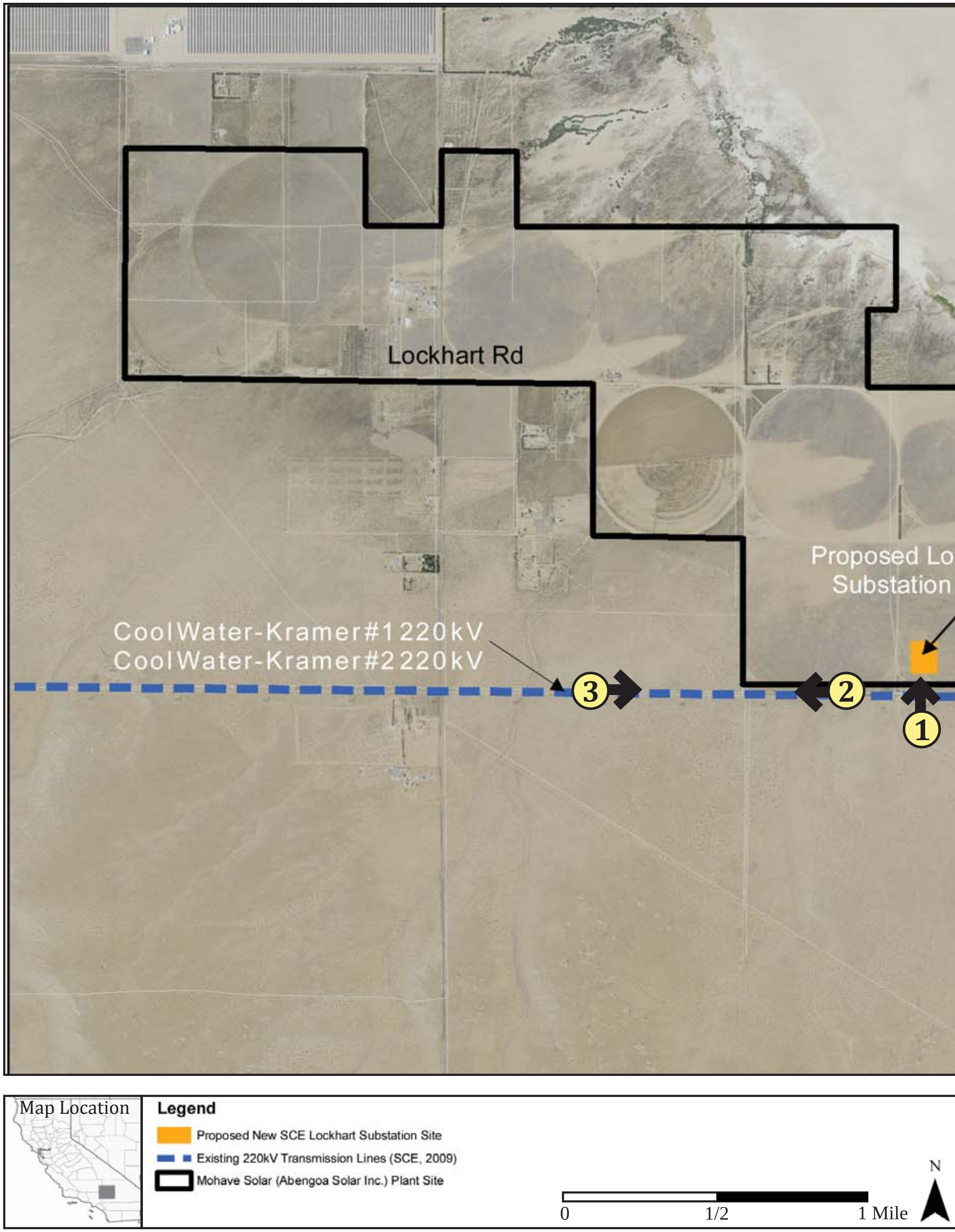
Lockhart Substation Interconnection & Communication Facilities

Figure 11 : Kramer to Victor - Planned Land Use

Mojave Solar

AECOM

Date: April 2010



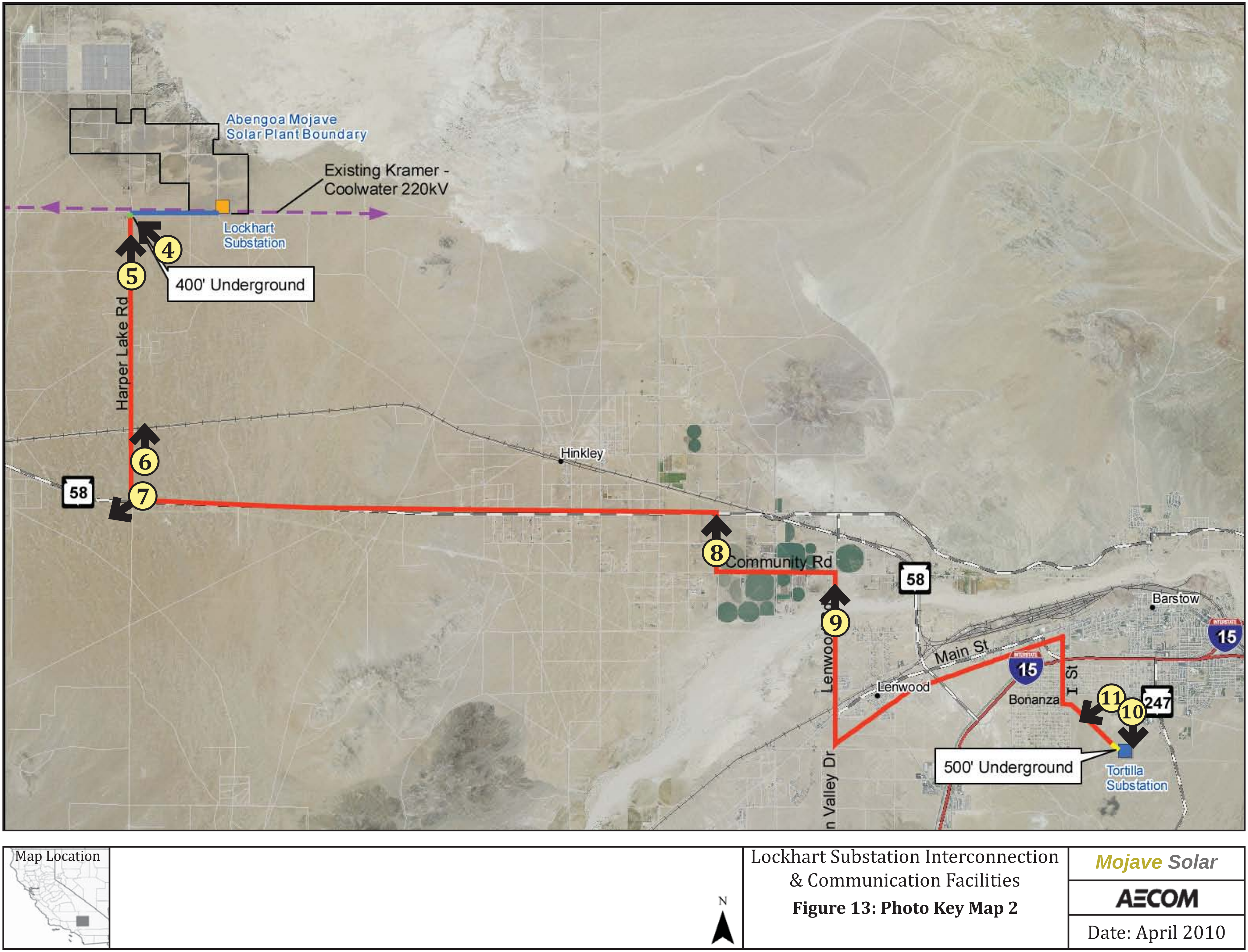
Lockhart Substation Interconnection & Communication Facilities

Figure 12: Photo Key Map 1

Mojave Solar

AECOM

Date: April 2010



Lockhart Substation Interconnection
& Communication Facilities

Figure 13: Photo Key Map 2

Mojave Solar

AECOM

Date: April 2010

Lockhart Substation Interconnection & Communication Facilities

Figure 14 :Photo Key Map 3

Mojave Solar

AECOM

Date: April 2010

Looking north to Lockhart Substation site.

Looking west from Lockhart Substation where new overhead poles are proposed.

Looking east toward Lockhart Substation within corridor where new poles are proposed.

Looking north on Harper Lake Road where underground trenching is proposed.

Lockhart Substation Interconnection & Communication Facilities

Figure 15: Study Area Photos 1-4

Mojave Solar

AECOM

Date: April 2010

Looking north on Harper Lake Road where underground trenching is proposed in road shoulder.

Looking north on Harper Lake Road at existing poles.

Looking southwest at corner of SR 58 and Harper Lake Road at Hinkley Substation.

Existing overhead poles along Summerset Road, looking north.

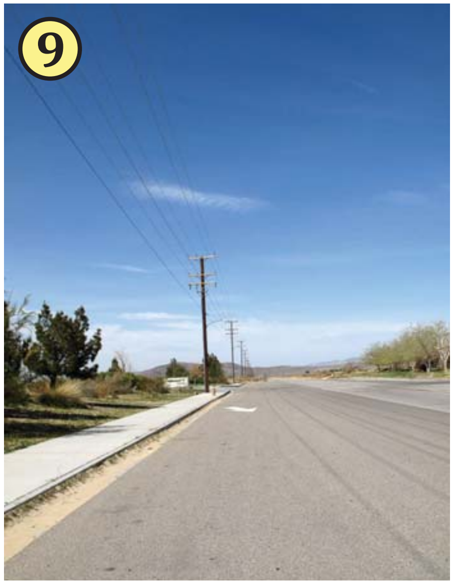
Lockhart Substation Interconnection & Communication Facilities

Figure 16: Study Area Photos 5-8

Mojave Solar

AECOM

Date: April 2010



Looking north on Lenwood Road, existing poles.

Looking south toward Tortilla Substation.

Looking southwest at existing Kramer - Tortilla 115 kV line.

View of Kramer Substation.

		Lockhart Substation Interconnection & Communication Facilities **Figure 17: Study Area Photos 9-12**	Mojave Solar AECOM Date: April 2010

Looking southwest along Highway 395 at existing transmission line corridors.

Looking southwest along Highway 395 of existing transmission line corridors.

View of proposed underground trenching within Bellflower Street.

View of Tortilla Substation.

Lockhart Substation Interconnection & Communication Facilities

Figure 18: Study Area Photos 13-16

Mojave Solar

AECOM

Date: April 2010

ATTACHMENT 1

PRELIMINARY PROJECT DESCRIPTION FOR SCE'S FACILITIES RELATED TO THE ABENGOA SOLAR, INC. MOJAVE SOLAR PROJECT INTERCONNECTION

SOUTHERN CALIFORNIA EDISON
LOCKHART SUBSTATION
PROJECT DESCRIPTION
FOR ABENGOA SOLAR INC.

Dated: March 15, 2010

LOCKHART SUBSTATION PROJECT DESCRIPTION
Table of Contents

LOCKHART PROJECT DESCRIPTION

Abengoa Solar Inc. (Abengoa) applied to the California Independent System Operator (CAISO) for interconnection of a new 250 MW solar generation project currently referred to as the *Abengoa Mojave Solar Project* (AMSP). Abengoa requested and paid for Interconnection Studies in accordance with the CAISO Large Generation Interconnect Procedures (LGIP) Tariff. The CAISO assigned Queue Position 125 to the AMSP. All applicable interconnection studies have been completed for the AMSP, and Abengoa is currently negotiating the execution of the Large Generator Interconnection Agreement (LGIA) under an "Energy Only" service arrangement with the implementation of special protection system (SPS). Such service arrangement could result in the need to implement congestion management protocols which could result in the curtailment of generation resources in the area during times when total generation production in the area exceeds the total area transmission capability.

1.0 Project Overview

Southern California Edison (SCE) proposes to construct the Lockhart Substation and associated facilities to interconnect the 250 MW Abengoa Mojave Solar Project (AMSP) to SCE's existing Cool Water-Kramer No.1 220 kV transmission line (Project). This project description is prepared for Abengoa for use in their California Energy Commission (CEC) Application for Certification (AFC) (docket 09-AFC-05) and Bureau of Land Management (BLM) Environmental Impact Statement (EIS). Major components of the Project are summarized below:

- *Lockhart Substation*: Construct a new 220 kV Substation to loop-in the existing Cool Water-Kramer No. 1 220 kV transmission line and provide two 220 kV line positions to terminate two new 220 kV generation tie lines (gen-ties) owned by AMSP.

- *Transmission Lines*: Loop the existing Cool Water-Kramer No. 1 220 kV transmission line into the new Lockhart Substation. The transmission loop will require construction of approximately 3,000 feet of new transmission line segments (comprised of two line segments of approximately 1,500 feet each) creating the new Lockhart-Kramer and Cool Water-Lockhart 220 kV transmission lines.

- *Generation Tie Line Connections*: Connect the two AMSP-built gen-ties into the SCE-owned Lockhart Substation. This work involves construction of two single spans of conductors between the Lockhart switchrack and the last AMSP-owned tower(s).

- *Distribution Line for Station Light and Power*: Connect the existing Hutt 12 kV distribution circuit out of the Hutt Poletop Substation replacing one and removing one existing pole approximately 40 feet north of the Lockhart Substation. A range of approximately 200-400 feet of underground conduit would be installed from the replaced pole to the substation to provide a path for one of the two required sources of station light and power.

- *Telecommunications Facilities*: Install fiber optic communication cables, associated poles, conduits, and other telecommunication facilities to provide diverse path routing of communications required for the AMSP interconnection, and to provide communications redundancy at the two AMSP power blocks. This work would include installing communication paths between the Victor, Roadway, Tortilla, Kramer, Lockhart, and Cool Water Substations.

This project description is based on planning level assumptions. Further details will be made available upon completion of preliminary and final engineering, identification of field conditions, verification of availability of materials and equipment, and compliance with applicable environmental and permitting requirements.

2.0 Project Location

The Lockhart Substation would be located on private land within the boundaries of the new AMSP solar generation facility and located approximately 5.5 miles north-east of the intersection of California State Highway 58 and Harper Lake Road in the County of San Bernardino (see Figure 1). At this time, the extent of the SCE portion of the overall facility property would be approximately 8 to 10 acres including the Lockhart Substation, safety buffers, access for new loop-in line segments, and two gen-ties. To accommodate the proposed Lockhart Substation location within Abengoa's identified property and allow for future access to the substation, a corridor (transmission right-of-way (ROW)) would also be provided to SCE along the southern boundary of the AMSP paralleling the AMSP water drainage channel.

The electrical distribution system to provide station light and power would tap into the existing Hutt 12 kV distribution circuit that is in immediate proximity to the Lockhart Substation site.

The telecommunication facilities needed to provide adequate line protection would require the installation of new fiber optic cable from (1) SCE's Kramer Substation to Lockhart Substation on an existing distribution pole line (see Figure 3-1), (2) SCE's proposed Lockhart Substation to SCE's Tortilla Substation on existing distribution pole lines and approximately 1,500 feet of new underground and approximately 11,000 feet of new overhead pole line (see Figure 3-2), (3) SCE's Tortilla Substation to SCE's Cool Water Substation on existing distribution pole lines (see Figure 3-2), and (4) SCE's Lockhart to the AMSP Alpha and Beta plant sites (two routes are required to each plant site as shown in Figure 3-4). In addition, a new telecommunication facility would be required within SCE's Tortilla Substation (see Figure 3-6).

Abengoa elected to interconnect to SCE's transmission system with the implementation of a Special Protection System (SPS). Implementation of the SPS would enable the AMSP to operate under an "Energy Only" service arrangement. The telecommunication facilities needed for the SPS would require the installation of new fiber optic cable from SCE's Victor Substation to SCE's Kramer Substation on the existing Kramer-Victor 115 kV line (see Figure 3-5), and installation of an optical repeater site would be required at SCE's Roadway Substation.

3.0 Lockhart Substation

The Lockhart Substation would be a 220 kV switching station measuring approximately 450 feet by 542 feet. Lockhart Substation would be an unattended collector station (no power transformation) surrounded by a wall or chain-link fence with two gates (see Figure 2).

3.1 Substation Design and Equipment

The Lockhart Substation would be constructed with a six-bay 220 kV switchrack. One bay position would be utilized to loop the SCE Cool Water-Kramer No. 1 220 kV transmission line. Two of the bays would be used to terminate the two AMSP gen-ties. The three remaining positions would be available for future use.

Lockhart Substation would be initially equipped with:

- Two (2) overhead 220 kV buses
- Seven (7) 220 kV circuit breakers
- 220 kV disconnect switches
- One (1) Mechanical Electrical Equipment Room (MEER)
- Light and power transformers
- Station lighting
- Back-up generator

3.2 Substation Construction

3.2.1 Grading and Ground Disturbance

Because the Lockhart Substation would be located within the boundaries of the new solar facility, the grading of the substation site would be included within the solar developer's overall grading design. Therefore, SCE would not prepare a grading and drainage plan, nor would SCE apply for grading permits from the County of San Bernardino. Prior to Abengoa's submittal of the site grading application to the County, SCE would review and approve that portion of the grading design pertaining to the substation location. Abengoa would carry out site grading in accordance with the developer's county approved grading plans.

Land disturbance areas and earth moving quantities at the substation location are included within the AMSP facilities application.

Upon completion of the site preparation by the developer, SCE would assume responsibility for the remainder of the Lockhart Substation construction including the installation of a temporary chain-link fence surrounding the construction site.

Access to the substation site for both construction and operation would be gained through the solar facilities internal road network from its main access on Harper Lake Road. This internal road network would be paved as identified in the AMSP facility application.

Table 1 below provides the approximate area of land disturbance at the Lockhart Substation site within the substation fences and the approximate volume and type of earth materials that would be used or disposed by SCE during Substation construction.

Table 1: Substation Materials and Estimated Volumes

Element	Material	Approximate Volume (yd^3)
Substation Equipment Foundations	Concrete	1,300
Equipment and cable trench excavations *	Soil	1,500
Cable Trenches**	Concrete	25
Internal Driveway	Asphalt concrete Class II aggregate base	360 550
Substation Rock Surfacing	Rock, nominal 1 to 1-1/2 inch per SCE Standard	2,400

Notes to Table 1

* Excavation "spoils" would be placed on site during the below-ground construction phase to the extent possible.

** Standard cable trench elements are factory fabricated, delivered to the site and installed by crane. Intersections are cast in place concrete.

3.2.2 Construction Yard/Staging Areas

Abengoa would provide a temporary staging yard necessary to construct the Lockhart Substation and appropriate transmission facilities.

3.2.3 Geotechnical Studies

Prior to the start of construction Abengoa would 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.

3.2.4 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 resistivity measurements collected during a geotechnical investigation that would be conducted prior to construction.

3.2.5 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.

3.2.6 Hazards and Hazardous Materials

Construction and operation of the Lockhart Substation would require the limited use of hazardous materials such as fuels, lubricants, and cleaning solvents. SCE would comply with all applicable laws relating to hazardous materials use, storage, and disposal. A Stormwater Pollution Prevention Plan (SWPPP) would also be prepared for the Lockhart Project.

3.2.7 Waste Management

Construction of the Lockhart Substation would result in the generation of various waste materials including soil, vegetation, and sanitation waste (portable toilets). Soil excavated for the Lockhart Substation would either be used as fill or disposed of off-site at an appropriately licensed waste facility. Sanitation waste (i.e., human generated waste) would be disposed of according to sanitation waste management practices.

3.2.8 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 Lockhart Substation 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. SCE would conduct a final inspection to ensure that cleanup activities were successfully completed.

3.2.9 Construction Equipment Personnel and Temporary Facilities

The estimated elements, materials, number of personnel and equipment required for construction of the Lockhart Substation are summarized below in Table 2- Construction Equipment and Personnel Use Estimations. In addition to the information provided in Table 2, a temporary contractor office trailer and equipment trailer would 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. Contractor construction personnel would be managed by SCE construction management personnel. SCE anticipates a total of approximately 14 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 County permitting, 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.

Table 2: Construction Equipment and Personnel Use Estimations

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)	30	1-Dozer (Diesel) 2-Loader (Diesel) 1-Scraper (Diesel) 1-Grader (Diesel) 1-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)	60	1-Excavator (Diesel) 1-Foundationauger (Diesel) 2-Backhoes (Diesel) 1-Dump truck (Diesel) 1-Cement truck (Diesel) 1-Skip Loader (Diesel) 1-Water Truck (Diesel) 2-Bobcat Skid Steer (Diesel) 1-Forklift (Propane) 1-17TonCrane (Diesel) 1-Tool Truck (Gasoline)	4 5 3 2 2 3 3 3 4 2 hours/day for 45 days 3
MEER (4 people)	20	1-Carry-all Truck (Gasoline) 1-Stake Truck (Gasoline)	3 2
Electrical (8 people)	70	2-Scissor Lifts (Propane) 2-Manlifts (Propane) 1-Reach Manlift (Propane) 1-15 ton Crane (Diesel) 1-Tool Trailer 2-Crew Trucks (Gasoline)	3 3 4 3 3 2
Wiring (2 people)	25	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)	80	1-Crew Truck (Gasoline)	3
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

4.0 Transmission Lines and Related Structures

SCE's transmission line requirements for the Lockhart Substation interconnection to the Cool Water-Kramer No. 1 220 kV transmission line would consist of the following components: (1) 220 kV transmission line loop-in, (2) existing 220 kV transmission line structure modification/replacement, and (3) 220 kV gen-tie extension. Each of these components is described below.

4.1 Transmission Line and Related Structures Design and Equipment

4.1.1 220 kV Transmission Line Loop-In

The proposed Lockhart Substation would be connected to the Cool Water-Kramer No. 1 220 kV transmission line via loop-in transmission segments. The two loop-in line segments would create two new separate transmission lines: the Cool Water-Lockhart 220 kV transmission line and the Kramer-Lockhart 220 kV transmission line. Each transmission line segment into the Lockhart Substation would be approximately 1,500 feet long (see Figure 2).

The proposed loop-in of the existing Cool Water-Kramer No. 1 220 kV transmission line would require approximately four double circuit transmission structures to enter the Lockhart Substation. The exact combination of new tubular steel poles (TSP) and/or lattice steel towers (LST) needed for the loop-in would be determined during detailed engineering (see Figures 4-1 and 4-2).

Two of the 220 kV double circuit structures would be utilized just outside of the substation fence or wall. The other two structures would be used to re-route the Cool Water-Kramer No. 1 220 kV transmission line into Lockhart Substation. The conductor utilized would be 1-1590 kcmil "Lapwing" ACSR conductor.

The section of line connecting the existing Cool Water-Kramer No. 1 220 kV transmission line to the first structure outside of Lockhart Substation would require a new right of way as shown in Figure 2 between SCE's existing ROW and the new Lockhart Substation facilities.

4.1.2 Existing 220 kV Transmission Line Structure Modification/Replacement Design

To support the loop-in, one existing double circuit transmission structure may need to be removed. However, the exact number of towers to be removed would be determined during detailed engineering.

4.1.3 220 kV Generation Tie Line Extension Design

The proposed Lockhart Substation design would involve bringing two 220 kV gen-tie segments into a 220 kV position. SCE understands that there would be one customer-owned double circuit structure outside the SCE-owned Lockhart Substation facilities to support connection of the two customer gen-ties.

SCE's scope of work would be to connect the gen-ties from the customer owned dead end structures to the appropriate 220 kV position inside Lockhart Substation. The span needed for this connection is estimated to be up to 300 feet depending on the location of the transmission line tower relative to Lockhart Substation. The conductor utilized would be 1590 kcmil "Lapwing" ACSR conductor.

4.2 Transmission Line and Related Structures Construction

Construction activities would consist of the receiving and handling of construction materials, rehabilitation of existing and creation of new access roads for construction activities, site preparation, assembly and erection of structures, removal of existing structure(s), stringing of conductors, and site cleanup.

4.2.1 Transmission Line Access and Spur Roads

This portion of the Project would involve construction within existing and new ROW. Existing public roads as well as existing transmission line roads would be used as much as possible during construction of this Project. However, this Project would 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, 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).

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. New road gradients would be leveled so that any sustained grade would not exceed 12 percent. Drainage hardware would be installed where necessary to ensure adequate drainage of the road to reduce erosion and rutting. 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.

4.2.2 Marshalling Yard/Staging Areas

A marshalling yard would be required for the construction of the transmission line loop-in segments and the gen-tie connection to SCE’s proposed Lockhart Substation. A temporary equipment and material staging area would also be established for short-term utilization within the Lockhart Substation or within AMSP property as needed.

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

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 would 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 the extent possible, to preconstruction conditions following the completion of construction.

4.2.3 Temporary Shoo-Fly

SCE may temporarily transfer the existing Cool Water-Kramer No 2 220 kV conductor to temporary structures during the removal and replacement of the existing Cool Water-Kramer No. 1 220 kV structures. Upon completion of the construction of the 220 kV replacement structures and dismantling of the existing 220 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 220 kV structures. The exact number of temporary transmission structures and the related ground disturbance would not be known until additional engineering is performed.

4.2.4 Construction of New 220 kV Transmission Structures

The new 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. The temporary laydown area, approximately 200 feet by 200 feet (0.92), required for the assembly of the structures would also be cleared of vegetation and graded as required to provide a reasonably level and vegetation-free surface for the laydown, assembly, and erection of the structures. 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 final engineering.

The foundation process starts with the excavation of the hole for the structure. The hole would be excavated using truck or track-mounted auger 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 Lockhart 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, aggregate, 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 and off loaded at site. 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.

4.2.5 Removal of Existing 220 kV Transmission Structure

Transmission line facilities planned to be removed would include an existing 220 kV transmission structure, 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 the structure site, but some rehabilitation work on these routes 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. A crane truck or rough terrain crane would be used 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.

SCE may temporarily transfer the existing 220 kV conductor to temporary structures during the removal and replacement of the existing 220 kV structure. Upon completion of the construction of the 220 kV replacement structures and dismantling of the existing 220 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 220 kV structures.

4.2.6 Wire-Stringing of 220 kV Conductor

Wire-stringing would include all activities associated with the installation of conductors, including 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) would be typically attached during the steel erection process.

A standard wire-stringing plan would include 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 would include the length of any given continuous wire installation process between two selected points along the line. Wire pulls would be 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 would be 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, if applicable, 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 depend upon terrain. The preferred minimum area needed for tensioning equipment set-up sites would require approximately 150 feet by 500 feet (1.72 acres). The preferred minimum area needed for pulling equipment set-up sites would require approximately 150 feet by 300 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 for the Project based on the construction methods chosen by SCE or its contractor.

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

4.2.7 Housekeeping and Construction Site Cleanup

During construction, water trucks may be used to minimize the quantity of airborne dust created by construction activities. Any damage to existing roads as a result of construction would be repaired, to the extent possible, once construction is complete.

SCE would restore, to the extent possible, 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 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. SCE would conduct a final inspection to ensure that cleanup activities are successfully completed.

Table 3 below provides information on temporary and permanent land disturbance areas related to construction of the transmission lines.

Table 3: Ground Disturbance Table – Transmission Line Construction

Project Feature	Site Quantity	Disturbed Acreage Calculation (L x W)	Acres Disturbed During Construction	Acres to be restored	Acres Permanently Disturbed
Modify Existing 220 kV Lattice Steel Tower (1)	0	150' x 150'	0	0	0.000
Remove Existing 220 kV Lattice Steel Tower (1)	1	150' x 150'	0.517	0.517	0.000
Temporary Conductor Field Snub/Transfer Area (2)	6	200' x 150'	4.132	4.132	0.000
Construct New 220 kV Lattice Steel Tower (3)	4	200' x 200'	1.837	1.200	0.637
Construct New 220 kV Gen-Tie Structure (5)	0	200' x 200'	0	0	0.000
Conductor & OHGW Stringing Setup Area - Puller (6)	3	300' x 150'	3.099	3.099	0.000
Conductor & OHGW Stringing Setup Area - Tensioner (7)	3	500' x 150'	5.165	5.165	0.000
New Access/Spur Roads (8)	0.6	linear miles x 14' wide	1.018	0.000	1.018
Lockhart Sub - Material & Equipment Staging Area	1	approx. 1.5 acres	1.500	1.500	0.000
Total Estimated (6)			17.268	15.613	1.6552

Notes to Table 3:
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' of the LST to remain permanently cleared of vegetation and access area of 25' around structure; area to be permanently disturbed for each 220 kV LST equals 0.3183 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 and access area of 25' around structure; area to be permanently disturbed for each LST equals 0.2173 acres.
5. Includes foundation installation, structure assembly & erection, and conductor & OHGW attachment; a majority of the area to be restored after construction; a portion of area within 25' of the structure to remain permanently cleared of vegetation; approximately 0.057 acre would be permanently disturbed for the structure.
6. Based on 9,000' conductor reel lengths, number of circuits, and route design.
7. Based on length of road in miles x road width of 14'.
8. 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.

4.2.8 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 be 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.

4.2.9 Labor and Equipment

Construction of the Project would be performed by SCE crews or contract personnel and supervised by SCE's project administration and inspection. The estimated number of persons and types of equipment required for each phase of transmission line construction for the Lockhart Substation Project is shown in Tables 4, 5, and 6 below.

TABLE 4

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT NEW 220 KV LOOP-IN LINES

LOCKHART SUBSTATION PROJECT

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 and Construction Support
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 (4)				**5**	**4**		**0.5 Miles & 4 Pads**
1-Ton Crew Cab, 4x4	300	Diesel	2		4	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	

TABLE 4

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT NEW 220 KV LOOP-IN LINES

LOCKHART SUBSTATION PROJECT

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		4	4	
Track Type Dozer	350	Diesel	1		4	6	
Lowboy Truck/Trailer	500	Diesel	2		2	2	
Install LST Foundations (5)				**9**	**6**		**4 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		6	2	
30-Ton Crane Truck	300	Diesel	1		6	5	
Backhoe/Front Loader	200	Diesel	1		6	8	0.50 LST/Day
Auger Truck	500	Diesel	1		6	8	
10-cu. yd. Dump Truck	350	Diesel	2		6	8	
10-cu. yd. Concrete Mixer Truck	425	Diesel	4		4	5	
LST Steel Haul (6)				**6**	**4**		**4 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		4	2	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		4	6	1 LST/Day
40' Flat Bed Truck/ Trailer	350	Diesel	1		4	8	
LST Steel Assembly (7)				**14**	**11**		**4 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	3		11	4	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		11	4	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		11	6	0.25 LST/Day
30-Ton Crane Truck	300	Diesel	2		11	8	
Compressor Trailer	350	Diesel	2		11	6	
LST Erection (8)				**8**	**16**		**4 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		16	5	0.13 LST/Day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		16	5	

TABLE 4

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT NEW 220 KV LOOP-IN LINES

LOCKHART SUBSTATION PROJECT

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
Compressor Trailer	120	Diesel	1		16	6	
80-Ton Rough Terrain Crane	350	Diesel	1		16	6	
Install Conductor & OHGW (9)				**16**	**6**		**0.6 Circuit Miles**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		6	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		6	8	
Wire Truck/Trailer	350	Diesel	2		6	2	
Dump Truck (Trash)	350	Diesel	1		5	2	
20,000 lb. Rough Terrain Fork Lift	350	Diesel	1		6	2	
22-Ton Manitex	350	Diesel	1		6	8	
30-Ton Manitex	350	Diesel	2		6	6	
Splicing Rig	350	Diesel	1		6	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		6	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		6	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	

TABLE 5

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT NEW 220 KV GEN-TIE CONNECTION ON SCE PROPERTY

LOCKHART SUBSTATION PROJECT

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**		**500 feet**
3/4-Ton Pick-up Truck, 4x4	200	Gas	2		2	8	1 Mile/Day
Temporary Equipment & Material Staging Area (2)				**4**			
1-Ton Crew Cab, 4x4	300	Diesel	1			2	
Water Truck	350	Diesel	1			8	
30-Ton Crane Truck	300	Diesel	1		Duration of Project	2	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1			5	
Truck, Semi, Tractor	350	Diesel	1			1	
Roads & Landing Work (3)				**5**	**2**		**0.1 Miles & 1 Pad**
1-Ton Crew Cab, 4x4	300	Diesel	2		2	2	
Road Grader	350	Diesel	1		1	4	
10-cu. yd. Dump Truck	350	Diesel	2		2		
Backhoe/Front Loader	350	Diesel	1		2	6	0.5 Miles/Day & 2 Structure Pads/Day
Drum Type Compactor	250	Diesel	1		2	4	
Track Type Dozer	350	Diesel	1		2	6	
Lowboy Truck/Trailer	500	Diesel	2		2	2	
Install TSP Foundation (4)				**7**	**2**		**1 TSP**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	3		2	2	
30-Ton Crane Truck	300	Diesel	1		2	5	
Backhoe/Front Loader	200	Diesel	1		1	8	2 TSPs/Day
Auger Truck	500	Diesel	1		2	8	
10-cu. yd. Dump Truck	350	Diesel	2		2	8	
10-cu. yd. Concrete Mixer Truck	425	Diesel	3		1	3	
TSP Haul (5)				**3**	**1**		**1 TSP**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	1		1	5	4 TSPs/Day

TABLE 5

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT NEW 220 KV GEN-TIE CONNECTION ON SCE PROPERTY

LOCKHART SUBSTATION PROJECT

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
Flat Bed Truck/Trailer	350	Diesel	1		1	8	
80-Ton Rough Terrain Crane	350	Diesel	1		1	6	
TSP Assembly (6)				**8**	**1**		**1 TSP**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		1	5	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		1	5	2 TSPs/Day
Compressor Trailer	120	Diesel	1		1	5	
80-Ton Rough Terrain Crane	350	Diesel	1		1	6	
TSP Erection (7)				**8**	**1**		**1 TSP**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		1	5	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		1	5	2 TSPs/Day
Compressor Trailer	120	Diesel	1		1	5	
80-Ton Rough Terrain Crane	350	Diesel	1		1	6	
Install Conductor & OPGW (8)				**16**	**4**		**0.1 Circuit Miles**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	4		4	8	0.2 miles/day
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	4		4	8	
Wire Truck/Trailer	350	Diesel	4		2	2	
Dump Truck (Trash)	350	Diesel	1		4	2	
20,000 lb. Rough Terrain Fork Lift	350	Diesel	1		4	2	
22-Ton Manitex	350	Diesel	1		4	8	
30-Ton Manitex	350	Diesel	4		4	6	
Splicing Rig	350	Diesel	2		4	2	
Splicing Lab	300	Diesel	2		2	2	
Spacing Cart	10	Diesel	2		2	8	
Static Truck/ Tensioner	350	Diesel	1		2	2	
3 Drum Straw line Puller	300	Diesel	2		2	4	

TABLE 5

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TO CONSTRUCT NEW 220 KV GEN-TIE CONNECTION ON SCE PROPERTY

LOCKHART SUBSTATION PROJECT

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
60lk Puller	525	Diesel	1		2	3	
Sag Cat w/ 2 winches	350	Diesel	2		2	2	
580 Case Backhoe	120	Diesel	1		4	2	
D8 Cat	300	Diesel	2		2	3	
Lowboy Truck/Trailer	500	Diesel	1		4	2	
Restoration (9)				**7**	**3**		**0.5 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		1	6	
Lowboy Truck/Trailer	300	Diesel	1		3	3	

TABLE 6

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TRANSMISSION LINE STRUCTURE REMOVAL

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
Temporary Equipment & Material Staging Area(2)				**4**			
1-Ton Crew Cab, 4x4	300	Diesel	1			2	
30-Ton Crane Truck	300	Diesel	1			2	
Water Truck	350	Diesel	1		Duration of Project	8	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1			5	
Truck, Semi, Tractor	350	Diesel	1			1	
Roads & Landing Work (3)				**5**	**2**		**.5 Miles & 3 Pads**
1-Ton Crew Cab, 4x4	300	Diesel	2		2	2	
Road Grader	350	Diesel	1		2	4	
Backhoe/Front Loader	350	Diesel	1		2	6	
Drum Type Compactor	250	Diesel	1		2	4	0.5 Miles/Day & 2 Structure Pads/Day
Track Type Dozer	350	Diesel	1		2	6	
Excavator	300	Diesel	1		2	6	
Lowboy Truck/Trailer	500	Diesel	1		2	2	
LST Removal (4)				**8**	**2**		**1 LSTs**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		2	6	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		2	6	0.75 LST/Day
Compressor Trailer	120	Diesel	1		2	6	
80-Ton Rough Terrain Crane	350	Diesel	1		2	6	
Remove Foundations (5)				**9**	**1**		**3 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		1	2	0.50 LST/Day
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	

TABLE 6

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TRANSMISSION LINE STRUCTURE REMOVAL

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
Compressor Trailer	120	Diesel	1		2	6	
LST Steel Haul (6)				**4**	**1**		**3 LSTs**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		1	2	
10,000 lb Rough Terrain Fork Lift	200	Diesel	1		1	6	1 LST/Day
40' Flat Bed Truck/ Trailer	350	Diesel	1		1	8	
Transfer Conductor (9)				**16**	**3**		**.5 Circuit Miles**
3/4-Ton Pick-up Truck, 4x4	300	Diesel	2		3	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	2		3	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		3	2	
22-Ton Manitex	350	Diesel	1		3	8	
30-Ton Manitex	350	Diesel	2		3	6	
Splicing Rig	350	Diesel	1		3	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		3	2	
D8 Cat	300	Diesel	1		3	3	
Lowboy Truck/Trailer	500	Diesel	1		3	2	
Restoration (11)				**7**	**3**		**.5 Miles**
1-Ton Crew Cab, 4x4	300	Diesel	2		3	2	0.5 Mile/Day
Road Grader	350	Diesel	1		1	6	
Backhoe/Front Loader	350	Diesel	1		1	6	

TABLE 6

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY TRANSMISSION LINE STRUCTURE REMOVAL

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	
Track Type Dozer	350	Diesel	1		3	6	
Lowboy Truck/Trailer	300	Diesel	1		2	3	

5.0 Distribution System for Station Light and Power

The following elements describe the distribution requirements for one of the two required sources of Lockhart Substation station light and power.

5.1 Distribution System Design and Equipment

The Hutt 12 kV distribution circuit out of Hutt Poletop Substation would be the source to provide station light and power to the Lockhart Substation. The Project calls for rearranging the existing Hutt 12 kV overhead distribution circuit where it terminates at the central site for the proposed Lockhart Substation at approximately the location of an existing distribution pole located near Roy Street and a private dirt road. This distribution pole would need to be removed as well as the pole to the north in order to make room for the new Lockhart Substation.

A new distribution riser pole would be installed approximately 40 feet north of the Lockhart Substation northern fence with down guys and an anchor located in between (see Figure 5 and Figure 6). The existing 12 kV tap line would be dead-ended on this new pole and an Omni-rupter switch would be installed. From this last dead-end pole, a distribution 12 kV riser would be installed and approximately 200 feet of two five inch conduits would be installed to a new 12 kV station light and power rack location within Lockhart Substation adjacent to the MEER. Portions of these facilities could also be utilized for installation of the required telecommunication fiber optic cables into Lockhart Substation (described below in Section 6.0, Telecommunication System).

The 12 kV Hutt distribution circuit would extend through one of the new five inch conduits with 1/0 aluminum jacketed concentric neutral (JCN), cross-linked polyethylene (CLP) cable to connect the existing overhead tap line to three new 25 kVA, 120/240 three phase, four wire, back-up station light and power transformers mounted on the 12 kV rack.

TABLE 7
LOCKHART SUBSTATION

CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
12KV HUTT STATION LIGHT & POWER

Work Activity				**Estimated Workforce**	**Estimated Schedule (Days)**		**Activity Production**
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity			Duration of Use (Hrs/Day)	Estimated Production Per Day
Trenching, Structure Excavation(1)				**4**	**1**		
1-Ton Crew Cab	300	Diesel	1		1	2	
Backhoe Front Loader	300	Diesel	1		1	8	
Dump Truck	300	Diesel	1		1	4	
Overhead Line Work(2)				**4**	**3**		
1-Ton Crew Cab, 4x4	300	Diesel	1		3	2	
55’ Double Bucket Truck	350	Diesel	1		2	8	
Auger Truck	350	Diesel	1		1	8	
Underground Cable Pulling and Makeup (3)				**4**	**1**		
55’ Double Bucket Truck	350	Diesel	1		1	8	
1-Ton Crew Cab, 4x4	300	Diesel	1		1	2	
Hydraulic Rewind Puller	300	Diesel	1		1	6	

Crew size assumptions:

1. Trenching and Conduit Installation = one 4-man crew
2. Overhead Line Work = one 4-man crew
3. Underground Cable Pulling and Makeup = one 4-man crew

5.2 Distribution System Construction

A lay down area within the SCE-owned Lockhart Substation property or within AMSP property as needed would be required to store any materials needed during construction. Distribution line crews would work Monday through Friday in one 8 to 10 hour shift each day. One line truck and a companion vehicle with four man crew would be utilized to perform the work each day.

6.0 Telecommunication System

The following elements describe the requirements for Lockhart Substation telecommunication facilities.

6.1 Telecommunication System Design and Equipment

A telecommunication system would be required in order to provide transmission line protection, SPS, monitoring and remote operation capabilities of the electrical equipment at Lockhart Substation.

To provide line protection, the telecommunications system would extend diverse communication paths utilizing fiber-optic cables to connect Lockhart Substation to the SCE telecommunication network via SCE's Kramer Substation, SCE's Tortilla Substation, and also to the AMSP Alpha and Beta power facilities. In addition, a telecommunication path between SCE's Tortilla Substation and SCE's Cool Water Substation is currently undergoing permitting as part of a separate project and would also be used for the required line protection. This path between SCE's Tortilla Substation and SCE's Cool Water Substation is not described within this document but is represented in the figure provided (see Figure 3-1, Figure 3-2, Figure 3-3 and Figure 3-4). In addition, a new telecommunication facility would be required at SCE's Tortilla Substation (see Figure 3-6). This telecommunications facility is needed to support the additional telecommunication equipment to be installed at Tortilla Substation.

To provide for the required SPS, SCE telecommunications would install a fiber optic cable between SCE's existing Kramer Substation and SCE's existing Victor Substation. SCE is currently evaluating the possibility of installing a telecommunication ADSS fiber optic cable on the existing Kramer-Victor 115 kV pole line. However, a determination of feasibility has not been made so the document provides for the installation on a new pole line. If completion of the evaluation identifies that SCE's Kramer-Victor 115 kV pole line is adequate to support the ADSS fiber optic cable, SCE would install the cable on this facility; otherwise, a new telecommunication pole line would be required (see Figure 3-5).

It is anticipated that the total distance of the combined telecommunication routes would be approximately 85 miles.

As described in detail below, certain portions of the fiber optic cable would be constructed on existing overhead distribution and transmission wood and light duty steel poles, while other portions of the cable would be constructed on new overhead structures and newly constructed underground conduit system(s). For a breakdown of new versus existing components refer to the Table 8 below.

Telecommunications Equipment:

- New overhead/underground 48-strand fiber optic cables to connect the Lockhart Substation Site/Property to SCE's Kramer and Tortilla Substations, and AMSP's Alpha and Beta Substations.
- New overhead/underground 96-strand fiber optic cables to connect SCE's Kramer Substation to SCE's Victor Substation.
- New fiber optic multiplex equipment and channel equipment in the Lockhart Substation MEER.
- New telecommunications room within SCE's existing Tortilla Substation.
- New fiber optic multiplex equipment and channel equipment at SCE's Kramer, Tortilla, Cool Water, Roadway, Lugo Substations and any other location necessary to support the communication requirements for the Lockhart Project.
- Replacement of existing poles if required, to be determined by final engineering.

Cable Route, SCE's Kramer Substation to Lockhart Substation:

From SCE's Kramer substation, proceed north from the MEER building approximately 800' feet installing underground cable in an existing underground trench. Continue west approximately 525 feet installing underground cable in existing underground conduit. Continue north approximately 725 feet installing underground cable in existing underground conduit to pole 1793491E rise up.

Continue north approximately 2,000 feet installing ADSS overhead cable on existing overhead structures, continue east on ROW approximately 63,500 feet installing overhead cable on existing overhead structures. Continue north on Harper Lake Rd. approximately 5,700 feet installing overhead cable on existing overhead structures, continue east on Lockhart Rd. approximately 11,000 feet installing overhead cable on existing overhead structures to pole 4488408E where path would continue south approximately 5,700 feet installing overhead cable on new overhead structures to be installed for station light and power for Lockhart Substation. Install riser and continue west for approximately 1,000 feet installing underground cable in new underground conduit structures to Lockhart Substation MEER.

Cable Route, SCE's Lockhart Substation to SCE's Tortilla Substation:

From Lockhart Substation, proceed south from the MEER for approximately 1,000 feet installing underground cable in new underground conduit to a new pole with riser. From this point continue west on new overhead poles along the edge of the existing SCE's Cool Water-Kramer 220 kV ROW for approximately 11,000 feet. This would require approximately 54 new poles. A riser would be installed on the last pole at the intersection with Harper Lake Road. Continue south on Harper Lake Road for approximately 400 feet installing new underground cable and conduit to pole 4349976E where a new riser would be installed. Continue south on Harper Lake Road to HWY 58 for approximately 26,000 feet installing ADSS overhead cable on existing overhead structures.

From HWY 58 continue east for approximately 52,600 feet installing overhead cable on existing overhead structures. Continue south on Summerset Road for approximately 5,300 feet installing overhead cable on existing overhead structures. Continue east on Community Boulevard for approximately 10,600 feet installing overhead cable on existing overhead structures to Lenwood Road. Continue south for approximately 13,500 feet installing overhead cable on existing overhead structures. Continue south on Sun Valley Drive for approximately 2,000 feet installing overhead cable on existing overhead structures. Continue northeast on the existing SCE Poco 33 kV pole line for approximately 25,000 to Avenue I installing overhead cable on existing overhead structures. Continue south approximately 1,850 feet installing overhead cable on existing overhead structures. Continue south over the Interstate 15 for approximately 425 feet to pole 1847916E on I Street continue south approximately 4,500 feet to Siderite Road installing overhead cable on the existing overhead structures.

From Siderite Road continue east for approximately 1,400feet installing overhead cable on existing overhead structures. Continue northwest on SCE's existing Kramer-Tortilla 115 kV ROW for approximately 6,100feet installing overhead cable on existing overhead structures to pole 2263364E drop down existing riser, continue east for approximately 500 feet installing underground cable in existing underground conduit to SCE's Tortilla Substation MEER.

Cable Route, SCE's Lockhart Substation to AMSP's Alpha and Beta Power Facilities:

Routing of second diverse path routed fiber-optic cable from Lockhart Substation to AMSP's Alpha and Beta Power facilities would be dependent on easements and paths provided by Abengoa.

Cable Route, SCE's Victor Substation to Kramer Substation:

From SCE's Victor Substation, proceed west from the MEER for approximately 1,200 feet installing underground cable in existing underground conduit rising up on the existing riser pole. Continue west on Palmdale Road for approximately 2,750 feet installing overhead cable on existing overhead structures. Continue north on Hwy 395 for approximately 27,000 feet installing overhead cable on existing overhead structures to Bartlett Avenue. Continue west on Bartlett Avenue for approximately 1800 feet installing overhead cable on existing overhead structures. Continue north on Bellflower Street for approximately 1,000 feet installing overhead cable on existing overhead structures, installing riser on existing pole drop down. Continuing north approximately 1000 feet installing underground cable in new underground conduit, installing riser on existing pole rise up. Continue north on Bellflower Street approximately 4,300 feet installing overhead cable on existing overhead structures. Continue north on Hwy 395 approximately 46,000 feet installing overhead cable on existing overhead structures on SCE ROW. Continue north approximately 100,600 feet installing overhead cable on new overhead structures within SCE ROW on approximately 525 poles to new riser pole at SCE's Kramer Substation, installing riser drop down. Continue north on SCE ROW installing underground cable in new underground conduit to trench at Kramer substation. Continue approximately 1000 feet installing underground cable in existing underground conduit into MEER building.

Table 8 – Summary of Proposed Telecommunications Fiber Optic Cables Estimates

	Kramer to Lockhart	**Lockhart to Tortilla**	**Victor to Kramer**
Fiber-Optic Cable Length (Proposed)	92,000 ft (18Miles)	164,000 ft (31 miles)	189,000 ft. (36 miles)
Total Length Underground (U.G.)	3,100 ft	1,900 ft.	3,200 ft.
-Existing U.G. Conduits	2,000 ft.	500 ft.	1,200 ft.
-New U.G. Conduits Needed	1,100 ft.	1,400 ft.	2,000 ft.
Total Length Overhead (O.H.)	88,000 ft.	162,000 ft.	185,000 ft.
-Existing O.H.	82,000 ft.	150,000 ft	82,600 ft.
-New O.H.	6,000 ft.	12,000 ft	102,400 ft.
-Existing Poles	250	600	250
-New Poles Required	30	55	525
Time and Resources to Construct (4 men per crew)	38 Crew Days	64 Crew Days	83 Crew Days
Total Man Days Required	152 Man Days	256 Man Days	332 Man Days

Note: These figures may change based upon final engineering.

6.2 Telecommunication System Construction

Construction Activities

SCE would utilize SCE's existing Victor, Roadway, Kramer, Tortilla, and Cool Water Substations as well as SCE's Barstow Service Center and the proposed Lockhart Substation as marshalling yards to support the installation of the telecommunications facilities required for this Project. SCE or contractor crews would use standard construction methods to construct the required fiber optic cables. The crews would comply with all rules, regulations and standards with interdepartments and other agencies while in their performance of the construction phase.

Portions of the fiber optic cable would be constructed on existing overhead distribution and transmission wood and light duty steel poles. In addition, portions of the cable would be constructed on new overhead structures and newly constructed underground conduit system(s), subject to determination through final engineering. This project description is based on planning level assumptions. Exact details would be determined following completion of preliminary and final engineering, identification of field conditions, availability of labor, material, and equipment, and compliance with applicable environmental and permitting requirements.

Generally no hazardous material would be used in installing underground conduit, new wood communication poles, and the stringing of fiber-optic cables. There is generally no need for local services or utilities (such as water). Waste generated (empty cable reels, cut-off pieces of fiber cable) would be disposed of at existing SCE facilities.

Table 9 - Telecommunications Labor Force and Construction Equipment Estimates

Construction Element	Number of Personnel	Equipment Requirements
Cable Construction	4	2 – Bucket Trucks (Diesel) 1 – Pick-up (Diesel) 2 – Cable Dollies 1 – Single Drum Puller (Diesel) 1 – 2 Axle Trailer
Receive and Load Out Materials	4	1 – 5-Ton Forklift (Diesel) 1 – Pick-up (Diesel)
Cleanup	4	2 – Bucket Trucks (Diesel) 1 – Pick-up (Diesel)

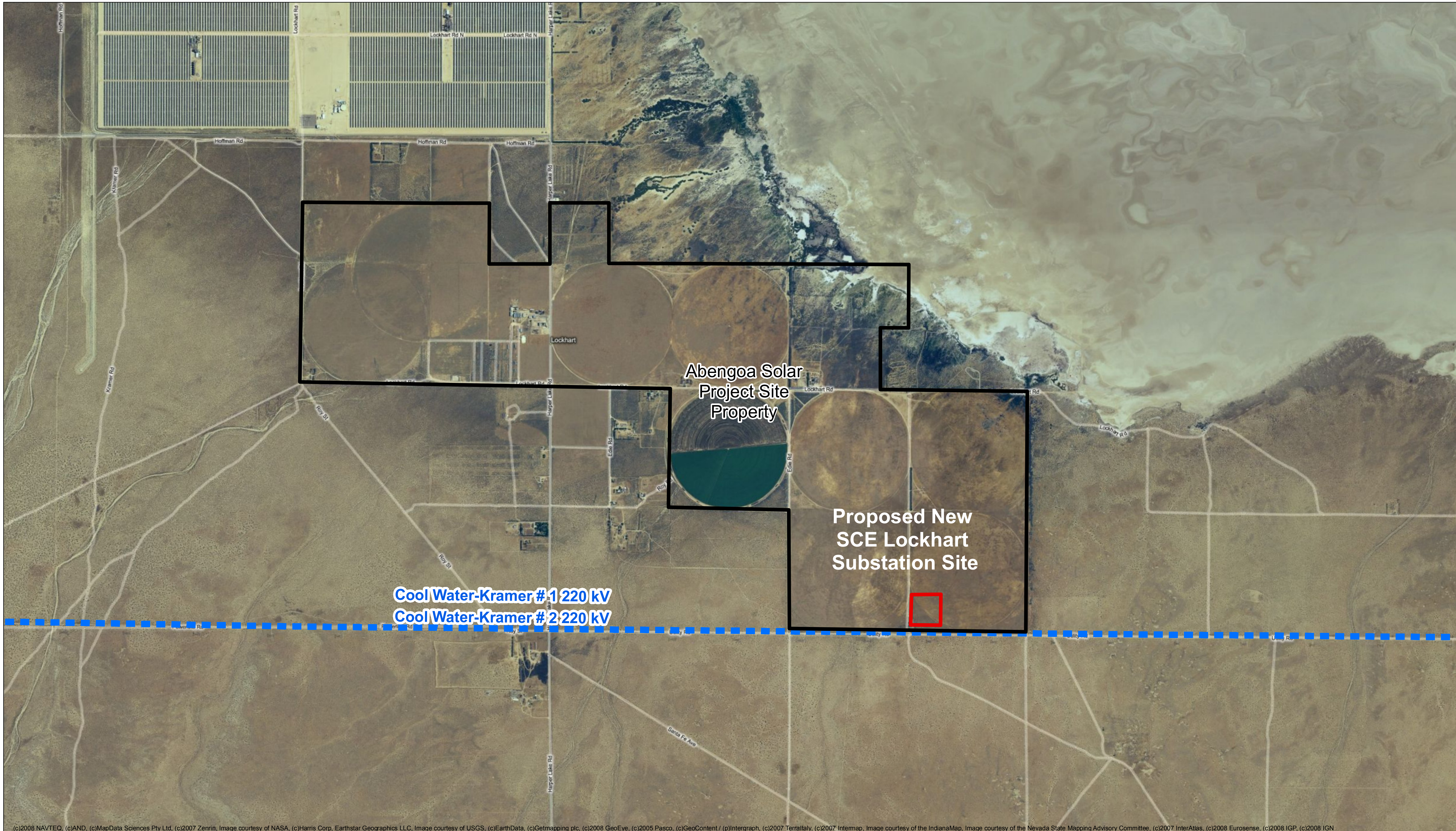


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FIGURE 1
PROPOSED NEW SCE LOCKHART SUBSTATION SITE

0 0.25 0.5 1 Miles

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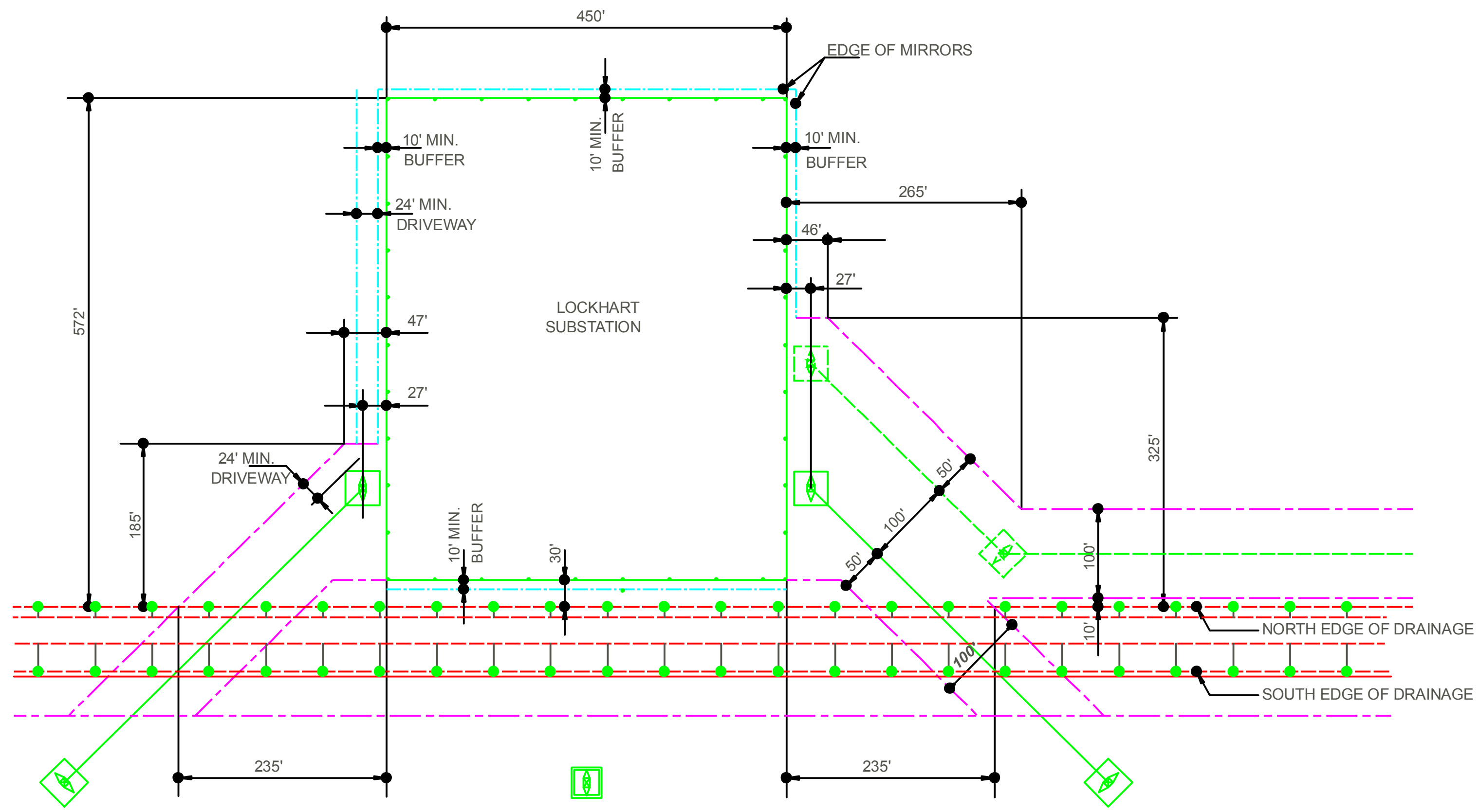
LEGEND -
- Proposed New SCE Lockhart Substation Site
- Mohave Solar (Abengoa Solar Inc.) Plant Site
- Existing 220kV Transmission Lines (SCE, 2009)

N W E S

P:\GISData\Projects\MasterData\Major Transmission Projects\LockhartProject\2010\NOT20081962 5_Interconnection_Maps\Figure 1 - Preferred Substation Site-Property and Alternate Substation Site-Property.mxd 3/12/2010

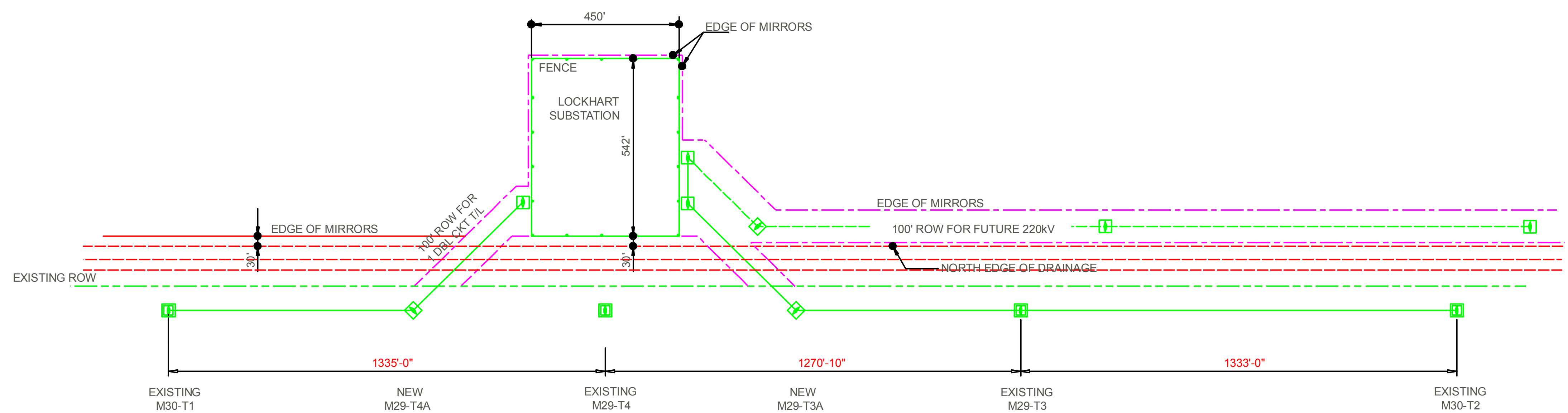


SUBSTATION DETAILS

LEGEND

- SCE SUBSTATION FENCE
- TEN-FOOT OPEN SPACE BUFFER OUTSIDE THE SUBSTATION FENCE
- SCE TRANSMISSION RIGHT-OF-WAY
- DRAINAGE CHANNEL TOP OF SLOPE
- DRAINAGE CHANNEL BOTTOM OF SLOPE
- SOLAR FARM FENCE
- FUTURE GEN-TIE LINE
- EXISTING SCE 220KV TRANSMISSION TOWERS
- PROPOSED SCE 220KV TRANSMISSION TOWERS
- FUTURE GENERATION TIE LINE TOWERS

Note: CONCEPTUAL ENGINEERING, DO NOT SPOT



SITE PLAN

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FIGURE 2
PROPOSED NEW SCE LOCKHART SUBSTATION AND ASSOCIATED ELECTRICAL LINES

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N W E S

P:\GISData\Projects\MasterData\Major Transmission Projects\Millennium_Project\2010NOT20081959 1_Interconnection_Maps\Figure 2 - Substation Site.mxd 3/10/2010

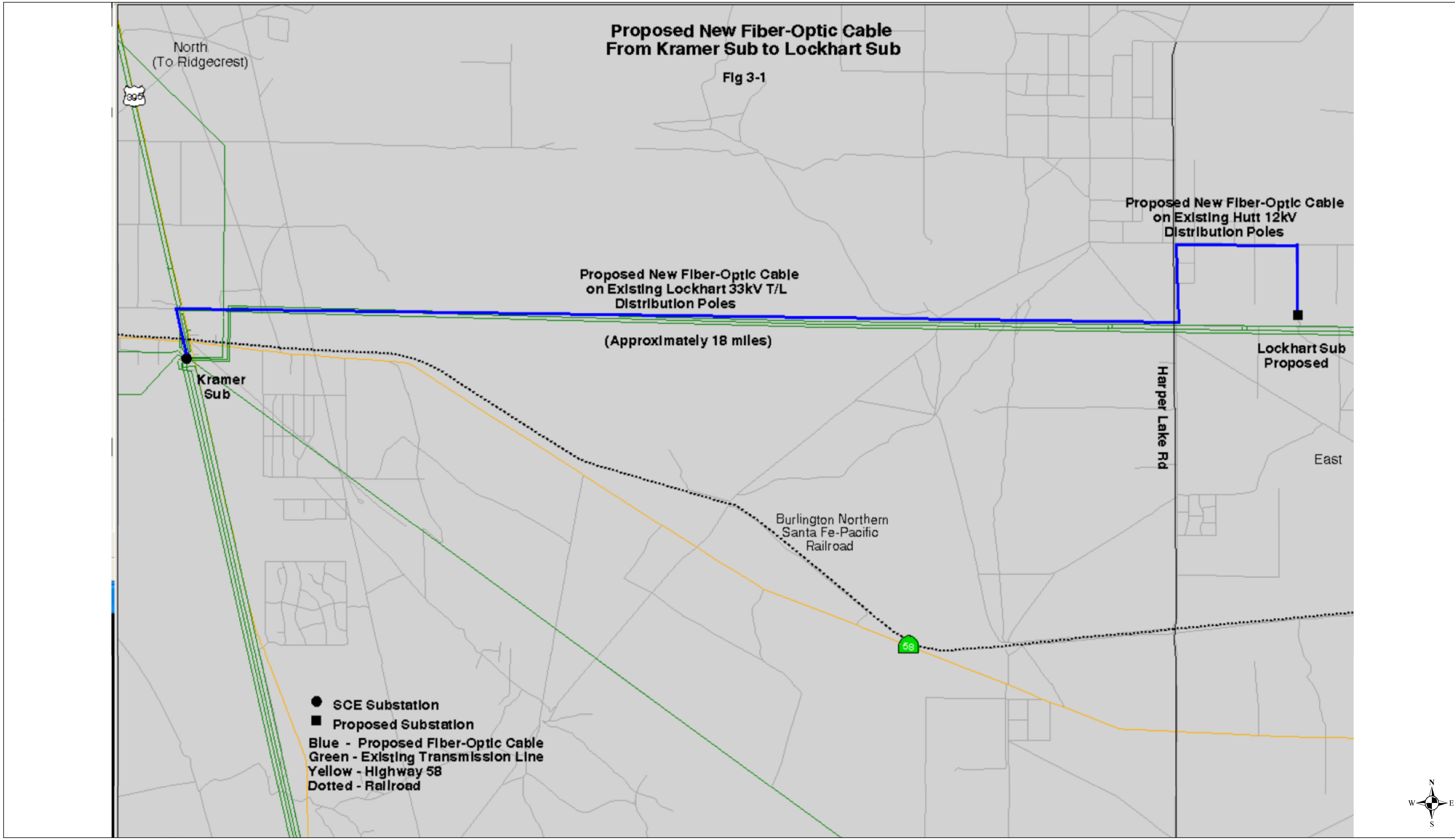

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FIGURE 3-1
PROPOSED NEW TELECOMMUNICATION LINES CONNECTING KRAMER SUBSTATION TO NEW LOCKHART SUBSTATION

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LEGEND

- PROPOSED KRAMER SUB TO NEW LOCKHART SUB FIBER OPTIC CABLE (blue line)
- EXISTING TRANSMISSION LINES (green line)
- ■ LOCKHART PROPOSED SITE
- ● EXISTING SUBSTATION

P:\GISData\Projects\MasterData\Major Transmission Projects\Millennium_Project\2010NOT200819591_Interconnection_Maps\Figure 3-1 Proposed Telecomm Kramer_Lockhart.mxd 3/11/2010

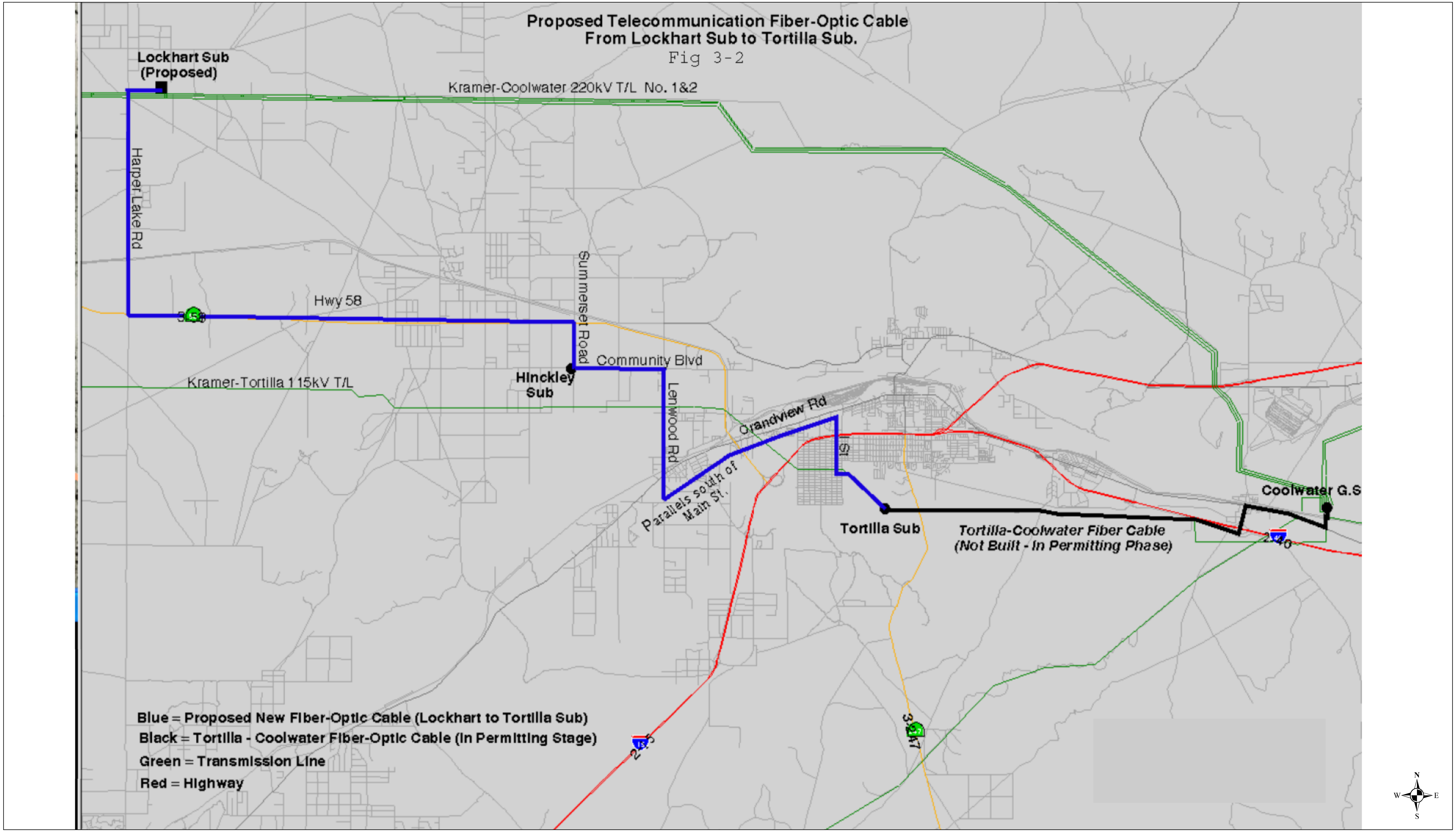

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FIGURE 3-2
PROPOSED NEW TELECOMMUNICATION LINES CONNECTING NEW LOCKHART SUBSTATION TO TORTILLA SUBSTATION

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LEGEND
- PROPOSED NEW LOCKHART SUB TO TORTILLA SUB FIBER OPTIC CABLE
- TORTILLA SUB TO COOLWATER SUB FIBER OPTIC CABLE (IN PERMITTING STAGE)
- EXISTING TRANSMISSION LINES
- LOCKHART PROPOSED SITE
- EXISTING SUBSTATION

P:\GISData\Projects\MasterData\Major Transmission Projects\Millennium_Project\2010NOT200819591_Interconnection_Maps\Figure 3-2 Proposed Telecomm Lockhart_Tortilla.mxd 3/11/2010

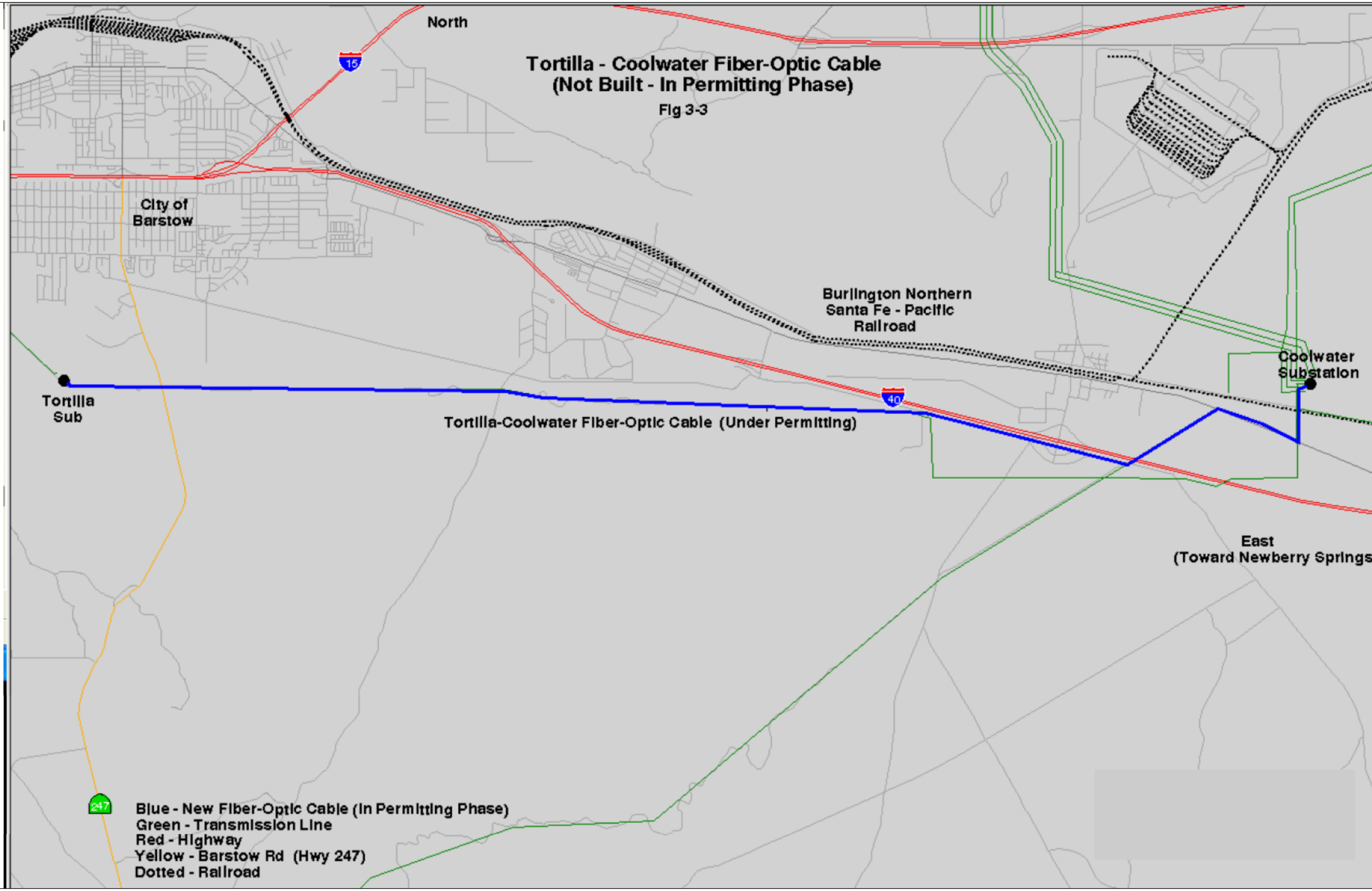

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FIGURE 3-3
TELECOMMUNICATION LINES CONNECTING TORTILLA SUBSTATION TO COOLWATER SUBSTATION (NOT BUILT- IN PERMITTING PHASE)

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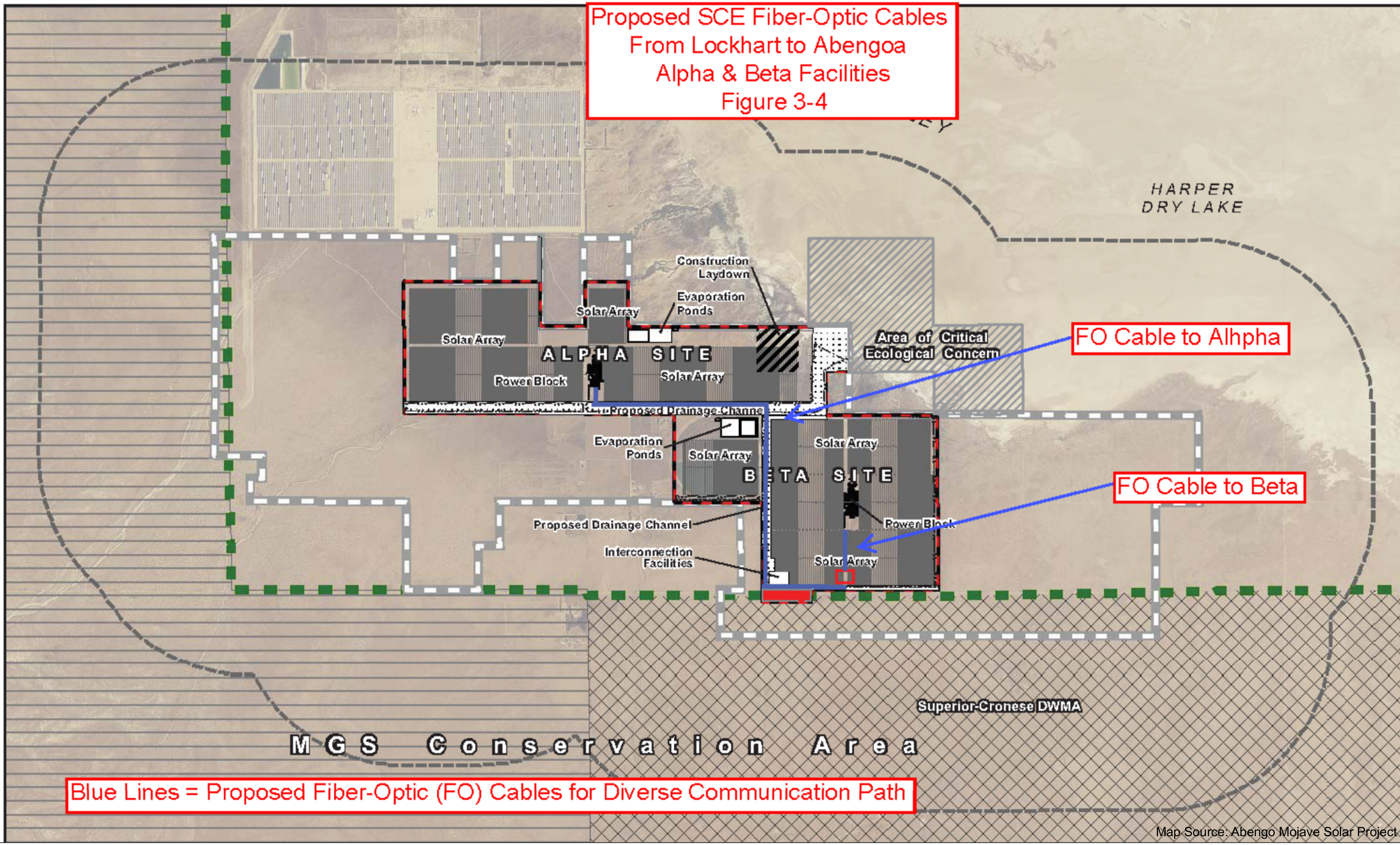
LEGEND

- TORTILLA SUB TO COOLWATER SUB FIBER OPTIC CABLE (IN PERMITTING STAGE)
- EXISTING TRANSMISSION LINES
- EXISTING SUBSTATION

P:\GISData\Projects\MasterData\Major Transmission Projects\Millenium_Project\2010NOT200819591_Interconnection_Maps\Figure 3-3 Proposed Tortilla_Coolwater.mxd 3/11/2010



P:\GISData\Projects\MasterData\Major Transmission Projects\LockhartProject\2010NOT200819625_Interconnection_Maps\Figure 3-4 Proposed Telecomm abengoa.mxd 3/11/2010

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FIGURE 3-4
PROPOSED NEW TELECOMMUNICATION LINES CONNECTING NEW SCE LOCKHART SUBSTATION TO ABENGOA ALPHA AND BETA FACILITIES

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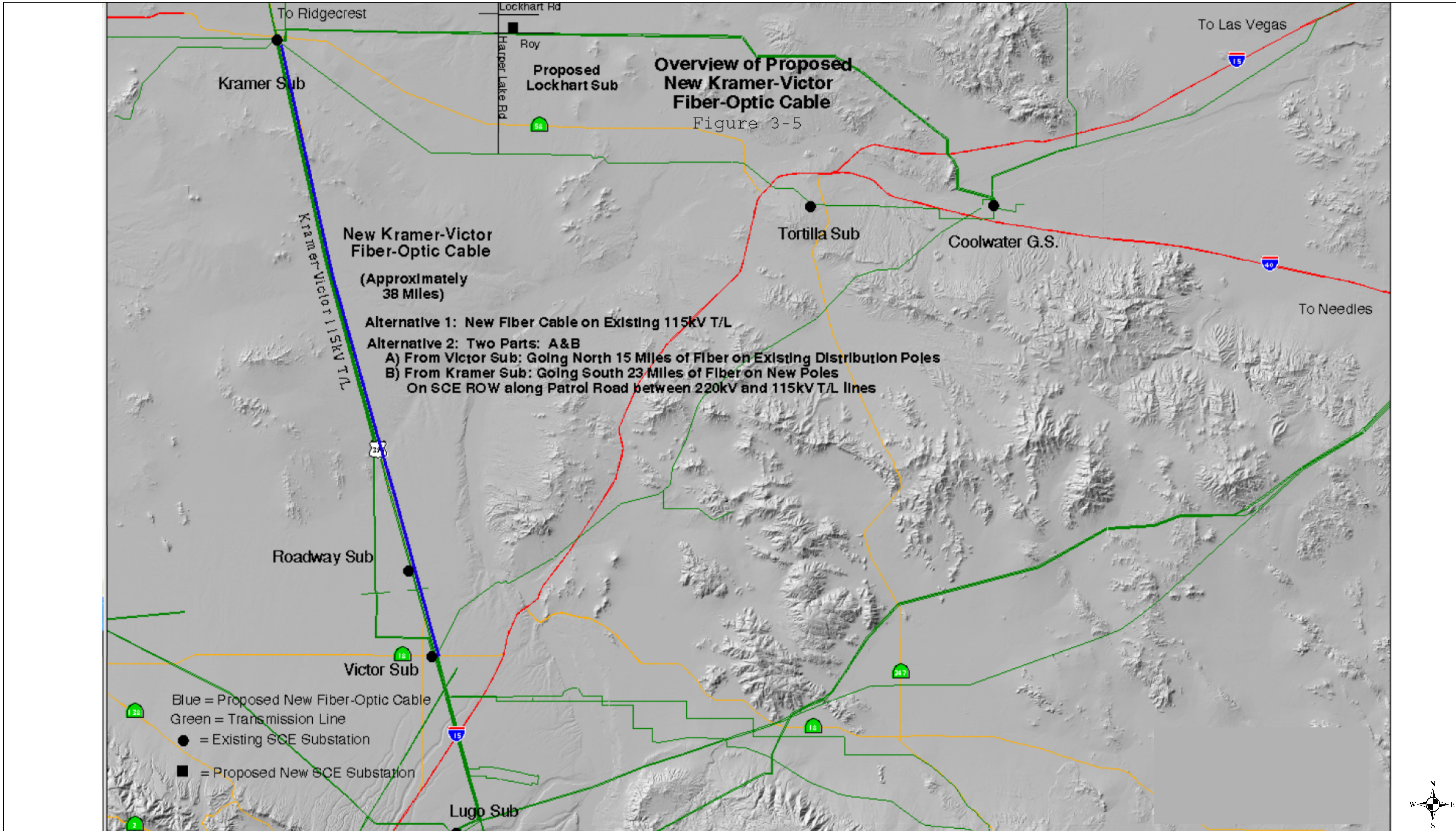

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FIGURE 3-5
PROPOSED NEW TELECOMMUNICATION LINES CONNECTING NEW KRAMER SUBSTATION TO VICTOR SUBSTATION

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LEGEND
- PROPOSED NEW KRAMER SUB TO VICTOR SUB FIBER OPTIC CABLE
- EXISTING TRANSMISSION LINES
- LOCKHART PROPOSED SITE
- EXISTING SUBSTATION

P:\GISData\Projects\MasterData\Major Transmission Projects\Millennium_Project\2010\NOT200819591_Interconnection_Maps\Figure 3-5 Proposed Telecomm New Kramer_Victor.mxd 3/11/2010

DOUBLE 220KV

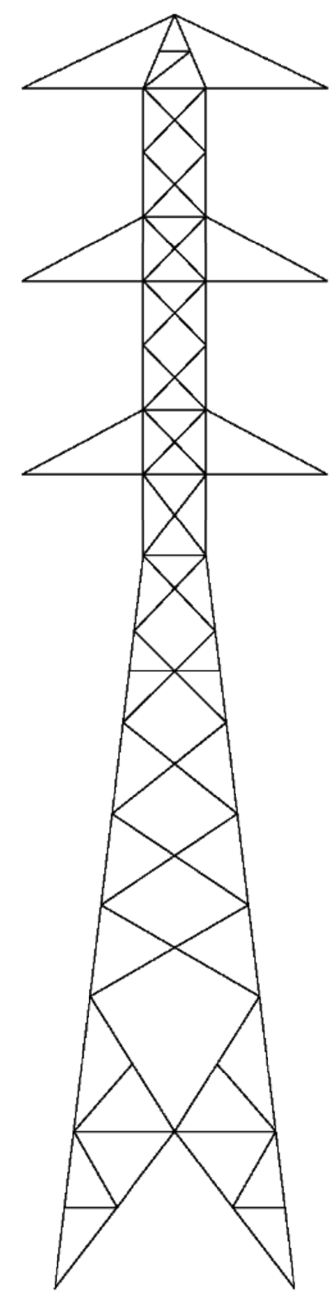

FIGURE 4-1
220KV LATTICE STEEL
TOWER CONFIGURATION

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N
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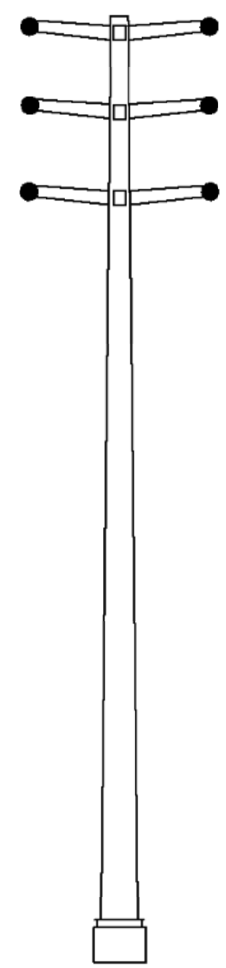
S

P:\GISData\Projects\MasterData\Major Transmission Projects\LockhartProject\2010NOT200819625_Interconnection_Maps\Figure 4 - 220 kV Lattice Steel Tower Configuration.mxd 3/12/2010

DOUBLE CIRCUIT
220KV TSP



SINGLE CIRCUIT
220KV TSP

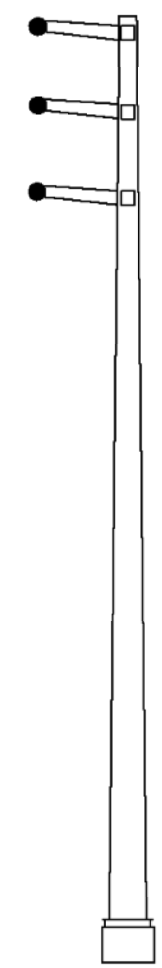


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FIGURE 4-2
220KV TUBULAR STEEL POLE CONFIGURATION

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

P:\GISData\Projects\MasterData\Major Transmission Projects\LockhartProject\2010NOT200819625_Interconnection_Maps\Figure 4-2 220 kV TSP Pole Configuration.mxd 3/12/2010

Typical Pole Heads/Clearance

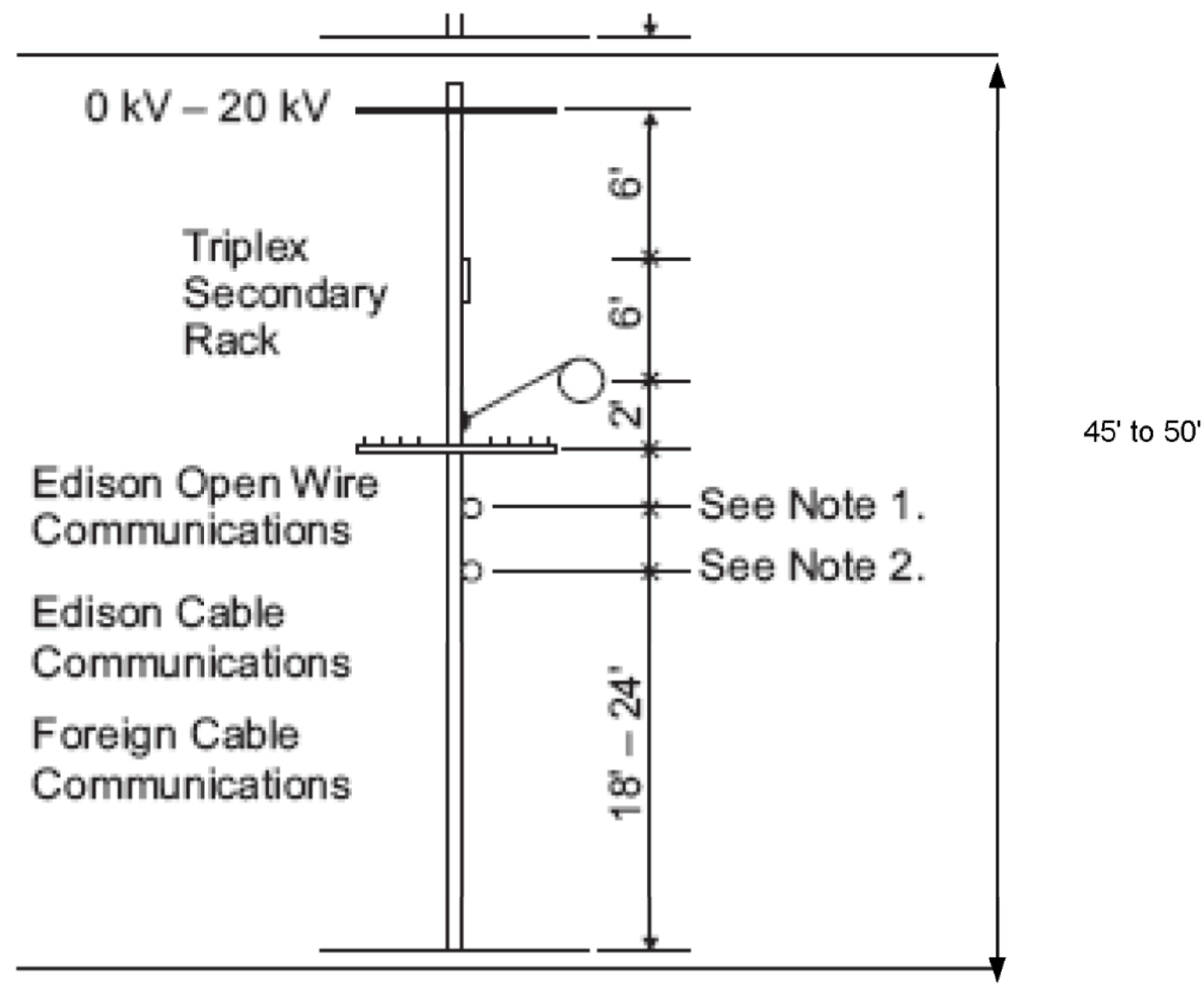

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FIGURE 5
POLE CONFIGURATION

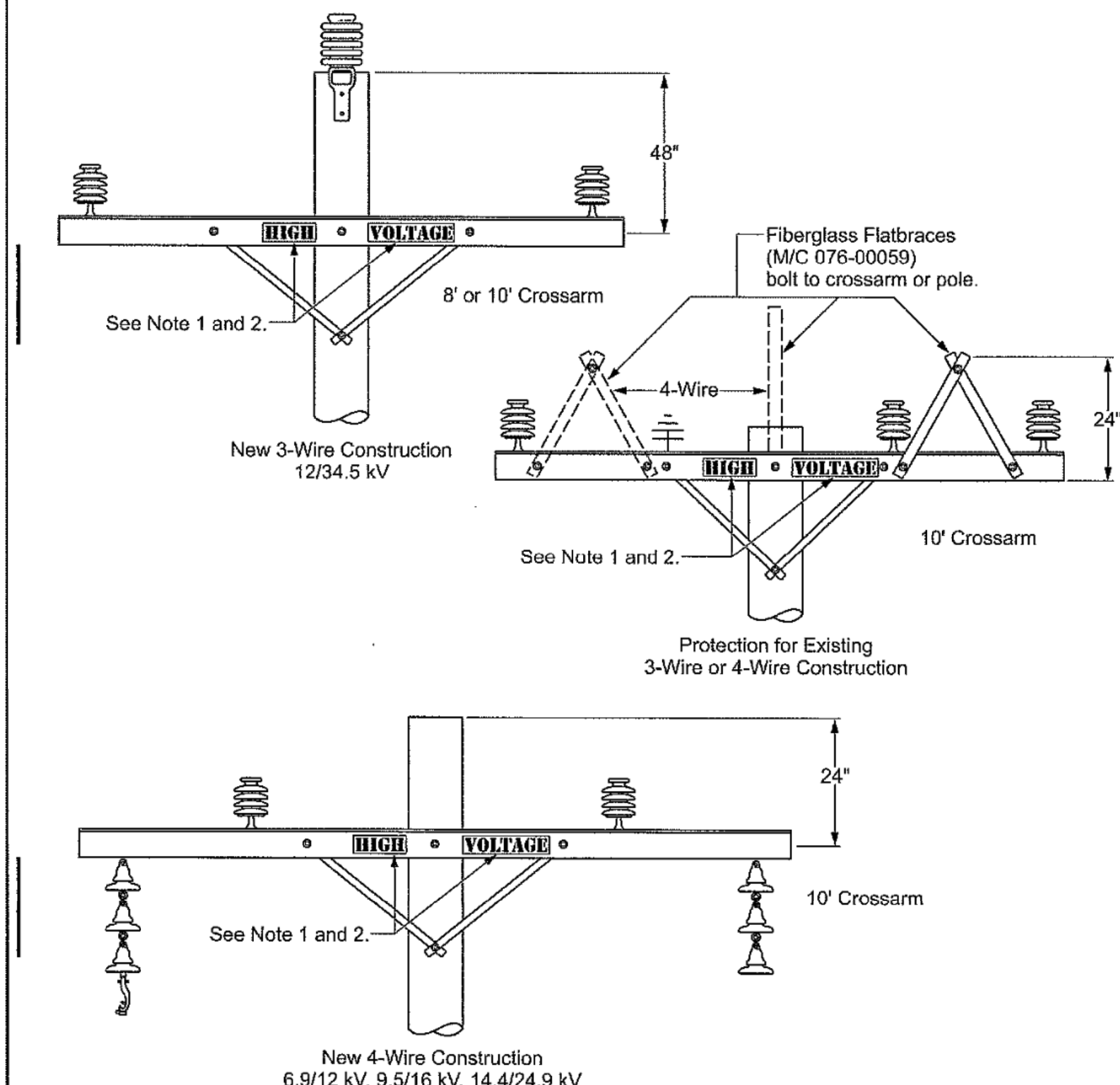
Features depicted herein are planning level accuracy, and intended for informational purposes only. Distances and locations may be distorted at this scale. Always consult with the proper legal documents or agencies regarding such features.

P:\GISData\Projects\MasterData\Major Transmission Projects\LockhartProject\2010NOT200819625_Interconnection_Maps\Figure 5 - Pole Configuration.mxd 3/5/2010

DC 535 Raptor Construction

Scope DC 535.1 Construction for Protection of Bald or Golden Eagles and Other Large, Rare, Predatory Birds

Figure DC 535–1: Raptor Construction



Note(s):

1. HIGH VOLTAGE signs mounted on crossarm are for existing installations only. For new or replacement of deteriorated sign installations, encircle the pole with HIGH VOLTAGE sign per PO 120.

NOTE: If the project is located within a designated raptor area, any new 12 kV distribution line work will be constructed in accordance with SCE's raptor construction standards.

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FIGURE 6
POLE AND CROSSARM CONFIGURATION WITH RAPTOR GUARD

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.

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