2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Introduction

The Proposed Action consists of the development of a new electrical transmission line and associated switching stations and substations. The transmission line would connect a new substation / switching station near the Blythe, California area to SCE's Devers Substation near Palm Springs, California. A new substation / switching station would also be developed near the intersection of the proposed line and the existing DPV1 line. The Proposed Project would operate at 500-kV and would provide increased transmission line capabilities to meet existing and future transmission system requirements.

This section provides a detailed description of the Proposed Project and alternatives. As discussed in Section 1, the Proposed Project transmission line alignment would be located entirely within a BLM-designated utility corridor in areas within the CDCA. The Proposed Project would require approval and a Right-of-Way Grant from the BLM for construction and operation on federal rights-of-way, but would not require an amendment to, or exemption from, the CDCA Plan. However, certain alternative alignments under consideration are not located entirely within BLM-designated utility corridors in the CDCA and would, therefore, require an amendment of the CDCA Plan or a project-specific exemption to the CDCA Plan. Such federal actions and/or authorizations that would be required for the various project alternatives are also discussed in this section.

The alternatives contained herein are the result of an alternative screening analysis conducted to develop a reasonable range of alternatives to the Proposed Action, taking into account the objectives of the Proposed Project as identified in Section 1 of this EIS/EIR. The alternative screening process is described below in Section 2.6. Based on the screening analysis, five alternatives (including the Proposed Project/Preferred Alternative) are fully analyzed in this document: 1) the Proposed Project/Preferred Alternative (including a minor variation referred to as PP1) that generally parallels the existing DPV1/DPV2 corridor except for a short segment west of Desert Center; 2) Alternative A (also including a minor variation referred to as A1) that also parallels the existing DPV1/DPV2 corridor for its entire length; 3) Alternative B that would connect the Blythe area to Niland instead of Devers and would include upgrading and use of certain existing transmission facilities; 4) Alternative C that also generally follows the DPV1/DPV2 corridor with an alignment north of the Alternative A alignment; and 5) the No Action Alternative. The Proposed Project and each of these alternatives, including certain segment alignment options under consideration, are described in the following sections.

2.2 Proposed Project (Preferred Alternative)

2.2.1 Overview of the Proposed Project

The Desert Southwest Transmission Project proposes to construct, operate, and maintain a new, transmission line, approximately 118-miles in length from a new substation / switching station (referred to as Keim) in the Blythe, California area to Southern California Edison's (SCE) existing Devers Substation located approximately 10 miles north of Palm Springs, California. The Proposed Project would operate at 500-kV and would provide increased transmission line capabilities from the new Keim substation / switching station to the existing Devers Substation to meet transmission requirements. The transmission line would be located adjacent to SCE's existing 500-kV DPV1 transmission line and DPV2 right-of-way for the majority of the alignment. In addition, the Proposed Project would include a new substation/switching station (referred to as Midpoint) located at the eastern intersection of the proposed line with the existing DPV1 line. The new line would be constructed as a double circuit line or two parallel lines from the new Keim substation/switching station to the new Midpoint substation/switching station. In the future, a new substation could be built on Dillon Road adjacent to the existing transmission line facilities near Indio, California to connect the proposed transmission line to IID's existing Coachella Substation. The proposed location of the new substations/switching stations, connection facilities, and Proposed Project transmission line route are shown on Figure ES-1. As discussed in Section 1, the Proposed Project transmission line would be located entirely within a BLM-designated utility corridor; therefore, an amendment to the CDCA Plan would not be required. However, a Right-of-Way Grant from the BLM for construction and operation activities associated with the Proposed Project would be necessary for areas within the CDCA.

2.2.2 Project Components

Table 2-1 summarizes the various components of the Proposed Project. These components are discussed in detail in the following sections that describe the proposed transmission line route, and transmission line, substation/switching stations, and communication facilities.

Table 2-1
Summary of Proposed Project Components

Proposed Project and Right-of-Way

- Transmission Line Length: approximately 118 miles.
- Initiation Point: New Keim Substation / Switching Station 4.5 miles west of Blythe, California.
- Connection Point: New Midpoint Substation / Switching Station at intersection of new line(s) with DPV1 and DPV2.
- Possible future connection with IID's system at Dillon Road near Coachella, CA.
- Termination Point: SCE's Devers Substation near Palm Springs, CA.
- Right-of-Way Width: 300 feet (280 feet on BLM lands). The right-of-way width would be reduced consistent with prudent utility practices, in specific locations to mitigate potential impacts to resources (e.g., historic trails, adjacent land restrictions, existing roads and highways, and biological and cultural resources).
- Total Right-of-Way Acreage: approximately 4,290 acres.

Transmission Line Facilities (single-circuit, 500-kV)

- Conductors: One 3-phase AC circuit consisting of two 1.5 to 2-inch ACSR conductors per phase.
- Minimum Conductor Distance from Ground: 30 feet at 60 °F and 27 feet at the maximum operating temperature.
- Shield Wires: Two 1/2 to 3/4-inch diameter wire(s) for steel lattice.
- Transmission Line Tower Types:
    - Steel Lattice Towers along entire route.
    - Structure Heights (approximate): Steel Lattice – Up to 180 feet.
- Average Distance between Towers: Steel Lattice – 1,400 feet*.
- Total Number of Towers (approximate): 430 – 480*.

Substation Facilities

- A new substation/switching station (referred to as Keim) near the Blythe, CA. This will require an area of approximately 25 acres.
- A new substation/switching station (referred to as Midpoint) at the intersection of the existing DPV1 line and the proposed line, requiring an area of approximately 25 to 50 acres.
- In the future, a new substation/switching station on Dillon Road, requiring an area of approximately 25 acres.
- Devers Substation: Facilities would be expanded at SCE's existing Devers Substation, north of Palm

Table 2-1
Summary of Proposed Project Components

Springs, California, to accommodate interconnection of the Proposed Project transmission line and to reconfigure existing transmission line approaches to the substation to provide the necessary clearances between adjacent transmission lines and other facilities.
Communications Facilities • Systems: Digital Radio System, microwave, VHF/UHF radio, and Fiber Optic Ground Wire (OPGW). • Functions: Communications for fault detection, line protection, SCADA, and two-way voice communication.
* The exact quantity and placement of the structures depends on the final detailed design of the transmission line which is influenced by the terrain, land use, and economics.

2.2.2.1 Proposed Project Transmission Line Alignment

The Proposed Project transmission line alignment is shown in Figure ES-1. The Proposed Project transmission line would be approximately 118-miles in length, and would originate at the new Keim Substation / Switching Station located just east of Blythe, California. The transmission line would traverse southwest along existing transmission line rights-of-way approximately 1.8 miles. At this point it would turn west and proceed approximately 7 miles to the point where it would meet the corridor of SCE's existing 500-kV DPV1 Transmission Line and DPV2 right-of-way. A proposed new 25 to 50-acre substation / switching station (Midpoint) would be developed at this location. The proposed line would be built as a double-circuit or two parallel 500-kV lines between Keim and Midpoint. From Midpoint, the line would parallel the DPV1 Transmission Line until approximately 3 miles southeast of Desert Center. At this point, the line would shift to the north to go around the Alligator Rock area. After passing the north end of Alligator Rock, the line would again shift back to the south to return to its parallel alignment adjacent to the existing DPV1 transmission line and DPV2 right of way. The proposed transmission line would cross to the north side of Interstate 10 (I-10), approximately 2.5 miles east of the Cactus City rest area, and continue west adjacent to the existing DPV1 transmission line and DPV2 right-of-way to the termination point at Devers Substation.

In response to comments on the Draft EIS/EIR, a minor variation of the Proposed Project, referred to as PP1, has been developed. It is the same as the Proposed Project in all respects except that west of the new Midpoint substation / switching station, where the Proposed Project parallels the DPV1/DPV2 rights-of-way, the new line would be built within SCE's DPV2 right-of-way instead of immediately adjacent to it as originally proposed. Variation PP1 would remain in the same general alignment as the Proposed Project but would be shifted only slightly (about 150 feet) to occupy the DPV2 right-of-way. In addition, Variation PP1 would pass through the Alligator Rock Area of Critical Environmental Concern (ACEC), just south of Desert Center. Figure 2-1 shows the spatial relationships among the existing DPV1, DPV2, and Preferred Alternative rights-of-ways. Under this variation of the Preferred Alternative, one 500 kV line would be built by both entities (Desert Southwest and SCE) within the DPV2 right-of-way instead of two parallel lines being built - one by each.

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Figure 2-1 Right-of-Way Locational Relationships Among DSWTP, PVD-1 and PVD-II

Back page of figure.

2.2.2.2 Transmission Line Facilities (Lines and Structures)

2.2.2.2.1 Type of Structures – The Proposed Project and Alternatives A and C would be built at 500-kV and would use steel lattice towers along the entire route. All structures would be single-circuit structures except possibly between the Keim and Midpoint substation / switching stations, where double-circuit structures may be used. All tower structures would be designed to withstand wind speeds of 108 miles per hour (mph). Meteorological studies would be referenced and/or updated to evaluate and confirm maximum wind loading criteria to be used for the final design of the structures.

2.2.2.2.1.1 <u>500-kV Steel Lattice Tower Structures</u> – A self-supporting steel lattice tower structure similar to that used on the existing PVD 1 transmission line is proposed for the Proposed Project and Alternatives A and C. Figure 2-2 illustrates this typical 500-kV steel lattice tower structure. Tower heights would vary from 100 to 180 feet above the ground surface depending on terrain and associated "span lengths" (i.e., distances between transmission line support structures). The average span length would be approximately 1,400 feet, resulting in about 3.8 towers per mile of line. Span lengths would generally range from a minimum of 400 feet to a maximum of 2,200 feet. However, the exact quantity and placement of the structures would depend on the final detailed design of the transmission line which would be influenced by factors such as terrain, land use, economics, and possible environmental constraints within the right-of-way.

Each tower would support three phases consisting of two conductors per phase. Each tower would be supported by four legs that would be bolted to caisson foundations approximately 22 feet deep and 4 to 5 feet in diameter.

The section of the line between the new Keim and Midpoint substations / switching stations would contain two 500 kV circuits either on parallel single circuit towers or on double-circuit structures.

2.2.2.2.2 Collocating the Proposed Project with Other Utilities - Proposed general strategies for potential utility conflicts should first focus on avoidance of the potential conflicts. The Project right-of-way has been coordinated with DPV2 and Blythe Energy to avoid conflicts. If such conflicts are unavoidable, the next strategy should focus on reducing and minimizing the potential impact.

For crossing, closely following, or using other utility's rights-of-way the strategy for reducing and minimizing impacts would begin with close consultation and coordination with the utility owner. Followed by complying with each utilities encroachment permits conditions of approval. In addition, state and federal regulations require the project applicant to adhere to minimum standards established by the National Electric Safety Code (NESC) and General Order 95.

Buried water and gas pipelines collocated with overhead electrical transmission lines are subject to the influence of electromagnetic fields that may result in safety concerns for people making contact with the pipeline, including pipeline personnel, as well as long-term corrosion damage to the pipeline and to any existing corrosion protection equipment.

Determining proper mitigation for placing electrical transmission lines over pipelines requires a detailed site specific analysis involving measuring the background inductive electrical currents found within the pipeline, the effect of any existing pipeline corrosion protection, and any potential voltages transferred through the earth in location of the electrical conductor and towers. Factors such as soil resistivity, soil layering, length and proximity of pipeline to the transmission line, fault current levels, transmission line static wire type, transmission line structure as well as the effectiveness of pipeline grounding and coating need to be fully analyzed in order to determine proper mitigation requirements. This site specific analysis is also completed during the construction planning phase of the project.

2.2.2.3 Substation Facilities

The Proposed Project includes a new substation/switching station near Blythe, California, a new substation/switching station at the intersection of the proposed transmission line and the existing DPV1 line, possibly a new substation in the future at Dillon Road, expansion of the existing Devers Substation at its western terminus, and future upgrades to the Coachella Substation.

2.2.2.3.1 New Keim Substation/Switching Station - Under the Proposed Project, a new substation/switching station would be constructed along Hobsonway east of Blythe, California near the Blythe Energy Project. In response to a comment from the City of Blythe regarding potential conflicts with the Blythe Airport at the originally proposed location of this facility on the north side of Hobsonway, its location has been moved to the south side of Hobsonway to reduce the potential for these conflicts. In order to eliminate potential confusion with the original location, the name of this substation /switching station has been changed to the Keim Substation / Switching Station. This new substation/switching station would provide a means of connection to a number of existing and future power transmission facilities operated by the Western Area Power Administration, SCE, IID, and Florida Power and Light, and others in the Blythe, California area. It would require approximately 25 acres of permanent disturbance.

2.2.2.3.2 New Substation/Switching Station at Midpoint - Under the Proposed Project, a new substation/switching station would be constructed where the Proposed Project intersects with the existing DPV1 transmission line (see Section 1). The new substation/switching station would provide a connection point for the Proposed Project to DPV1, DPV2 and the Blythe Energy Project. The new substation/switching station would require approximately 25 to 50 acres of permanent disturbance. Figure 2-3 shows the location and layout of the Midpoint substation / switching station.

2.2.2.3.3 New Substation/Switching Station on Dillon Road – In the future, a new substation / switching station could be built west of Dillon Road adjacent to the existing transmission line facilities near Indio, California. The need for this new substation / switching station will be based on need to provide electrical service to IID’s growing customer base in the Coachella Valley. Other regional planning studies are underway which will determine the timing and configuration of the facility. This substation would require an area of approximately 25 acres. When built, this new substation/switching station would provide a connection point with the Proposed Project transmission line and IID’s existing Coachella Substation.

Figure 2-2 Typical Single-Circuit 500kV Steel Latice Tower Structure

Back page of figure.

Figure 2-3 Proposed Location of the Midpoint Substation / Switching Station

Back page of figure.

2.2.2.3.4 Devers Substation –- Interconnection of the proposed transmission line at the Devers Substation would require modification to existing equipment and installation of new equipment. Such modifications would include installing additional circuit breakers, protection devices, and associated communication equipment to accommodate the new facilities. The current arrangement of the substation would be modified by relocating existing equipment to new locations within the substation perimeter, and by adding new equipment in place of the existing equipment. These modifications would require incorporation of approximately five acres of land adjacent to the Devers Substation.

2.2.2.3.5 Coachella Substation – At such time when the new substation / switching station at Dillon Road is built, connection of the proposed transmission line at the Coachella Substation would require upgrades to existing equipment as well as new equipment. The need for this new substation / switching station will be based on need to provide electrical service to IID's growing customer base in the Coachella Valley. Other regional planning studies are underway which will determine the timing and configuration of the facility. Such modifications may include installing additional circuit breakers, protection devices, and associated communication equipment to accommodate the new facilities.

2.2.2.4 Communication Facilities

DSWTP is proposing to use both fiber optics and a digital radio system for essential communication and system protection needs, as well as provisions for voice and data communications. The installation of OPGW would be included in the transmission line design for this purpose. Using specialized equipment, the system would provide for automatic high speed interruption of power flow over the transmission line when a fault is detected at the substations. System operations would be monitored through a System Control and Data Acquisition (SCADA) process utilizing the digital radio system and the fiber optic links. Similarly, necessary construction, operation, and maintenance communication would be included to ensure the safety of the public and employees. The attributes of the proposed communication links are described below:

2.2.2.4.1.1 SCADA System

A SCADA system would be used to monitor system operation, and would consist of remote computers located at the substations. The system would continuously provide information to system operators regarding the quantities of power transmitted through the line, and the control and status indication of circuit breakers and switches in the substations.

2.2.2.4.1.2 Two-Way Communication

Two-way communication would be required for construction, operation, and maintenance personnel. Such communication would be provided by cellular phones or a VHF/UHF two-way radio system. Cellular phone communication would be possible utilizing the services of existing cellular systems, and a conventional VHF or UHF two-way radio system could be possible by utilizing existing communication transmission facilities. It is likely that a combination of these two communication methods would be used to coordinate construction and operation activities.

2.2.2.4.1.2 System Protection

Transmission system protection is paramount to assuring reliable system operations. The communication system will provide the essential paths for primary and back-up system protection against unforeseen disturbances and system faults. High speed relaying equipment will be placed at line end points and connection points to monitor transmission line voltage, current, and other parameters using data supplied via the communication system.

2.2.3 Preconstruction Activities

Preconstruction activities for the Proposed Project would include preconstruction surveys and right-of-way acquisition as described in the following sections.

2.2.3.1 Preconstruction Survey Activities

Preconstruction survey work would consist of locating the centerline, structure center hubs, right-of-way boundaries, and structure access roads. Intensive surveys would also be necessary prior to construction to determine the presence of cultural resources and special-status species within potentially affected areas. These surveys would be initiated following right-of-way and access road identification and marking. Prior to the initiation of any preconstruction surveys, the necessary survey permits for federal and state land and rights-of-entry to privately owned land would be obtained.

2.2.3.2 Right-of-Way Acquisition

The National Electrical Safety Code (NESC), the Western Energy Coordinating Council (WECC) requirements [California Public Utilities Code and California Public Utilities Commission (CPUC) General Order 95], and operational considerations would determine the width of the right-of-way. Specific right-of-way requirements depend on the structure type, height, span, and conductor configuration. Generally, rights-of-way are acquired that take into account the height of the structure on either side of the centerline to avoid issues associated with structure failure. An additional right-of-way distance of 50 feet is desired to allow equipment access in the event of a collapsed structure. The right-of-way width would be reduced in specific locations to meet local jurisdiction requirements and to mitigate potential impacts to resources (e.g., historic trails, existing structures, existing roads and highways, and biological and cultural resources).

The height of the transmission line structures would range from 100 to 180 feet. The planned overall right-of-way width for the Proposed Project would be 300 feet providing for a typical tip-over range of 125 feet for average height structures and an additional 25 feet on each side for maintenance access. The Proposed Project transmission line would be located adjacent to the existing PVD 1 and 2 transmission line rights-of-way for most of its length. The rights-of-way for these two lines are 290 feet in width on BLM land to accommodate the existing DPV1 line and the planned DPV2 line. Therefore, an additional 300-foot right-of-way for the Proposed Project would effectively result in a combined right-of-way width of 590 feet for all three lines. This is the maximum right-of-way width required to accommodate the existing DPV1 line, the planned DPV2 transmission line, and the Proposed Project transmission line (see Figure 2-1).

If the variation of the Proposed Project referred to as PP1 were utilized, the proposed line would be built within SCE's existing and approved DPV2 right-of-way where the Proposed Project parallels the DPV2 right-of-way between Midpoint and Devers. The new line would be in the same general alignment as the Proposed Project but would be shifted only slightly to utilize the adjacent right-of-way for the DPV2 line. Under this variation, no new right-of-way for the Proposed Project would be needed except where it deviates from the DPV2 alignment.

Where new rights-of-way are needed on federally managed public land, a Right-of-Way Grant would be required from the BLM. On state managed public land, a Land Use Lease would be required from the California State Lands Commission (CSLC). On private land, sufficient easements would be acquired to locate, construct, operate, and maintain the transmission facility. Landowners would be paid the appraised fair market value for the rights acquired across their property, and any damages resulting from construction, operation, and maintenance.

2.2.4 Project Construction

Constructing a transmission line includes identifying and constructing access roads, traveline along rights-of-way and structure site clearing (including construction yards, installing foundations, assembling and erecting the structures, clearing, pulling (i.e., stringing transmission line conductors through the structures), tensioning and splicing sites, installing ground wires and conductors, installing ground rods, and cleanup and site reclamation. Various phases of construction may be supported by the use of helicopters to minimize--and possibly eliminate in some cases--the need to travel along the right-of-way. The use of helicopters is especially beneficial for conductor installation activities.

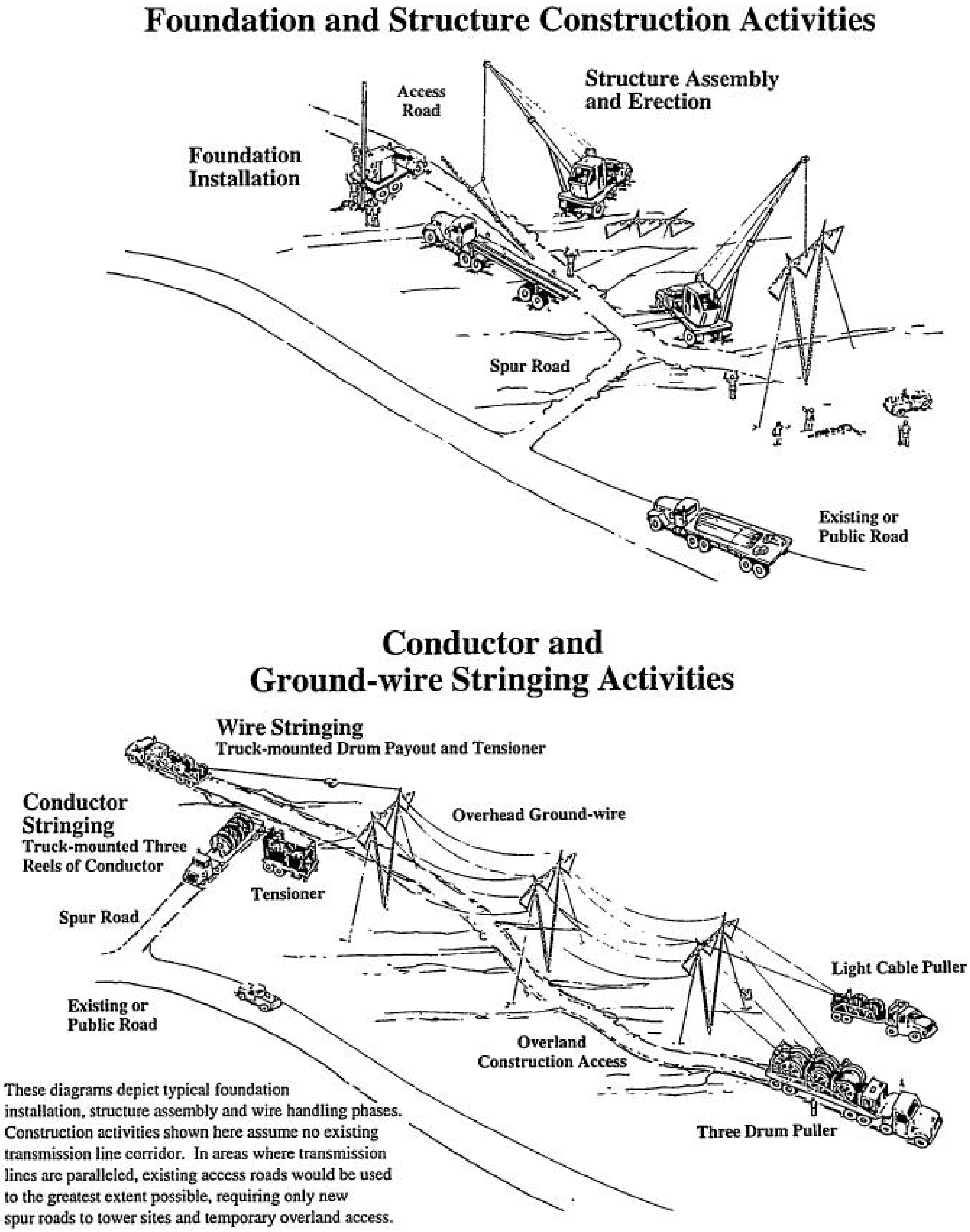
The phases of construction would occur at different locations throughout the construction process. This would require several construction crews operating simultaneously in different locations. Figure 2-4 depicts the typical construction procedures of transmission line structure and wire installations. Table 2-2 lists temporary and permanent disturbance for the Proposed Project.

Table 2-2
Proposed Project Land Disturbance by Project Feature

Project Feature	Acres Disturbed During Construction	Temporary Disturbance/Acres to be Restored	Acres Permanently Disturbed
Structure Sites	914 – 1,020	866 - 966	48 – 54[a]
Access Roads	26[b]	6	20
Staging Areas	28	28	0
Pull Sites[c]	63	63	0
New Substation/Switching Stations (3)	75 – 100		75 – 100
Devers Substation (expansion)	5		5
Total Estimated Disturbance	1111-1242	963-1063	148-179

[a] Area at structure sites include short spur roads from the existing Devers-Palo Verde Transmission Line maintenance road.
[b] New access roads would be required and some existing roads would require upgrades to allow passage of heavy equipment to set structures and deliver concrete.
[c] Pull sites are areas at which equipment utilized for installation of transmission line wires would be temporarily located during construction.
[d] The Keim Substation/Switching Station would require approximately 25 acres; the Midpoint Substation/Switching Station would require approximately 25 to 50 acres; and the Substation/Switching Station on Dillon Road would require approximately 25 acres.

Figure 2-4 - Construction Activities



2.2.4.1 Access Road Construction

The construction, operation, and maintenance of the proposed transmission line and substations/switching stations would require heavy vehicles access to the structure sites along the right-of-way and on substations/switching access roads. To the greatest extent possible, use of existing maintenance roads within existing transmission line right-of-way is planned to minimize potential impacts associated with new access road construction. Where necessary, certain road improvements would be made to allow passage of construction vehicles and heavy equipment. Following construction, disturbed sections of temporary roads would be restored to original contours. Some permanent road improvements will be left in place where necessary for operation or maintenance, or where the landowner or land managing agency requires. Road standards would be addressed specifically in the Construction, Operation and Maintenance (COM) Plan that would be prepared during the engineering phase of the Proposed Project.

New access roads to the structure sites, typically 24 feet wide, or spur roads may be constructed in the right-of-way from existing transmission line maintenance roads where terrain would prevent access over undisturbed surfaces. Wherever possible, new roads would be built at right angles to existing maintenance roads. All existing roads would be left in a condition equal to or better than their condition prior to the construction of the transmission line.

Existing maintenance roads to the Palo Verde-Devers 500-kV Transmission Line would be used the access the proposed Midpoint Substation/Switching Station site. Certain road improvements will be required to allow passage of construction vehicles and heavy equipment. In addition, as stated above, road improvement requirements would be addressed specifically in the COM Plan.

Existing roads would be used the access the proposed Keim Substation/Switching Station site. Road improvement requirements would be also be addressed specifically in the COM Plan.

Culverts or other drainage structures would be installed only as necessary to allow passage of heavy equipment across drainages. This type of facility would prevent damage to existing drainage banks by directing all traffic in a specific area. Existing paved and unpaved highways and roads would be used to the greatest extent possible.

In addition, road construction would include dust and erosion control measures in sensitive areas. The specific methods employed for dust and erosion control would be dependent upon the potential for harm to wildlife during construction (see Section 3.1, Biological Resources). A road sealant emulsion would be applied where permitted to control fugitive dust emissions while minimizing the use of water trucks. Use of water trucks would be required in areas where the application of road surface sealants would be considered unsuitable for the local wildlife habitat.

All roads would be constructed in accordance with project requirements for transmission line access roads. In the event of a conflict between project requirements and BLM, USFWS, state or other agencies' requirements, the requirements of the agency with specific land management jurisdiction would take precedence in such areas. Private landowners and owners of record along the proposed roads would be consulted before construction begins.

The contractor would be required to submit a specific Access Road Use Plan which would be carefully reviewed to ensure consistency with the requirements of local, state, and federal agencies and private land owners. The plan would address use of the existing road network to transport workers, materials, and heavy equipment to the staging areas, structure locations, concrete batch plant sites, and material storage locations. The planned use of existing roads would be evaluated to determine the best approach to mitigate potential impacts to the roads and adjacent construction areas. The installation of culverts and other road improvement amenities would be reviewed and addressed on a site-by-site basis. Construction activities would not be allowed to commence until after the Access Road Use Plan is approved.

2.2.4.2 Structure Sites

At each structure site, leveled areas would be needed to facilitate the safe operation of equipment, such as construction cranes. The leveled area required for the location and safe operation of large cranes would be approximately 30 by 40 feet. At each structure site, a work area of approximately 250 feet square would be required for the structure footing location, structure assembly, and the necessary crane maneuvers. The work area would be cleared of vegetation only to the extent necessary. After line construction, all pads not needed for normal transmission line maintenance would be restored to natural contours to the greatest extent possible and revegetated where required.

2.2.4.3 Clearing and Grading within Right-of-Way

Clearing and grading would be conducted only as necessary at construction areas for safe vehicle movement and construction activities. Estimated land disturbance associated with the Proposed Project by project feature is shown in Table 2-2.

2.2.4.4 Foundation Installation

Transmission line tower structure foundation excavations would be made with power drilling equipment. A vehicle-mounted power auger or backhoe would be used to excavate for the structure foundations. In rocky areas, the foundation holes would be excavated by drilling. Although not expected, in some instances blasting could be necessary because of the specific geologic conditions. In the unlikely event that blasting is necessary, conventional or plastic explosives would be used. Safeguards (e.g., blasting mats) would be employed when adjacent areas require protection (see Section 3.5, Geology and Soils).

Footings would be installed by placing reinforced steel and transmission structure steel components into each foundation hole, positioning the steel components, and encasing them in concrete. Excess spoil material would be used for fill where suitable. Spoil materials that could not be used for fill would be removed to a suitable location by the construction contractor for disposal. The foundation excavation and installation activities would require access to the site by a power auger or drill, a crane, material trucks, and ready-mix trucks.

2.2.4.5 Staging Areas and Construction Yards

Construction support areas would be located in previously disturbed sites, wherever possible, off the right-of-way and would be used by the construction contractor for equipment maintenance, material storage, personnel offices, dispatch centers, material assembly, and construction coordination. Facilities would be fenced where necessary and their gates locked. Security guards would be stationed where needed.

Concrete for use in constructing foundations would be dispensed from concrete mixer trucks. Commercial ready-mix concrete is proposed because of the relatively accessible nature to the construction sites. Concrete additives would be used to increase the maximum allowable concrete delivery time.

The sources of the materials would be from existing concrete suppliers in the project area. The water requirement for mixing the concrete for these foundations is estimated to be 1.35 to 1.5 acre-feet.

Final locations of the construction yard sites would be determined through an approval submittal process involving the project proponents, landowners, owners fo record, and land management agencies.

2.2.4.6 Structure Assembly and Erection

Structural steel components and associated hardware would be shipped to each structure site by truck. Steel structure sections would be delivered to tower locations where they would be fastened together to form a complete structure and hoisted into place by a large crane. General information regarding transmission line tower structures is provided below in Table 2-3.

Table 2-3

Description of Design Component	Steel Lattice Structure
Voltage (kV)	500
Right-of-Way Width (feet)	300
Number of Circuits Supported by Structure	1
Circuit Configuration	Horizontal
Average Span (feet)	1,400
Average Height of Structures (feet)	100 - 180
Average Number of Structures (per mile)	3.4
Temporary Disturbance Area at Each Pole (acres)	2
Permanent Disturbance (square feet)	1,400
Number of Guard Structures	16 - 20
Temporary Guard Structure Disturbance Area (acres)	75
Permanent Guard Structure Disturbance Area (acres)	0
Minimum Ground Clearance Beneath Conductors (feet)	27
Maximum Height of Machinery that could be Operated Safely Under Line (feet)	17

2.2.4.7 Conductor Installation

After the structures are erected, insulators, hardware, and stringing sheaves would be delivered to each structure site. The structures would be rigged with insulator strings and stringing sheaves at each ground wire and conductor position.

For public protection during wire installation, guard structures would be erected adjacent to highways, railroads, power-lines, structures, and other obstacles. Guard structures would consist of H-framed wood poles placed on either side of an obstacle. These structures would prevent ground wire, conductor, or equipment from falling on an obstacle, and would be removed following the completion of conductor installation. Ground disturbance associated with guard structures is presented in Table 2-3. Equipment for erecting guard structures would include augers, line trucks, pole trailers, and small cranes. Guard structures may not be required for small roads or other areas where suitable safety measures such as barriers, flagmen, or other traffic controls could be used.

Pilot lines would be pulled (strung) from structure to structure and threaded through the stringing sheaves at each structure. This phase of the work may be accomplished through the use of helicopters to minimize or otherwise eliminate the need to traverse the right-of-way along the ground from structure to structure. Following pilot lines, a larger diameter, stronger line would be attached to conductors to pull them onto structures. This process would be repeated until the ground wire or conductor is pulled through all sheaves.

The shield wire (and/or OPGW) and conductors would be strung using powered pulling equipment at one end and powered braking or equipment tensioning at the other end of each conductor stringing segment. Sites for tensioning equipment and pulling equipment would be approximately 2 miles apart. This distance would be essentially doubled where it is prudent to do so by pulling in two sets of conductors back to back.

Each tensioning site would be approximately 250 feet by 600 feet. Tensioners, line trucks, wire trailers, and tractors needed for stringing and anchoring the ground wire or conductor would be necessary at each tensioning site. The tensioner, in concert with the puller, would maintain tension on the shield wires or conductors while they are pulled through the structures. The pulling site would require approximately half the area of the tension site. A puller, line trucks, and tractors needed for pulling and temporarily anchoring the shield wires, OPGW, and conductor would be necessary at each pulling site.

2.2.4.8 Ground Rod Installation

Part of standard construction practices prior to wire installation would involve measuring the resistance of structure footings. If the resistance to remote earth for each transmission structure is greater than 25 ohms, additional ground rods would be installed to lower the resistance.

2.2.4.9 Cleanup

Construction sites, material storage yards, and access roads would be kept in an orderly condition throughout the construction period. Approved enclosed refuse containers would be used throughout the project. Refuse and trash would be removed from the sites and disposed of in an approved manner. Oils or chemicals would be hauled to a disposal facility authorized to accept such materials. No open burning of construction trash would occur without agency approval.

2.2.4.10 Hazardous Materials within Corridor

Petroleum products such as gasoline, diesel fuel, crankcase oil, lubricants, and cleaning solvents would be present within the transmission line corridor during construction. These products would be used to fuel, lubricate, and clean vehicles and equipment, and would be transported in containerized trucks or in other approved containers. When not in use, hazardous materials would be properly stored to prevent drainage or accidents.

Totally enclosed containment shall be provided for all hazardous waste. All construction waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials, would be removed to a disposal facility authorized to accept such materials.

All construction, operation, and maintenance activities would comply with all applicable federal, state, and local laws and regulations regarding the use, transportation and disposal of hazardous substances. Preventive measures such as the use of vehicle drip pans for overnight parking areas will be used.

The construction or maintenance crew foreman would ensure compliance with all applicable laws and regulations. In addition, an on-site inspector would be present during construction to ensure that all hazardous materials are used and stored properly. A health and safety plan would be developed as part of the COM Plan during the engineering and preconstruction phase of the project. In the event of a hazardous materials spill, notification and clean-up would be undertaken by construction contractors' certified personnel in an expeditious manner.

2.2.4.11 Site Reclamation

The right-of-way would be restored as required by the property owner, owners of record, or land management agency. All practical means would be made to restore the land to its original contour and to restore natural drainage patterns along the right-of-way. Because revegetation would be difficult in many areas of the project as precipitation is minimal, it would be important to minimize disturbance during the construction. The Reclamation Plan in Appendix E outlines the methods for restoration of disturbed areas.

2.2.4.12 Fire Protection

All applicable fire laws and regulations would be observed during the construction period. All personnel would be advised of their responsibilities under the applicable fire laws and regulations, including taking practical measures to report and suppress fires.

2.2.5 Operation, Maintenance, and Abandonment

2.2.5.1 Operational Characteristics

The nominal voltage for the Proposed Project transmission line would be 500-kV AC. Minor variations of up to five percent above or below the nominal voltage level may occur depending upon load flow.

2.2.5.2 Permitted Uses

After the transmission line has been energized, land uses that are compatible with safety regulations would be permitted in and adjacent to the right-of-way. Incompatible land uses within the right-of-way include construction and maintenance of inhabited dwellings, and any use requiring changes in surface elevation that would affect electrical clearances of existing or planned facilities.

Land uses that comply with local regulations would be permitted adjacent to the right-of-way. Compatible uses of the right-of-way on public land would require approval by the appropriate agency. Permission to use the right-of-way on private land would have to be obtained.

2.2.5.3 Safety

Safety is a primary concern in the design of the proposed transmission line and related facilities. The transmission line would be protected with power circuit breakers and related line relay protection equipment. Lightning protection would be provided by overhead ground wires (shield wires or OPGW) along the line. Electrical equipment and fencing at the substation would be grounded. All existing fences, metal gates, pipelines, etc. that cross or are within the transmission line right-of-way would be grounded to prevent electrical shock. Design and construction would be coordinated with utilities operating facilities along the project alignment to ensure prudent safety requirements are met. Specific crossing permits from these utilities would be obtained where necessary.

Buried water and gas pipelines collocated with overhead electrical transmission lines are subject to the influence of electromagnetic fields that may result in safety concerns for people making contact with the pipeline, including pipeline personnel, as well as long-term corrosion damage to the pipeline and to any existing corrosion protection equipment.

Determining proper mitigation for placing electrical transmission lines over pipelines requires a detailed site specific analysis involving measuring the background inductive electrical currents found within the pipeline, the effect of any existing pipeline corrosion protection, and any potential voltages transferred through the earth in location of the electrical conductor and towers. Factors such as soil resistivity, soil layering, length and proximity of pipeline to the transmission line, fault current levels, transmission line static wire type, transmission line structure as well as the effectiveness of pipeline grounding and coating need to be fully analyzed in order to determine proper mitigation requirements. This site specific analysis is also completed during the construction planning phase of the project.

2.2.5.4 Maintenance

The transmission line would be inspected on a regular basis by both ground and aerial patrols. Maintenance would be performed as needed. When access is required for non-emergency maintenance and repairs, the same precautions identified for original construction would be followed.

Emergency maintenance would involve prompt movement of crews to repair or replace any damaged equipment. Crews would be instructed, in accordance with specific maintenance plans and procedures, to protect crops, vegetation, wildlife, and other resources of significance. Specific training would be provided to all maintenance crews instructing them on plan and procedures policy requirements. Restoration procedures following completion of repair work would be similar to those prescribed for original construction. The comfort and safety of local residents would be provided for by limiting noise, dust, and the danger caused by maintenance vehicle traffic. Details would be provided in the COM Plan prior to line construction.

Substation maintenance activities would include routine scheduled equipment, groundskeeping, and emergency maintenance in the event of equipment failure. Substation maintenance would be performed by project personnel or approved contractors.

2.2.5.5 Abandonment

The Proposed Project transmission line would have a projected operational life of at least 50 years. At the end of the useful life of the project, if the facility were no longer required, the transmission line would be removed from service. At such time, conductors, insulators and hardware would be dismantled and removed from the right-of-way. Structures would be removed and foundations broken off below ground surface.

Following abandonment and removal of the transmission line from the right-of-way, any areas disturbed during line dismantle would be restored and rehabilitated as near as possible to their original condition, and would be available for the same uses that existed prior to construction of the project.

2.2.6 Construction Work Force and Equipment

General activities, number of personnel, and length of time to complete various construction activities for the Proposed Project is provided in Table 2-4. Table 2-5 lists the type and purpose of major equipment that would be used during construction of the transmission line.

2.2.7 Construction Schedule

The Proposed Project is estimated to take approximately 12 months to construct. Construction activities would start after the environmental review process and permitting are finalized.

Table 2-4
Proposed Project Construction Personnel Requirements[a]

Activity	Number of Personnel	Rate of activity (per week)	Length of Time (weeks)
Surveying	18	18 miles	7
Environmental Resource Surveys	20	20 miles	6
Environmental Resource Monitors (cultural resources and special-status species)	12	N/A	Duration of construction activities in sensitive areas.
Access Layout	10-20	18 miles	7
Structure Sites	16	10 miles	12
Hole Excavation and Foundation Installation	72	4 miles	30
Construction Yards and Material Staging	32	8 miles	15

Table 2-4
Proposed Project Construction Personnel Requirements[a]

Activity	Number of Personnel	Rate of activity (per week)	Length of Time (weeks)
Structure Assembly and Erection	48	4 miles	30
Shieldwire and Conductor Stringing	68	6 miles	20
Cleanup	24	12 miles	10
Rehabilitation	24	12 miles	10

a. Assumes two construction divisions with full crews in each.

Table 2-5
Major Equipment Used During Construction

Equipment	Purpose
3/4 ton pickup trucks	Transport construction personnel
1 ton crew trucks	Transport construction personnel
2 ton flat bed trucks	Haul materials
Flat bed boom truck	Haul and unload materials
Rigging truck	Haul tools and equipment
Mechanic truck	Service and repair equipment
Shop vans	Store tools
Office van	House the office
D-8 bulldozer	Blade access roads, platforms
D-6 bulldozer	Pull hardline and rangeland drill
Truck mounted digger	Excavate foundations
Crawler backhoe	Excavate foundations
Small mobile cranes (< 12 tons)	Load and unload materials
Large mobile cranes (> 75 tons)	Erect structures
Transport	Haul structure components
Drill cat	Drill holes for blasting
Puller	Pull conductor and wire
Tensioner	Pull conductor and wire
Wire reel trailer	Haul wire
Semi tractor trailers	Haul structure components
Air compressors	Operate air tools
Air tampers	Compact soil around poles
Rangeland drill	Sow seed

2.3 Alternative A – Second Northern Route Alternative

Alternative A would be similar in design and structure to the Proposed Project. This alternative would also include the construction of an approximately 118-mile long transmission line from the new Keim Substation / Switching Station to the Devers Substation. It would follow the same alignment as the Proposed Project except where the Alternative A route would follow Route Option A-2 for a segment west of Desert Center. In this area, Option A-2 follows the I-10 corridor.

Like the Proposed Project, in response to comments received on the Draft EIS/EIR, a minor variation to Alternative A has been developed (referred to as Variation A1). This variation involves building the proposed project within the right-of-way for SCE's DPV2 transmission line instead of immediately adjacent to it as originally proposed. Variation A1 would remain in the same general alignment as Alternative A but would be shifted slightly (approximately 150 feet) into SCE's existing and approved DPV2 right-of-way.

As with the Proposed Project, the Alternative A transmission line would be located entirely within a BLM-designated utility corridor; therefore, a CDCA Plan amendment would not be required. The Alternative A transmission line alignment is shown on Figure ES-1. The BLM-designated utility corridors in the CDCA are shown on Figure ES-2.

2.3.1 Alternative A Components

With the exceptions discussed in the following section, the structural components for Alternative A would be the same as those described for the Proposed Project (see Table 2-1).

2.3.1.1 Alternative A Transmission Line Alignment

The Alternative A transmission line alignment is shown on Figure ES-1. The Alternative A transmission line would be approximately 118 miles in length. It would follow the same alignment as the Proposed Project except the Alternative A route would parallel the I-10 corridor between Desert Center and the Cactus City rest area.

2.3.1.2 Alternative A Transmission Line Facilities (Lines and Structures)

The type of tower structures that would be used for the Alternative A transmission line would be the same as the Preferred Alternative. Steel lattice towers would be used along the entire route. All tower structures would be designed to withstand wind speeds of 108 mph. Meteorological studies would be reviewed and/or updated to evaluate and confirm maximum wind loading criteria to be used for the final design of the structures. These tower types are described for the Proposed Project in Section 2.2.2.2.

2.3.1.3 Substation Facilities

Substation facilities used for Alternative A would be the same as those described for the Proposed Project in Section 2.2.2.3.

2.3.1.4 Communication Facilities

Communication facilities and systems used for Alternative A would be the same as those described for the Proposed Project in Section 2.2.2.4.

2.3.2 Preconstruction Activities

With the exceptions discussed in the following section, preconstruction activities for Alternative A would be the same as those described for the Proposed Project.

2.3.2.1 Right-of-Way Acquisition

The right-of-way required for Alternative A would be approximately 300 feet, based on allowance for a topple distance of 125 feet and an additional 25-foot maintenance access zone on either side (the same as those described for the Proposed Project in Section 2.2.3.2). The right-of-way width would be reduced in specific locations to mitigate potential impacts to resources (e.g., historic trails, existing roads and highways, and biological and cultural resources).

Alternative A would be located adjacent to the existing PVD 1 and 2 transmission line rights-of-way for a substantial portion of its length between Midpoint and Devers as described for the Proposed Project in Section 2.2.3.2 The proposed right-of-way for the section of Alternative A between Desert Center and the Cactus City rest area would be 200 feet in width.

If the variation of Alternative A referred to as A1 were utilized, the proposed line would be built within SCE's existing and approved DPV2 right-of-way. The proposed line would be shifted only slightly under this variation. No new or additional right-of-way for the proposed line would be needed between the Midpoint Substation / Switching Station and the Devers Substation.

On federally managed public land, a Right-of-Way Grant would be required from the BLM. On state managed public land, a Land Use Lease would be required from the California State Lands Commission. On private land, sufficient easements would be acquired to locate, construct, operate, and maintain the transmission facility. All land rights would be acquired in accordance with applicable state laws governing acquisition of property rights. Landowners would be paid fair market value for the rights acquired throughout their property, and any damages resulting from construction, operation, and maintenance.

2.3.3 Project Construction

With the exceptions discussed in the following section, project construction activities associated with Alternative A would be the same as those described for the Proposed Project (see Section 2.2.4). Estimated land disturbance would be the same as that identified for the Proposed Project (see Table 2-2).

2.3.4 Operation, Maintenance, and Abandonment

Operation, maintenance, and abandonment procedures for the Alternative A transmission line would be similar to those described for the Proposed Project in Section 2.2.5.

2.3.5 Construction Workforce and Equipment

General activities, number of personnel, and length of time required to construct the Alternative A transmission line would be the same as the Proposed Project (see Table 2-4). Table 2-5 lists the type and purpose of major equipment that would be used during construction of the transmission line.

2.3.6 Construction Schedule

Alternative A is estimated to take approximately 12 months to construct. Construction activities would start after the environmental review process and permitting are finalized.

2.4 Alternative B – Southern Route Alternative

If Alternative B were selected, the new transmission line would have to be built at 230-kV. Alternative B would include the construction of a new approximately 79-mile, 230-kV double-circuit transmission line between the new Keim Substation / Switching Station and the existing Midway Substation near Niland. In addition to the new transmission line, and the equipment upgrades at the Midway Substation, Alternative B would require upgrading segments of IID's existing KN-KS transmission line and related facilities between the existing Coachella and Mirage Substations and between the Mirage and Devers Substations. This upgrade would enable the final interconnection between the new substation/switching station and the Devers Substation commensurate with the Proposed Project.

Approximately 40 miles of the new transmission line right-of-way would be located within a BLM-designated utility corridor. However, 38 miles of the right-of-way would not be located within a BLM-designated utility corridor; therefore, an amendment to the CDCA Plan would be required. Figure ES-1 shows the locations of the new substation/switching station on Hobsonway, the Alternative B transmission line alignment, and the section of IID's existing KN-KS transmission line that would be upgraded. The BLM-designated utility corridors in the CDCA are shown on Figure ES-2.

2.4.1 Alternative B Components

Table 2-6 summarizes the various components of Alternative B. The structural components of Alternative B are discussed in the following sections.

Table 2-6
Summary of Alternative B Components

Proposed Route and Right-of-Way

- Route Length: 79 miles (plus upgrades to an additional 35 miles of existing transmission lines).
- Initiation Point: New Keim Substation / Switching Station south of the Blythe Energy Project area.
- Termination Point: Midway Substation near Niland, CA. (Upgrades to segments of existing transmission lines between Coachella, Mirage, and Devers substations would achieve connection with Devers Substation.)
- Right-of-Way Width: 300 feet. The right-of-way width would be reduced in specific locations to mitigate potential impacts to resources (e.g., historic trails, existing roads and highways, and biological and cultural resources).
- Total Right-of-Way Acreage: 2,790 acres.

Transmission Line Facilities (double circuit, 230-kV)

- Conductors: Two, 3-phase AC circuits consisting of one or two 1-inch ACSR conductors per phase.
- Minimum Conductor Distance from Ground: 30 feet at 60 °F and 27 feet at the maximum operating temperature.
- Shield Wires: One for single pole designs and two for H-frame designs of 3/8 to 3/4-inch-diameter wire(s).
- Transmission Line Tower Types:
    - Single-pole steel structures entire route, with the exception of other transmission line crossings.
    - Structure Heights (approximate): Single Pole – 100 to 125 feet; H-frame – 45 to 65 feet.
- Distance between Towers (approximate): Single Pole – 800 to 1,200 feet.
- Total Number of Towers (approximate): 354 - 465 depending on final design.
- Total Number of Towers to be upgraded (approximate): 121
- Number of New "Inset" Towers in Upgrade Segments: 7

Substation Facilities

Expansion of existing facilities at substations would be necessary for Alternative B. The following modifications at existing substations, or at substations being completed as part of other projects, would be necessary:

- A new substation/switching station near the Blythe Energy Project (referred to as Keim). This will require a total area of approximately 25 acres.
- Midway Substation near Niland, CA: Existing facilities would be expanded at the existing Midway Substation to accommodate the new transmission line and to rearrange existing transmission line approaches to the substation to provide the necessary clearances between adjacent lines and other facilities. This will require a total area of approximately 2 acres.
- Coachella Substation: Existing facilities would be upgraded. All improvements would be within the existing footprint of the substation.
- Mirage Substation: Existing facilities would be expanded. All improvements would be within the existing footprint of the substation.

Table 2-6
Summary of Alternative B Components

• Devers Substation: Facilities would be expanded at the existing Devers Substation, north of Palm Springs, California, to accommodate interconnection of the Proposed Project transmission line, reconfigure existing transmission line approaches to the substation, and provide the necessary clearances between adjacent transmission lines and other facilities.
Communications Facilities • Systems: Digital Radio System, VHF/UHF radio. • Functions: Communications for fault detection, line protection, SCADA, and two-way voice communication.

2.4.1.1 Alternative B Transmission Line Alignment

The Alternative B transmission line alignment would originate at the new Keim Substation / Switching Station located south of the Blythe Energy Project Area. It would proceed along existing transmission line rights-of-way to the southwest paralleling IID's F Line to the point where it intercepts Western's existing 161-kV transmission line. At that point, the line would parallel the Western transmission line, crossing SR-78 and turning southwest to parallel SR-78. From that point the line would parallel SR-78 on the north, passing south of the Chocolate Mountains Aerial Gunnery Range (CMAGR) and continuing southwest to intercept the Southern Pacific Railroad (SPRR) right-of-way near Glamis, California. The alignment would then turn northwest to parallel the SPRR tracks and continue to Iris, California, where it would turn towards and continue to the Midway Substation near Niland.

As shown on Figure ES-1, one segment alignment option is under consideration for the Alternative B transmission line. Option B-1 would shift the transmission line alignment eastward for a distance of approximately 14 miles, increasing the total length of the transmission line by approximately 4 miles. This segment of the Alternative B transmission line alignment was originally conceived to follow the approved right-of-way for the North Baja Pipeline Project (NBP). The right-of-way for Option B-1 would not be located within a BLM-designated utility corridor.

As discussed above, Alternative B would also require upgrading segments of two existing transmission lines that interconnect the Coachella and Mirage Substations, and Mirage and Devers Substations (see Sections 2.4.1.2.1 and 2.4.1.2.2). Upgrading segments of these existing transmission lines would enable transmission interconnection between Buck Boulevard Substation and the Devers Substation similar to what would be achieved by the Proposed Project.

2.4.1.2 Alternative B Transmission Line Facilities (Lines and Structures)

The Alternative B transmission line would utilize double-circuit, single-column steel pole support structures along its entire route between the new Keim Substation / Switching Station and the Midway Substation, with the exception of two pairs of H-frame structures that would be necessary for undercrossing an existing 500-kV transmission line. These structures are described below.

2.4.1.2.1 230-kV Single Steel Pole Structures – Figure 2-5 illustrates the typical double-circuit 230-kV single steel pole tower structure that would be used for this alternative. Pole heights would vary from 100 to 150 feet above the ground surface depending on terrain and associated span lengths. Span lengths would range from 400 to 1,600 feet depending on final design and line capacity requirements.

Three horizontal arms would extend from the main pole to support three 230-kV phases consisting of two conductors per phase on each side of the main pole. The horizontal arms would extend approximately 12 feet from each side of the main pole with a vertical spacing of approximately 18 feet. A caisson foundation approximately 35 feet deep and 6 feet in diameter would be used to support each steel pole. A flanged base of each steel pole would be bolted to the caisson foundation.

2.4.1.2.2 230-KV Steel Pole H-Frame Structures – A single-circuit, double-column steel H-frame structure would be used as needed for connections with existing facilities and for specific instances where crossing other existing transmission facilities would be required. Steel H-frame structures would be used for the Alternative B transmission line when undercrossing the existing SCE 500-kV transmission line. A diagram of a typical H-frame structure is provided in Figure 2-6. Each H-frame structure would support three conductors (i.e., one circuit). As such, two parallel pairs of H-frame structures would be necessary. Each pair of H-frame structures would be placed perpendicular to one another in relation to the transmission line alignment, and would be separated by a distance of 70 feet (center to center). The H-frame structure heights would vary from 75 to 100 feet with span lengths ranging from 600 to 800 feet, passing under the 500-kV transmission line. Each H-frame structure would have a ground footprint of 4 feet by 28 feet that includes the two poles, ground rods, and other hardware. Caisson foundations approximately 30 feet deep by 7 feet diameter would be used to support each H-frame structure.

2.4.1.3 Transmission Line Upgrades

In addition to construction of the new 230-kV transmission lines between the new Keim Substation / Switching Station and the Midway Substation, Alternative B would require upgrading approximately 25 miles of an existing transmission line between the Coachella and Mirage Substations, and upgrading approximately 15 miles of an existing transmission line between the Mirage and Devers Substations. These two segments are referred to herein as Upgrade Segment 1 and Upgrade Segment 2, and are discussed in more detail in the following sections (See Figure ES-1).

2.4.1.3.1 Upgrade Segment 1 – Approximately 25 miles of IID's existing KN-KS 230-kV transmission line between IID's Coachella Substation and SCE's Mirage Substation would be upgraded. Tower upgrades would include expanding concrete tower foundations and adding structural steel members to existing lattice towers. These modifications would be necessary to increase the wind-loading capability of the existing transmission line towers from 60 to 108 mph, as required by IID. Replacing conductors of Segment 1 would entail replacing an existing single conductor with a doubled, bundled, multi-wire conductor.

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Figure 2-5 Typical Double-Circuit 230-kV Steel Pole Structure

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Figure 2-6 Typical Single-Circuit 230-kV H-Frame Structure

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2.4.1.3.2 Upgrade Segment 2 - Approximately 15 miles of IID's existing KN-KS 230-kV transmission line between SCE's Mirage and Devers Substations would undergo upgrades. The transmission line improvements would consist of adding 7 new inset steel lattice towers or steel poles at selected locations within the existing easement and increasing the height of 21 existing towers. The increases in tower heights would range between 5 and 48 feet with an average increase of 30 feet. Inset towers and height increases are needed to prevent tower overloads and to obtain required electrical clearances, including ground clearances.

2.4.1.4 Substation Facilities

The Alternative B transmission line would interconnect with the new Keim Substation / Switching Station and the Midway Substation. Facility modifications necessary to accommodate the Alternative B transmission line at the Midway Substation would include installing additional circuit breakers and protection devices and associated communication equipment to accommodate the new facilities. The current arrangement of the substation would be modified by relocating existing equipment to new locations and adding new equipment in place of the existing equipment. These modifications would be made within the existing substation perimeter and would not require additional land acquisition or disturbance of undisturbed land.

Upgrades at the Coachella, Mirage, and Devers Substations would also be necessary in association with improvements that would be made to Upgrade Segments 1 and 2 transmission line.

2.4.1.5 Communication Facilities

Communication facilities and systems used for Alternative B would be the same as those described for the Proposed Project in Section 2.2.2.4.

2.4.2 Preconstruction Activities

With the exceptions discussed in the following section, preconstruction activities for Alternative B would be the same as those described for the Proposed Project.

2.4.2.1 Right-of-Way Acquisition

The right-of-way required for the Alternative B transmission line would be approximately 300 feet wide, based on allowance for a topple distance of 125 feet plus a 25-foot maintenance access zone on either side. The right-of-way width would be reduced in specific locations to mitigate potential impacts to resources (e.g., historic trails, existing roads and highways, and biological and cultural resources).

On federally-managed public land, a Right-of-Way Grant would be required from the BLM (the Right-of-Way Grant would be issued following the adoption of the CDCA Plan amendment that would be necessary under this alternative). On state-managed public land, a Land Use Lease would be required from the California State Lands Commission. On private land, sufficient easements would be acquired to locate, construct, operate, and maintain the transmission facility. All land rights would be acquired in accordance with applicable state laws governing acquisition of property rights. Landowners would be paid fair market value for the rights acquired for property, and any damages resulting from construction, operation, and maintenance.

2.4.3 Project Construction

Project construction activities associated with Alternative B would be similar to those described for the Proposed Project in Section 2.2.4. Construction methods associated with Upgrade Segments 1 and 2 under this alternative are described below. Table 2-7 lists estimated land disturbance for Alternative B.

Table 2-7
Alternative B Land Disturbance by Project Feature

Project Feature	Acres Disturbed During Construction	Temporary Disturbance/Acres to be Restored	Acres Permanently Disturbed
Structure Sites	494 - 657	469 - 624	25 – 33[a]
Existing Access Roads	11[b]	9	2
New Access Roads[c]	24	12	12
Staging Areas	30	30	0
Pull Sites	43	43	0
New Keim Substation/Switching Station	25		25
Upgrade Segment 1	25	25	0
Upgrade Segment 2	10	8	2
Devers Substation (expansion)	5		5
Total Estimated	667 – 830	596 - 751	71 – 79

[a] Area at structure sites includes short access road from the existing maintenance roads.
[b] Existing roads would require upgrades to allow passage of heavy equipment to set structures and deliver concrete.
[c] Approximately 10 miles of new roads, 20 feet wide, would be required to access structure sites for construction. It is estimated that 50 percent of the roads would be restored.

2.4.3.1 Upgrade Segment 1 Construction

Towers between the IID Coachella and SCE Mirage Substations (approximately 100 towers) would receive structural and foundation reinforcement, as described below. Towers would be accessed by an existing road within the utility corridor right-of-way.

The existing lattice towers in Segment 1 would require foundation work and tower reinforcement work. Foundation work would entail adding concrete to the foundation of each tower leg. A temporary construction zone (including lay-down area) of approximately 100 feet by 100 feet would be required for each tower (approximately 0.25 acre per tower). Tower reinforcement work would require unbolting and lowering the tower arms to the ground by crane where they would be reinforced with structural steel, then raised and bolted back into position. Similar reinforcement would be performed on the main structure and legs of the lattice towers.

Following foundation work and tower reinforcement, the towers would be restrung with new conductors. Replacing conductors would require removal of existing conductors, and restringing new conductors in a manner similar to that described in Section 2.2.4. Replaced conductors would be removed from the site and recycled or disposed at an appropriate receiving site.

2.4.3.2 Upgrade Segment 2 Construction

Temporary construction zones (including lay-down areas) approximately 200 feet by 200 feet would be necessary for construction of each new inset tower and for each tower raising (approximately one acre per site). Construction equipment and vehicles would use existing access roads within the utility corridor, although a minimal amount of grading may be necessary to accommodate construction equipment. For new inset towers, short spur roads may need to be constructed from the existing access road to each tower site. Locations of new spur road construction would be situated to avoid areas determined to be environmentally sensitive.

Temporary disturbance around each tower requiring new foundation would be limited to a 100-foot-radius around the foundation which would be contained within the 200-foot by 200-foot construction zone. Material removed during the excavation process would be set aside and disposed according to applicable laws. Disturbance would consist of soil compaction from placement of crane outrigger pads and vehicle tracks, and excavation that may be necessary for foundation improvements. Erection of steel poles or lattice towers would be as described in Section 2.2.4. Foundation improvements may be necessary for some of the towers to be raised, and a final determination would be made during final design. Replacing conductors would consist of removing existing conductors, and restringing new conductors in a manner similar to that described in Section 2.2.4. The typical distance between pulling and tensioning equipment is 2 to 3 miles: However, some locations may require equipment separation to be limited to several thousand feet. Temporary disturbance at each pulling site area is estimated at 50 feet by 100 feet, and disturbance at each tensioning site would be approximately 100 feet by 300 feet.

2.4.4 Operation, Maintenance, and Abandonment

Operation, maintenance, and abandonment procedures for the Alternative B transmission line would be similar to those described for the Proposed Project in Section 2.2.5.

2.4.5 Construction Workforce and Equipment

General activities, number of personnel, and length of time to complete various construction activities for the Alternative B transmission line are shown in Table 2-8. Construction equipment required to build the transmission line would be similar to that identified for the Proposed Project.

2.4.6 Construction Schedule

Alternative B is estimated to take approximately 12 months to construct. Construction activities would start after the environmental review process and permitting are finalized.

Table 2-8
Alternative B Construction Personnel Requirements[a]

Activity	Number of Personnel	Rate of activity (per week)	Length of Time (weeks)
Surveying	18	18 miles	6
Environmental Resource Surveys	20	20 miles	6

Table 2-8
Alternative B Construction Personnel Requirements[a]

Activity	Number of Personnel	Rate of activity (per week)	Length of Time (weeks)
Environmental Resource Monitors (cultural resources and special-status species)	12	N/A	Duration of construction activities in sensitive areas.
Access Layout	10-20	18 miles	6
Structure Sites	16	10 miles	11
Hole Excavation and Foundation Installation	72	4 miles	28
Construction Yards and Material Staging	32	8 miles	14
Structure Assembly and Erection	48	4 miles	28
Shieldwire and Conductor Stringing	68	6 miles	19
Cleanup	24	12 miles	9
Rehabilitation	24	12 miles	9

[a] Assumes two construction divisions with full crews in each.

2.5 Alternative C – Third Northern Route Alternative

Alternative C would be similar in design and structure to the Proposed Project. This alternative would include the construction, operation, and maintenance of a new, approximately 117-mile-long, 500 kV transmission line from the new Keim Substation / Switching Station, to SCE's Devers Substation (also shown on Figure ES-1). However, Alternative C would generally parallel I-10 for much of its length (the Alternative C transmission line alignment is located at varying distances – approximately 1 to 4 miles – north of the Proposed Project transmission line alignment).

The Alternative C transmission line would be located entirely within a BLM-designated utility corridor in areas of the CDCA; therefore, a CDCA Plan amendment would not be required. The Alternative C transmission line alignment is shown on Figure ES-1. The BLM-designated utility corridors in the CDCA are shown on Figure ES-2.

2.5.1 Alternative C Components

Table 2-9 summarizes the various components of Alternative C. The structural components of Alternative C are discussed in the following sections. Note that many of the components would be similar to those described for the Proposed Project.

Table 2-9
Summary of Alternative C Components

Proposed Route and Right-of-Way

- Transmission Line Length: approximately 117 miles.
- Initiation Point: New Keim Substation / Switching Station south of the Blythe Energy Project area
- Possible future connection with IID's system at Dillon Road near Coachella, CA
- Termination Point: SCE's Devers Substation near Palm Springs, CA.
- Right-of-Way Width: 300 feet. The right-of-way width would be reduced in specific locations to mitigate potential impacts to resources (e.g., historic trails, adjacent land restrictions, existing roads and highways, and biological and cultural resources).
- Total Right-of-Way Acreage: approximately 4,250 acres.

Table 2-9
Summary of Alternative C Components

Transmission Line Facilities (single-circuit, 500-kV)
• Conductors: One 3-phase AC circuit consisting of two 1.5 to 2-inch ACSR conductors per phase.
• Minimum Conductor Distance from Ground: 30 feet at 60 °F and 27 feet at the maximum operating temperature.
• Shield Wires: Two 1/2 to 3/4-inch-diameter wire(s) for steel lattice.
• Transmission Line Tower Types:
  - Steel Lattice Tower along entire route.
  - Structure Heights (approximate): Steel Lattice – 100 to 180 feet.
• Average Distance between Towers: Steel Lattice – 1,400 feet*.
• Total Number of Towers (approximate): 405 – 440*.

Substation Facilities • A new substation/switching station near the Blythe Energy Project (referred to as Keim). This will require a total area of approximately 25 acres. • A new substation/switching station at the intersection of the existing DPV1 line and the proposed line (Midpoint). • In the future, a new substation/switching station on Dillon Road, requiring a total area of approximately 25 acres. • Devers Substation: Facilities would be expanded at the existing Devers Substation, north of Palm Springs, California, to accommodate interconnection of the Proposed Project transmission line and to reconfigure existing transmission line approaches to the substation to provide the necessary clearances between adjacent transmission lines and other facilities.
Communications Facilities • Systems: Digital Radio System, microwave, VHF/UHF radio. • Functions: Communications for fault detection, line protection, SCADA, two-way voice communication.
* The exact quantity and placement of the structures depends on the final detailed design of the transmission line, which is influenced by the terrain, land use, and economics. Alignment options may also slightly increase or decrease the quantity of structures.

2.5.1.1 Alternative C Transmission Line Alignment

The Alternative C transmission line alignment is shown on Figure ES-1. The Alternative C transmission line would be approximately 117 miles in length, and would originate at the new Keim Substation / Switching Station (also shown on Figure ES-1). The transmission line would proceed southwest along existing transmission line right-of-ways approximately 1 mile. At this point the line would turn west and proceed approximately 3 miles to a point where it turns northwest, and crosses I-10. From that point, the line would parallel I-10 to a point approximately 20 miles southeast of Desert Center where the line would turn southwest and cross I-10. The line would then parallel I-10 until approximately 2.5 miles east of the Cactus City rest area where the line would cross to the north side of I-10 and continue west adjacent to the existing DPV1 transmission line and DPV2 right-of-way to the termination point at Devers Substation.

2.5.1.2 Alternative C Transmission Line Facilities (Lines and Structures)

As with the Proposed Project, the type of tower structures that would be used for the Alternative C transmission line would be steel lattice towers along the entire route. All tower structures would be designed to withstand minimum wind speeds of 90 mph. Meteorological studies will be completed to evaluate maximum wind loading criteria to be used for the final design of the structures. These tower types would be the same as those described for the Proposed Project in Section 2.2.2.2.

2.5.1.3 Substation Facilities

Substation facilities used for Alternative C would be the same as those described for the Proposed Project in Section 2.2.2.3.

2.5.1.4 Communication Facilities

Communication facilities and systems used for Alternative C would be the same as those described for the Proposed Project in Section 2.2.2.4.

2.5.2 Preconstruction Activities

With the exceptions discussed in the following section, preconstruction activities for Alternative C would be the same as those described for the Proposed Project.

2.5.2.1 Right-of-Way Acquisition

The right-of-way required for Alternative C would be approximately 300 feet, based on allowance for a topple distance of 125 feet and an additional 25-foot maintenance access zone on either side (the same as those described for the Proposed Project in Section 2.2.3.2). The right-of-way width would be reduced in specific locations to mitigate potential impacts to resources (e.g., historic trails, existing roads and highways, and biological and cultural resources).

On federally-managed public land, a Right-of-Way Grant would be required from the BLM. On state-managed public land, a Land Use Lease would be required from the California State Lands Commission. On private land, sufficient easements would be acquired to locate, construct, operate, and maintain the transmission facility. All land rights would be acquired in accordance with applicable state laws governing acquisition of property rights. Landowners would be paid fair market value for the rights acquired throughout their property, and any damages resulting from construction, operation, and maintenance.

2.5.3 Project Construction

Project construction activities associated with Alternative C would be similar to those described for the Proposed Project in Section 2.2.4. Table 2-10 lists estimated land disturbance for Alternative C.

Table 2-10
Alternative C Land Disturbance by Project Feature

Project Feature	Acres Disturbed During Construction	Temporary Disturbance/Acres to be Restored	Acres Permanently Disturbed
Structure Sites	701 – 936	665 - 888	36 – 48[a]
Access Roads	20[b]	7	13
Staging Areas	28	28	0
Pull Sites	63	63	0
New Substation/Switching Stations[d] (3)	75 - 100		75 - 100
Devers Substation (expansion)	5		5
Total Estimated	892 - 1152	763 - 986	129 - 166

[a] Area at structure sites include short access road from the existing maintenance roads.
[b] Existing roads will require upgrades to allow passage of heavy equipment to set structures and deliver concrete.
[d] The Keim Substation/Switching Station would require approximately 25 acres; the Midpoint Substation/Switching Station would require approximately 25 to 50 acres; and the Substation/Switching Station on Dillon Road would require approximately 25 acres.

2.5.4 Operation, Maintenance, and Abandonment

Operation, maintenance, and abandonment procedures for the Alternative C transmission line would be similar to those described for the Proposed Project in Section 2.2.5.

2.5.5 Construction Workforce and Equipment

General activities, number of personnel, and length of time to construct the Alternative C transmission line would be the same as the Proposed Project (see Table 2-11).

Table 2-11
Alternative C Construction Personnel Requirements[a]

Activity	Number of Personnel	Rate of activity (per week)	Length of Time (weeks)
Surveying	18	18 miles	8
Environmental Resource Surveys	20	20 miles	7
Environmental Resource Monitors (cultural resources and special-status species)	12	N/A	Duration of construction activities in sensitive areas.
Access Layout	10-20	18 miles	8
Structure Sites	16	10 miles	15
Hole Excavation and Foundation Installation	72	4 miles	37
Construction Yards and Material Staging	32	8 miles	19
Structure Assembly and Erection	48	4 miles	37
Shieldwire and Conductor Stringing	68	6 miles	25
Cleanup	24	12 miles	12
Rehabilitation	24	12 miles	12

[a] Assumes two construction divisions with full crews in each.

2.5.6 Construction Schedule

Alternative C is estimated to take approximately 12 months to construct. Construction activities would start after the environmental review process and permitting are finalized.

2.6 No Action Alternative

Under the No Action Alternative, the BLM would not issue a Right-of-Way Grant for the construction of the Proposed Project.

2.7 Alternatives Overview and Screening

2.7.1 NEPA Requirements for Alternatives

One of the most important aspects of the environmental review process is the identification and assessment of reasonable alternatives to the proposed action that would avoid or minimize adverse effects [40 C.F.R. § 1500.2(e)]. The CEQ NEPA regulations set forth the following requirements for the analysis of alternatives in an EIS, at 40 C.F.R. § 1502.14.

[The alternatives] section is the heart of the environmental impact statement. Based on the information and analysis presented in the sections on the Affected Environment (§ 1501.16), it should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision-maker and the public. In this section, agencies shall:

(a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives that were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.

(b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.

(c) Include reasonable alternatives not within the jurisdiction of the lead agency.

(d) Include the alternative of no action.

(e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.

(f) Include appropriate mitigation measures not already included in the proposed action or alternatives.

In the context of licensing and permitting actions by federal agencies, the CEQ has advised that "[r]easonable alternatives include those that are *practical or feasible* from the technical and economic standpoint and using common sense." 48 Federal Regulations 34263, 34267 (July 28, 1983).

2.7.2 CEQA Requirements for Alternatives

Section 15126(d) of the State CEQA Guidelines requires a discussion of a reasonable range of alternatives to the Project, or to the location of the Project, which would feasibly attain most of the basic objectives of the Project. The comparative merits of the alternatives should also be presented. CEQA provides the following guidelines for discussing alternatives to a Proposed Project:

- If there is a specific Proposed Project or a preferred alternative, explain why the other alternatives were rejected in favor of the proposal if they were considered in developing the proposal.
- The specific alternative of "No Project" shall also be evaluated along with the impacts of this alternative. If the environmentally superior alternative is the No-Project Alternative, the EIR shall also identify the environmentally superior alternative among the other alternatives.
- The discussion of alternatives shall focus on alternatives which are capable of avoiding or substantially lessening any significant effects of the Project, even if these alternatives would impede to some degree the attainment of the Project objectives, or would be more costly.

- If an alternative would cause one or more significant effects in addition to those that would be caused by the Project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the Project as proposed.
- The range of alternatives required in an EIR is governed by the "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. The key issue is whether the selection and discussion of alternatives fosters informed decision-making and informed public participation. An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.

2.7.3 Alternatives Screening Methodology

Since the Federal actions associated with the development of the Proposed Project are limited primarily to the issuance of applicable permits necessary for the construction and operation of the Project, alternatives to these actions are similarly limited. However, a range of potential alternatives to the Proposed Project were considered and evaluated, as discussed below, to consider alternatives projects that may avoid or minimize potential adverse effects of the Proposed Project. Potential alternatives to the Proposed Project were identified on the basis of issues and concerns identified during the NEPA and CEQA scoping process.

The alternatives screening process consisted of three steps:

Step 1: - Identify the basic objectives of the Proposed Project.

Step 2: - Identify the primary environmental issues associated with the construction and operation of the Proposed Project.

Step 3: - Identify a reasonable range of potential alternatives and evaluate each alternative using the following criteria:

- Potential to provide a clear environmental advantage over the Proposed Project;
- Technical and regulatory feasibility; and
- Consistency with project objectives, the project's purpose and need, and public policy objectives.

Alternatives that met the screening criteria of Step 3 were carried forward for detailed analysis in the Draft EIS/EIR. Those alternatives that did not meet both criteria were not evaluated further. The particular reasons for removing them from consideration are provided in Table 2-12.

2.7.3.1 Objectives of the Proposed Project

The basic objectives of the Proposed Project are:

Objective-1: - Ensure access to competitive generation sources that would allow IID to minimize the market price spikes, which adversely affect the region's customers.

Objective-2: - Provide direct transmission access to new generation sources (e.g., the Griffith Energy Project, the South Point Energy Project, and the Blythe Power Plant) to meet the increased demands for electrical power in IID's service area.

Objective-3: - Enhance system reliability by providing additional transmission line capacity and thus improve loading situations on other transmission lines.

Objective-4: - Improve operational flexibility during normal as well as contingency situations.

2.7.3.2 Environmental Issues Identified with the Proposed Action

Issues and concerns that have been identified as part of the NEPA and CEQA scoping process include those associated with the potential effects on: 1) biological, cultural, and visual resources; 2) land use and recreation; 3) traffic and transportation; and 4) noise, public health and safety, and air quality. A discussion of these issues and concerns and how they were addressed through project design modifications or the development of mitigation measures is included in the Environmental Consequences section of each resource section (see Section 3).

2.7.4 Summary of Screening Results

2.7.4.1 Alternatives Analyzed in this Draft EIS

Sections 2.3 and 2.4 describe the alternatives that met the screening criteria and were carried forward for detailed analysis in the Draft and Final EIS/EIR. The No Action Alternative, while not meeting the objectives of the Proposed Project, was described in Section 2.5 and was considered in this EIS/EIR as required by NEPA and CEQA.

2.7.4.2 Alternatives Eliminated from Detailed Analysis in this Draft EIS

Table 2-12 describes the alternatives that did not meet both screening criteria and were eliminated from further analysis in the Draft and Final EIS/EIR and provides the reasons for removing alternatives from further analysis.

2.7.5 Environmentally Superior Alternative

Both NEPA and CEQA require the designation of the environmentally superior alternative, other than the No Project Alternative. Table ES-7 presents a summary of the comparative impacts of the three alternatives, including Variation PP1, Options A-1 and A-2, and Option B-1, evaluated in this EIS/EIR with the Proposed Project. All three alternatives would likely result in greater impacts than the Proposed Project; therefore, the Proposed Project would be the environmentally superior alternative.

Table 2-12
Results of Alternatives Screening Process

Description of Alternative	Alternative Screening Summary
TRANSMISSION ALTERNATIVES	
Construct a New 230-kV Line that would parallel or replace IID's existing F Line into the Midway Substation, with a 161-kV Tap Line from the Midway Substation to the Niland Substation – This alternative includes the construction of a new 230-kV transmission line to the Midway Substation. The existing 161-kV F Line could remain in operation or be removed. A 161-kV tap line would need to be constructed from the Midway Substation to the Niland Substation.	This alternative was eliminated from further consideration because the U.S. Navy has stated that a new transmission line would not be allowed through the CMAGR.
Upgrade the existing F Line for 230-kV operation - This option considers the coordinated removal of the existing single-circuit, 161-kV transmission line facilities for replacement along the same alignment with a double-circuit, 230-kV line.	This alternative was eliminated from further consideration because it is unclear at this time whether the U.S. Navy would allow the upgrade of the F-Line to a double-circuit, 230-kV line.
TRANSMISSION ROUTE ALTERNATIVES	
Construct a new line along different route (s) than the Proposed Project or Alternatives A and B.	Alternative routes for this transmission line other than those analyzed in detail within this Draft EIS/EIR were not considered. Only routes that utilized existing rights-of-way were considered viable options for connecting the project end-points.
Construct a new line along an alignment within BLM-designated utility corridor(s).	Following designated utility corridors was considered early in the planning process and discussed it at length with BLM representatives. Three alternative routes, the Proposed Project and Alternatives A and C are considered fully in this EIS/EIR.
GENERATION ALTERNATIVES	
Hydroelectric - This alternative assumes that an electric turbine could be installed on a local water resource or the Colorado River to generate hydroelectric power to supplement existing sources of electricity. The proposed hydroelectric alternative would generate only a few MW. These additional MW would be used when electrical demand could not be met.	This alternative was eliminated for a number of reasons. First, it is technically unfeasible due to the limited water resources available to generate hydroelectric power in the area. Second, this alternative would be unable to generate enough electricity to recoup costs for construction, operation, and maintenance. Third, this alternative source would also rely on consistent releases or flows from the reservoir which are currently determined by downstream water rights. Depending on who developed the hydroelectric facility, water rights would have to be obtained. This could impact the availability of water for downstream agricultural uses. If consistent flows through a dam were required to generate electricity, water may need to be released which could result in sending water downstream when it cannot be used for agricultural uses. Fourth, the biological impacts associated with effects to fish and fish habitat would also have to be considered. Fifth, this alternative would require the construction of a dam or reservoir. Permitting the construction of this type of facility is very time consuming and would result in a delay in supplying much needed electrical power to the area. Additionally, there is an increasing resistance by the public, agencies, and environmental groups regarding the construction of new dams.
Energy Storage - Battery energy storage in the area represents another alternative source of power to be considered. Batteries would charge while the demand for electricity was low, and provide power while the demand for electricity was high.	This alternative was eliminated for primarily technical reasons, because the technology is not very well developed at this time and, therefore, unreliable. Additionally, several battery storage areas would have to be located in the IID service area. After batteries discharge their rated capacity for one hour, their actual capacities are reduced to 60 percent of their rated capacities. Additional batteries could be added to allow discharge over a longer period, but larger storage areas would be required.
Photovoltaic - This alternative uses the energy of the sun to generate electrical power. A very large area would be required to harness sufficient energy to meet peak loads for the area.	This alternative was eliminated from further analysis for both environmental, technical, and economic reasons. A centralized solar energy project using the parabolic trough technology would require approximately five acres per MW. To generate 300 MW of electricity, a solar project would require approximately 1,500 acres of permanently disturbed land, which is approximately 62 times more permanent disturbance than the Proposed Project.

Table 2-12
Results of Alternatives Screening Process

Description of Alternative	Alternative Screening Summary
Geothermal - This alternative uses wind to generate electrical power.	This alternative was eliminated from further consideration for environmental and economic reasons. Additionally, this alternative was eliminated because new generating facilities are either operating, under construction, or in the permitting stage with the California Energy Commission (CEC) north, south (e.g., Salton Sea Geothermal Power Plant), and east of the area. The Salton Sea Geothermal Power Plant is not anticipated to be online until 3/2008. Geothermal exploration is being carried on in Imperial County primarily in the unincorporated areas of Heber and Niland. There are currently 15 geothermal plants employing approximately 600 employees. A 30 megawatt geothermal plant has been approved for construction in the Heber area that is expected to generate $433,000 revenue for Imperial County. A new geothermal power plant would create a new stationary pollutant source operating year round in Imperial County that would continue to increase emissions as local loads grow. The biological and visual impacts, and habitat fragmentation associated with construction of a Geothermal Power Plant would also have to be considered with this alternative. The costs associated with this alternative are expensive when compared to the costs of the other alternatives being considered in this EIS/EIR. The environmental impacts and costs associated with this alternative have eliminated the need to further evaluate it.
Wind - This alternative uses wind to generate electrical power. Electrical power is produced by wind turning large propellers. To supply sufficient energy to meet the project needs would require a large number of these wind propelled generator systems over a vast area. Additionally, this alternative depends upon wind to be available during peak demand periods.	Harnessing energy from the wind requires a major investment and large acreage of land. In addition, this alternative has significant impacts associated with visual aesthetics and noise. The source of energy for this technology cannot be depended upon to be available during periods of high electrical demand, when they would be required. While alternative sources of energy such as wind would be useful for reducing the consumption of non-renewable sources of energy, it would not be consistently available during times of high electrical demand. The high cost and low reliability of this kind of technology cannot meet the goals of the Project, therefore, this alternative has been eliminated from further analysis.
Natural Gas-Fired Generation Station - This alternative assumes that a natural gas-fired combustion turbine generator could be constructed and located in the area to supplement the electrical capability. This alternative would require the construction of support facilities, such as underground natural gas pipelines and upgrades to local substations and transmission line. The opportunities associated with this alternative include the benefits that would result from bringing natural gas to this area. Natural gas represents an inexpensive alternative to heating homes and businesses as compared to utilizing electricity and propane.	This alternative was eliminated from further consideration for environmental and economic reasons. Additionally, this alternative was eliminated because new generating facilities are either operating, under construction, or in the permitting stage with the California Energy Commission (CEC) north and east of the area. The main constraints in obtaining this power is transmission line capacity. This alternative would create a new stationary pollutant source operating year round in Imperial County that would continue to increase emissions as local loads grow. Although the turbines could meet ambient air quality standards for nitrogen oxides and carbon monoxides, they could pose a visibility concern. The biological and visual impacts, and habitat fragmentation associated with construction of a natural gas pipeline would also have to be considered with this alternative. The costs associated with this alternative are expensive when compared to the costs of the other alternatives being considered in this EIS/EIR. Construction and operation of electrical generation alternatives have various concerns associated with them. These concerns include siting, emissions, and costs that continue beyond the 20-year present value analysis. Selecting multiple sites in proximity to the area that are close to the existing transmission line and satisfactory to landowners would be a continuing problem with potentially significant cost. Any distributed generation alternative must also be tied back to the regional transmission system by means of a transmission line to ensure unit stability and to provide adequate frequency and voltage control.[3] In essence, this would create a significant stationary air pollutant source that would increase as native loads grow. Permitting for nitrous oxide and carbon monoxide emissions would be a challenge that could prevent siting and permitting activities to be successful. The environmental impacts and costs associated with this alternative have eliminated the need to further evaluate it.

Table 2-12
Results of Alternatives Screening Process

Description of Alternative	Alternative Screening Summary
ALTERNATIVE TRANSMISSION TECHNOLOGIES	
Voltages - The maximum voltage used for major AC transmission lines throughout the western United States is 500 kV. The Proposed Project would operate at 500-kV.	Higher and lower transmission line voltages are being considered for environmental and economic reasons. These voltage options are considered fully in this EIS/EIR.
Direct Current Transmission - Direct current or DC transmission is rarely suitable for projects of this voltage or length. A 500-kV AC system was selected because it has a shorter construction schedule, substantially lower cost, and would allow more flexibility for future connections to other systems.	This alternative was eliminated from further evaluation because DC transmission lines require a longer time to construct than AC lines and at a substantially higher cost because each DC terminal installation (i.e., stations that convert AC power to DC power and vise versa) is a unique and highly technical installation. Because of these unique and expensive DC terminal installations, there would also be considerable difficulty and expense to connect the DC system to any intermediate AC systems in the future.
Underground Construction - Because visual issues were identified during the scoping phase of the project, constructing the transmission line underground was considered. The following paragraphs include the advantages and disadvantages associated with this alternative method of construction. Burying transmission lines is often perceived as a way to accomplish the electrical objective of a project while minimizing visual impacts. However, there would be significant economic, technological, and environmental considerations associated with constructing a transmission line underground. Underground construction is frequently used with distribution lines that operate at 25 kV or less. At these relatively low voltages, the problems of electrically insulating each phase and of dissipating the heat generated by the conductors are not a concern. With lines of greater voltage (e.g., 500-kV line) the material costs, construction costs, and the heating of the transmission line cable all become a greater concern. The two types of underground transmission technologies are the pipe type and the solid dielectric type. The pipe type underground transmission lines have three oil impregnated paper insulated conductors in a steel pipe under high pressure with dielectric fluid (synthetic oil) as the pressurizing medium. The fluid serves to maintain the insulating properties of the oil impregnation on the paper insulation. Pressurizing plants must be placed every 3 to 5 miles depending on the terrain traversed by the line. Solid dielectric types of underground lines are insulated with either crosses link polyethylene or low-density polyethylene. Three cables are required, one per phase, and each cable is placed in a plastic duct. No dielectric fluid and, hence, no pressurizing plants are required for solid dielectric cables.	The environmental impacts of underground transmission lines differ from those of overhead lines and consequently, the siting considerations also differ. The impacts of underground transmission lines on soils, cultural sites, surface water, vegetation, and wildlife resources may be greater than those of a similarly located overhead line. The reason for these impacts is that underground construction would require a continuous trench 4 feet wide by 5 feet deep with intermediate vaults 7 feet wide by 20 feet long every 2,000 to 3,000 feet. Additionally, to install an underground line, construction equipment and vehicles must travel the entire length of the right-of-way. All gullies or washes along the route must be crossed with equipment and have the trench excavated through them to the required specification and to avoid damage by flash floods. An overhead line, in contrast, only requires excavation at each structure site, approximately 600 to 1,400 feet apart. Heat generated by the underground transmission line would also have the effect of drying the surrounding soil, which may impact vegetation. Heat dissipation is a difficult and expensive impact of underground transmission to overcome and is one reason for the high cost of such lines. Clear cutting of the entire width and length of the trench and right-of-way for the construction equipment would be required for an underground line to facilitate construction and overland travel of equipment. This could have a severe impact on soils, surface water, cultural resources, vegetation and wildlife habitat, and visual resources. By contrast, the right-of-ways for an overhead line would only require selective clearing and trimming, preserving as much of the native vegetation and wildlife habitat as possible. Location of poles could also be changed to avoid sensitive wildlife, washes, and cultural resources locations. The visual impacts of structures and conductors associated with overhead lines could be completely avoided with an underground line. However, other types of visual impacts would result from an underground line, particularly in steep and desert terrain. The additional impacts would result from increased excavation, road construction, and the need for continuous clearing of vegetation along the right-of-way. Desert terrain is very slow to recover after it has been disturbed. There would also be a visual impact from the pressurizing plants required at intermediary points along the line for a high pressure oil system, or from the large riser pole transition structures required for a solid dielectric system. By far the greatest factor to consider when evaluating overhead versus underground transmission is cost. Experience shows that costs for constructing a 230-kV underground transmission lines is five to ten times more costly than an equivalent overhead line. The reliability of underground lines is comparable to overhead lines. Although underground lines are immune to the effects of weather or lightning, the duration of an outage on an underground line can be weeks since failures are more difficult to locate and repair. In contrast, overhead line outages, while more frequent, can be corrected or repaired within hours.

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