CHAPTER 2: ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

The National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) both require consideration of a reasonable range of alternatives to the Proposed Action. In addition, CEQA requires the consideration of how to avoid or substantially lessen any of the significant or adverse effects of the Project. This chapter summarizes the development of the range of alternatives considered, describes the alternatives considered and eliminated from analysis, provides a detailed description of the proposed Barren Ridge Renewable Transmission Project (BRRTP or Project) and the Alternatives analyzed in detail, offers a comparison between the Alternatives analyzed, and presents the rationale behind the selection of the Environmentally Superior Alternative per CEQA and the Agency Preferred Alternative per NEPA.

2.1.1 ALTERNATIVES CONSIDERED AND ELIMINATED

The federal and State lead agencies identified the following alternatives, but eliminated them from detailed analysis in the Final Environmental Impact Statement/Environmental Impact Report (Final EIS/EIR) because they either did not meet the Project purpose and need/objectives or were determined to be infeasible (see Alternatives Development Report in Appendix B of this Final EIS/EIR).

- Generation Alternatives
  - Energy Conservation and Demand-Side Management
  - Distributed Generation and In-Basin Generation Expansion
  - Solar Generation
- Design Alternatives
  - Accessing Other Renewable Areas
  - Direct Current Technology
  - Quad-Circuit Towers
  - Alternative Voltages
  - Underground Transmission
  - Only Reconductor Existing Transmission Line (No New Transmission Line)
  - Only New 230 kV Transmission Lines (No Reconductoring of BR-RIN)
- Routing Alternatives
  - Midway to Vincent Corridor
  - Bouquet Canyon Alternative
  - Antelope Valley Alternative
  - Elizabeth Lake Tunnel
  - Haskell Canyon Switching Station Site B

2.1.2 ALTERNATIVES CONSIDERED IN DETAIL

The federal and State lead agencies identified the five Alternatives below to be carried forward and analyzed in this Final EIS/EIR: the No Action Alternative, the Proposed Action (Alternative 2), Alternative 1, Alternative 2a, and Alternative 3.
**No Action Alternative**

The No Action Alternative is required by NEPA and CEQA. Under the No Action Alternative, the construction of the new 230 kilovolt (kV) transmission line, addition of a new circuit on existing structures from Haskell Canyon to the Castaic Power Plant, reconductoring of the existing Barren Ridge to Rinaldi (BR-RIN) 230 kV transmission line, construction of a Haskell Canyon Switching Station, and expansion of the existing Barren Ridge Switching Station would not occur. Current, ongoing operation and maintenance activities for existing transmission line and switching station facilities in the Project area would continue by utility maintenance personnel.

**Action Alternatives**

Each action Alternative includes the construction, operation, maintenance, and decommissioning of the same five Project components, listed below, but proposes alternate routes for the proposed 230 kV double-circuit transmission line from the Barren Ridge Switching Station to the proposed Haskell Canyon Switching Station. These components are illustrated in Figure 2-1.

1) Expansion of the existing Barren Ridge Switching Station;
2) Construction of a new switching station in Haskell Canyon;
3) Construction of a new 230 kV double-circuit transmission line from the Los Angeles Department of Water and Power (LADWP) Barren Ridge Switching Station to the proposed Haskell Canyon Switching Station (item #2 above); length of the transmission line would vary by Alternative;
4) Reconductoring of 76 miles of the existing BR-RIN 230 kV transmission line with larger-capacity conductors between the Barren Ridge Switching Station and the Rinaldi Substation;
5) Addition of 12 miles of new 230 kV circuit on the existing double-circuit structures from Haskell Canyon to the Castaic Power Plant.
FIGURE 2-1. ACTION ALTERNATIVES

Action Alternatives

Alternative Routes for 230 kV Transmission Line
- Alternative 1
- Alternative 2 - Proposed Action
- Alternative 2a
- Alternative 3

A - K Original Segment Labels

Project Components Applicable for each Alternative
- New 230 kV Circuit
- Reconductoring of Existing 230 kV Transmission Line (Barren Ridge - Rinaldi)
- Expansion of Existing Switching Station
- New Switching Station
Proposed Action (Alternative 2)

The new 230 kV double-circuit transmission line for Alternative 2 would be 61 miles long and run from the Barren Ridge Switching Station to the proposed Haskell Canyon Switching Station, paralleling LADWP’s existing BR-RIN 230 kV transmission line for the entire length. Impacts would be concentrated along this utility corridor. The addition of a new 230 kV circuit from the Castaic Power Plant to the proposed Haskell Canyon Switching Station would occur in a separate utility corridor from that of the new 230 kV transmission line. This Alternative would have the potential to affect portions of unincorporated Kern and Los Angeles Counties; the unincorporated communities of Mojave, Willow Springs, Antelope Acres, Elizabeth Lake, Green Valley, and Saugus; and cities of Santa Clarita and Los Angeles.

Alternative 1

The new 230 kV double-circuit transmission line for Alternative 1 would be 83 miles long from the Barren Ridge Switching Station to the proposed Haskell Canyon Switching Station and would be the westernmost Alternative. The addition of the new 230 kV circuit from the Castaic Power Plant to the proposed Haskell Canyon Switching Station would parallel the new 230 kV transmission line for eight miles. The reconductoring of the existing BR-RIN 230 kV transmission line would occur in a separate utility corridor. Alternative 1 has the potential to impact portions of unincorporated Kern and Los Angeles Counties; the unincorporated communities of Mojave, Holiday Valley Estates, Castaic, and Saugus; and cities of Santa Clarita and Los Angeles. Eight miles of the new transmission line would be constructed utilizing helicopter mitigation.

Alternative 2a

Alternative 2a’s new 230 kV double-circuit transmission line from the Barren Ridge Switching Station to the proposed Haskell Canyon Switching Station would be 63 miles long and would follow a route very similar to the Proposed Action (Alternative 2). The two Alternatives share the same proposed alignment for 56 miles, but for seven miles, Alternative 2a would be re-routed around the unincorporated community of Green Valley and would run outside of existing utility corridors through the Angeles National Forest (ANF). The same communities as Alternative 2 would be potentially impacted.

Alternative 3

The new 230 kV double-circuit transmission line for Alternative 3 would be 76 miles long from the Barren Ridge Switching Station to the proposed Haskell Canyon Switching Station. This Alternative would be the easternmost Alternative. Approximately 38 miles of Alternative 3’s northern alignment would parallel the reconductoring of BR-RIN, and impacts would be concentrated within the same corridor. Thirty-four miles of the southern portion of the Alternative would be placed in a separate utility corridor from the reconductoring; 11 miles of Alternative 3 would be within an existing utility corridor containing only Southern California Edison (SCE) transmission lines. The installation of the new 230 kV transmission circuit from Castaic Power Plant to the proposed Haskell Canyon Switching Station would not share a corridor with the new 230 kV double-circuit transmission. Alternative 3 has the potential to impact portions of unincorporated Kern and Los Angeles Counties; unincorporated communities
of Mojave, Willow Springs, Leona Valley, Antelope Acres, Agua Dulce, Castaic and Saugus; and cities of Lancaster, Palmdale, Santa Clarita, and Los Angeles.

**Decisions to be Made by BLM**

This document address both planning and implementation decisions. Planning decisions differ from implementation decisions in that they allocate land uses, rather than approve a specific action. On BLM-managed land, the application area is within the California Desert Conservation Area (CDCA) planning area, which requires that all transmission lines over 161 kV are placed within a designated corridor, or be considered through the planning process. On BLM-managed land, all portions of the action Alternatives would be entirely within a designated corridor. For the purposes of this document, the BLM would make the following implementation decisions:

For the implementation (construction, operation, maintenance, and decommissioning) of any one of the action Alternatives on BLM-managed public lands, BLM will need to take the following actions:

1. Grant 3.7 miles of new 200-foot-wide right-of-way adjacent to existing transmission lines for the new 230 kV double-circuit transmission line;
2. Authorize 3.8 miles of reconductoring of the existing Barren Ridge-Rinaldi transmission line on an existing right-of-way on BLM-managed lands (BLM Right-of-Way Grant LA-088876 as authorized by Congress in the Act of October 10, 1949); and
3. Authorize 275 feet of new 230 kV circuit on existing double-circuit structures on an existing right-of-way on BLM managed lands (BLM Right-of-Way Grant RI-2822).

**2.2 DEVELOPMENT OF ALTERNATIVES**

**2.2.1 NEPA & CEQA REQUIREMENTS FOR ALTERNATIVES**

NEPA and CEQA both require consideration of a reasonable range of alternatives to the Proposed Action. In addition, CEQA requires the consideration of how to avoid or substantially lessen any of the significant or adverse effects caused by the Project. The NEPA and CEQA requirements for the identification of project alternatives are described below.

The Council on Environmental Quality’s NEPA Regulations (40 CFR 1502.14) require an EIS to present the environmental impacts of the proposed action and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision makers and the public. The analysis of Alternatives shall:

(a) Rigorously explore and objectively evaluate all reasonable alternatives and, for alternatives which 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 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.

CEQA Guidelines (Section 15126.6) state the following:

(a) An EIR shall describe a range of reasonable alternatives to the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives.

(b) The discussion of alternatives shall focus on alternatives to the project or its location 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.

(c) The EIR should briefly describe the rationale for selecting the alternatives to be discussed. The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency’s determination. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts.

(d) The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project.

(e) The EIR shall include the evaluation of the “No project” alternative.

(f) The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project. The range of feasible alternatives shall be selected and discussed in a manner to foster meaningful public participation and informed decision making.

An Alternatives Development Report (refer to Appendix B of this Final EIS/EIR) was prepared to document the development of alternatives and determine which alternatives would be considered for full analysis in the Draft EIS/EIR. The Alternatives Development Report documents the range of alternatives that were considered, describes the approach and methodology used in evaluating potential alternatives, and provides rationale for elimination or retention of alternatives. Through a siting and routing evaluation, the scoping process, supplemental studies and consultations, and input provided by the public, a range of alternatives were identified. The siting and routing evaluation identified nine preliminary routing paths (Segments A through I). During the scoping process, additional routing alternatives or modifications of the Segments were suggested by the public. The public also suggested different types of generation and design alternatives.
To determine which alternatives would be analyzed in this Final EIS/EIR, alternatives were evaluated to determine whether they would:

1. Attain the purpose and need/objectives of the Project.
2. Have the potential to avoid or substantially lessen any of the significant or adverse effects of the Project.
3. Be considered feasible.

Sixteen alternatives (categorized as generation and transmission, design, or routing alternatives) were considered and eliminated from further study. Some of the preliminary routing paths were modified and later combined to create end-to-end routing Alternatives carried forward for evaluation in this Final EIS/EIR.

**Regional Siting and Routing Evaluation**

In May 2007, LADWP conducted a regional siting and routing evaluation for the proposed Barren Ridge to Castaic 230 kV Transmission Line Project (renamed in March 2008 as the Barren Ridge Renewable Transmission Project). A study area for the siting of an electrical transmission line was identified by utilizing physical features of the area to create boundaries. Interstate 5 (I-5) became the western boundary; the northern boundary followed the Tehachapi Mountains; State Route 14 and Edwards Air Force Base created an eastern boundary; and the Santa Clara River and San Gabriel Mountains formed the southern boundary. Because multiple crossings of any these features by the proposed Project would be very difficult, they formed a reasonable geographical boundary to the area in which the proposed Project would be feasible. The area measured approximately 819,000 acres (approximately 1,280 square miles), and was utilized as the basis for data inventory and mapping and sensitivity analyses.

Environmental resource data were gathered within the study area, and resource sensitivity was developed for six disciplines: land use, visual resources, biological (wildlife and botanical) resources, cultural resources, water resources, and geohazards. “Sensitivity” is defined as a measure of probable adverse response of a resource to direct and indirect impacts associated with the construction, operation, maintenance, and decommissioning of the proposed high-voltage transmission line. Sensitivity levels were categorized as exclusion, high avoidance, moderate avoidance, or low avoidance. Areas of low sensitivity and linear features (e.g., highways, existing transmission lines, pipelines, aqueducts) were considered siting opportunities for the new 230 kV transmission line. Resource data were then mapped in a geographic information system (GIS) to identify areas of opportunity or constraint, and ground reconnaissance was completed to verify and supplement inventory mapping.

Several potential corridors were eliminated from further consideration due to dense urban development, other conflicting land uses, transmission reliability constraints, or the potential to add significant length to the proposed transmission line. As a result, over 200 miles of preliminary routing segments or corridors (also known as Segments A through K) were identified for the siting of a new 230 kV transmission line, reconductoring of an existing transmission line, and addition of a new 230 kV circuit. Nine preliminary routing segments (Segments A through I) were identified for the new 230 kV transmission line, which are illustrated in Figure 2-2. Some of the routing segments were adjusted or modified based on
public input, preliminary environmental review, and preliminary electrical system studies. Segment J represents the alignment for the addition of a new 230 kV circuit. Segment K represents the southern portion of the reconductoring of the existing BR-RIN 230 kV transmission line. These segments were later combined to create end-to-end routing “alternatives” as discussed further in Section 2.6.
Figure 2-2. Preliminary Routing Segments Analyzed for the New 230 kV Transmission Line
Scoping Process and the Development of Alternatives

In spring 2008, public scoping for the BRRTP was conducted to determine the scope of issues to address, and to identify the range of actions, alternatives, mitigation measures, and environmental effects to be analyzed in the Draft EIS/EIR. For a full discussion of the public scoping process, please refer to Chapter 7 of this Final EIS/EIR. The public suggested a number of alternatives to the Proposed Action that included system, design, and routing alternatives.

The comments received at the scoping meetings, as well as via phone, email, and mail, were analyzed to identify the significant issues and formulate alternatives that would avoid or minimize adverse impacts to environmental resources. Analysis of this scoping information identified significant issues associated with the following resources: biological resources, cultural resources, earth resources, water resources, land use, and recreation. These resources and their associated significant issues have been considered in the development of alternatives to the Proposed Action and drive the analysis in this Final EIS/EIR.

Some residents in the Project area recommended the use of tubular steel monopoles instead of lattice steel structures, or suggested undergrounding of transmission lines. Some residents recommended the use of a single-tower system (multi-circuit towers) to accommodate the need for existing and proposed towers, as well as to minimize right-of-way expansion by combining new and existing lines on one set of structures. Direct current (DC) lines were recommended as an alternative to the proposed alternating current (AC). Residents also requested the use of niobium wire as an alternative to aluminum or copper wire. Electrical generation within the City of Los Angeles was recommended to avoid long-distance electrical transmission distribution and impacts to rural communities. People also inquired about upgrading the electrical transmission system to a 500 kV instead of 230 kV transmission system.

The public proposed two localized routing alternatives during the scoping period. Residents of the unincorporated community of Green Valley proposed the first, referred to as the Green Valley Re-route, to be approximately one quarter-mile west of the community along an existing fire road through NFS lands. The Green Valley Re-route would avoid possible impacts to the unincorporated community of Green Valley. The second routing suggestion, referred to as the 110th Street Re-route, was proposed by the residents to occur along Segments F and H. The modification of Segment F would parallel 110th Street and connect Segments F and H instead of following along the existing transmission lines to Antelope Substation. This modification was proposed to follow property lines and avoid bisecting private property in the area.

Informational Public Meetings and the Development of Alternatives

Five informational public meetings were held in the unincorporated communities of Lake Hughes, Agua Dulce, Saugus, and Leona Valley, and Mojave in February 2009 to give updates on project studies and alternatives development. The Project team, comprising representatives from LADWP, the U.S. Department of Agriculture, Forest Service (USFS), and the U.S. Department of the Interior, Bureau of Land Management (BLM), presented the six routing Alternatives for the new 230 kV transmission line identified for further study, along with the recommendation to eliminate Segment D and the Green Valley Re-route from further study.
The comments received were very similar to those received during the scoping period. Residents in the Project area suggested localized alternatives to the Proposed Action, consideration of in-basin generation of renewable resources, and sharing of transmission lines and renewable resources with other utility companies. Residents in the unincorporated communities of Green Valley and Elizabeth Lake recommended the use of multi-circuit towers instead of numerous double- or single-circuit towers. Undergrounding was suggested along Segments B, C, and E, and in the unincorporated communities of Elizabeth Lake, Green Valley, Leona Valley, and the Antelope Valley. Tubular steel monopoles were recommended in Antelope Valley. To minimize the number of new transmission line corridors, residents in the unincorporated community of Quartz Hill recommended moving the 110th Street Re-route to 115th Street (following SCE’s Tehachapi Renewable Transmission Project’s proposed alignment through the area). The public also requested consideration of a 500 kV transmission line system instead of the proposed 230 kV transmission line system. Residents along Segment D suggested utilization of existing transmission line corridors instead of impacting undisturbed areas. Questions were asked about electric and magnetic fields (EMF), eminent domain, and property values. Mitigation to purchase land around Lake Elizabeth was also suggested. The public, along with elected officials, strongly recommended reconsideration of Segment D to avoid impacts to the unincorporated communities of Elizabeth Lake, Green Valley, Leona Valley, and Agua Dulce.

2.2.2 ALTERNATIVES SCREENING CRITERIA

Meeting the Purpose and Need/Objectives

Each Lead Agency has its own purposes to consider in evaluating a proposed project/action and the alternatives to the proposed project/action. NEPA regulations (promulgated by the Council on Environmental Quality at 40 CFR 1502.13) and CEQA Guidelines (at Section 15124(b)) explain that an agency’s statement of purpose and need or objectives should describe the underlying purpose of the proposed project or need for action. Detailed purpose and need statements by each of the lead agencies are found in Chapter 1 of this Final EIS/EIR.

Potential to Avoid or Minimize Environmental Effects

Per NEPA Regulations (40 CFR 1500.2(e)), the NEPA process is used to identify and assess the reasonable alternatives to proposed actions that would avoid or minimize adverse effects of these actions upon the quality of the human environment. CEQA Guidelines (Section 15126.6(b)) also state that the discussion of alternatives shall focus on alternatives to the project or its location that 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.

Through scoping, subsequent public involvement efforts, and preparation of preliminary technical reports, the following potentially significant issues were identified with the construction, operation, maintenance, and decommissioning of the proposed BRRTP.
### Table 2-1. Significant Issues of the BRRTP

<table>
<thead>
<tr>
<th>RESOURCE</th>
<th>POTENTIAL SIGNIFICANT ISSUES</th>
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<tbody>
<tr>
<td>Biological Resources</td>
<td>• Potential for adverse effects to rare, threatened, endangered, and special-status species.</td>
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<td></td>
<td>• Considerable concern for Riparian Conservation Areas and the spread of noxious weeds throughout Angeles National Forest lands.</td>
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<td>• Impacts to avian species and increased raptor predation of sensitive species due to the use of lattice towers.</td>
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<td>• Potential for loss of habitat.</td>
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<tr>
<td>Cultural Resources</td>
<td>• Impacts to historical, cultural and archaeological resources in the Project area.</td>
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<tr>
<td>Earth Resources</td>
<td>• Adverse impacts to soils throughout the proposed Project area, including sedimentary rocks and fossils.</td>
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<tr>
<td>Water Resources</td>
<td>• Impacts to drainages, wetlands, Waters of the State, Waters of the U.S., and intermittent and ephemeral streams.</td>
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<tr>
<td>Land Use</td>
<td>• Acquisition of private property, eminent domain, and the expansion of transmission line rights-of-way and easements.</td>
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<td>• Decreased property values with additional transmission lines.</td>
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<td></td>
<td>• Conflicts with land use and recreation policies of the Angeles National Forest Land Management Plan.</td>
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<tr>
<td>Wildfire Suppression and Management</td>
<td>• Impacts to fire suppression efforts.</td>
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<tr>
<td>Recreation</td>
<td>• Impacts to recreational facilities and trails.</td>
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<tr>
<td></td>
<td>• Impacts to the quality of the Antelope Valley California Poppy Reserve, Pacific Crest Trail, Wild and Scenic River Corridor, and wilderness.</td>
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<tr>
<td>Visual Resource</td>
<td>• Adverse effects to visual resources of the area, especially those important to the character of the ridgelines, as well as views from homes, communities, businesses, trails, State Parks, the Angeles National Forest, BLM-managed lands, and other public lands.</td>
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### Feasibility

CEQA Guidelines (Section 15126.6(f)(1)) state that a number of factors may be considered in determining which alternatives are feasible. These include, but are not limited to, the following:

- Suitability;
- Economic viability;
- Availability of infrastructure;
- General plan consistency;
- Other plans or regulatory limitations;
- Jurisdictional boundaries; and
- Whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or if the site is already owned by the proponent).

According to NEPA’s Forty Most Asked Questions No.2a, reasonable alternatives include those that are practical or feasible from a technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant.
2.3 ALTERNATIVES CONSIDERED AND ELIMINATED FROM DETAILED ANALYSIS

NEPA and CEQA require an EIS/EIR to consider a reasonable range of alternatives to the project. In addition, CEQA requires the consideration of how to avoid or substantially lessen any adverse effects of the proposed project. The scoping process, informational public meetings, and preliminary studies identified sixteen alternatives to the Proposed Action.

The sections below provide a brief description of each alternative, the alternative’s ability to meet the screening criteria, and a rationale for elimination of the alternative from full analysis in this Final EIS/EIR. The alternatives are categorized as generation, design, or routing alternatives and summarized in Table 2-2.

2.3.1 GENERATION ALTERNATIVES

Energy Conservation and Demand-Side Management

This alternative would involve increased energy conservation and demand-side management within the LADWP service area instead of interconnecting to generation from the Tehachapi Mountains and Mojave Desert. Energy conservation and demand-side management are currently an integral part of LADWP’s strategy to meet customer needs. Energy-saving and efficiency efforts include the Consumer Rebate Program, the Refrigerator Exchange and Retire Program, the Low Income Refrigerator Exchange Program, Trees for a Green LA, the Small Business Direct Install Program, and the Compact Fluorescent Light Bulb Delivery Program. This alternative would continue these existing programs and invest in expanding them.

Energy conservation and demand-side management alone, or in combination with other listed generation alternatives, would not meet the electrical energy demands, meet Renewable Portfolio Standard (RPS) goals (see Chapter 1), or achieve greenhouse gas emission reduction goals. While it could lead to avoidance and minimization of environmental effects from the construction of a new transmission line, it is not feasible to rely solely on this strategy to meet the electrical energy demands and RPS and greenhouse gas reduction goals.

Distributed Generation and In-Basin Generation Expansion

This alternative would involve the increased expansion of distributed generation, including solar facilities and fuel cells within the LADWP service area, and the development of additional large-scale in-basin generation instead of interconnecting to generation from the Tehachapi Mountains and Mojave Desert. Distributed generation entails the installation of new small electrical generating plants, typically less than 20 megawatts, at or near electric load centers. New in-basin generation could include facilities such as gas, biogas, small hydro-electric, solar, and geothermal power plants.

Increased distributed generation and small solar generation is already an integral part of LADWP’s approach to meeting energy needs and RPS goals. Some of the programs that LADWP has implemented are the Distributed Generation Program, the Customer Generation Rebate Program, and the Residential Solar Initiative Program. In addition, LADWP has also recently upgraded a number of its generating stations to make them more efficient.
LADWP has implemented a number of distributed generation and in-basin generation programs. This alternative alone, or in combination with other listed generation alternatives, would not meet the electrical energy demands, meet RPS goals, achieve greenhouse gas emission reduction, or increase overall system reliability, nor would it provide delivery of renewable energy at a level and within a timeframe necessary to meet the purpose and need/objectives.

**Solar Generation**

The solar alternative would involve the increased use of solar energy. LADWP has a Solar Energy Plan that consists of the following five programs that are mainly in the Los Angeles Basin:

1. The Solar Incentive Program (SIP), which encourages LADWP ratepayers to install solar panels on their roofs. The goal is to install 130 MW of customer-owned solar systems by 2020;
2. Feed-in Tariff (FiT) would allow a solar developer in the City of Los Angeles to sell wholesale power directly to LADWP through a long-term contract between the private seller and LADWP. The goal is to obtain 150 MW of solar power from developers by 2016;
3. The new SunShares Program would provide residential customers the opportunity to invest in an LADWP solar power plant. The goal is to obtain approximately 100 MW of solar power from a SunShares power plant by 2020;
4. The Utility Built (LADWP-owned Solar Projects) program would involve the installation of solar systems on LADWP-owned rooftops, reservoirs, and parking lots. LADWP has a goal of obtaining 400 MW of solar power from City-owned systems by 2014; and
5. The Large-Scale Solar Program would involve LADWP procuring large-scale power purchase agreements from third-party solar developers. LADWP has a goal of obtaining 500 MW of utility-scale solar power from developers in the Mojave Desert by 2020.

The SIP, the SunShares Program, and FiT would be within the Los Angeles Basin. The Utility Built program would be mostly in-basin, as well. The Large-Scale Solar Program (or power purchase agreements) would largely be out-of-basin in order to access solar resources in the Mojave Desert, and would require transmission to the City of Los Angeles.

LADWP’s Solar Energy Plan proposes to provide approximately 10% of LADWP’s electrical demand. Although this alternative may avoid or minimize impacts of the Proposed Action, this alternative alone, or in combination with other listed generation alternatives, would not meet the electrical energy demands or RPS goals. Additional transmission capacity may also be required to transfer solar energy from the Large-Scale Solar Program in the Mojave Desert area to the Los Angeles Basin.
2.3.2 DESIGN ALTERNATIVES

Accessing Other Renewable Areas

The Renewable Energy Transmission Initiative (RETI) has identified a number of high quality renewable energy areas in Southern California—the Salton Sea/San Diego, Southeastern California, and Tehachapi/Owens Valley. The Salton Sea/San Diego resource area is rich with renewable resources, including substantial amounts of geothermal potential near the Salton Sea, solar resources throughout the area, and wind resources in local mountain ranges. LADWP would need to construct transmission lines to access this renewable resource area. The Southeastern California area includes most of San Bernardino and Riverside counties; RETI has identified this resource area as having the largest quantity of potential resources (wind and solar). LADWP’s existing transmission lines to this resource area have limited capacity to transfer that energy to the Los Angeles Basin.

LADWP’s primary purpose and need/objective for the BRRTP is to access the Tehachapi/Owens Valley resource area. The Mojave Desert has some of the highest solar insolation in the world, along with the most economical solar resources. Furthermore, the Tehachapi Mountains have excellent wind resources. LADWP’s existing BR-RIN transmission line currently accesses this renewable resource area; however, transmission capacity is limited. This alternative would consider accessing the Salton Sea/San Diego and Southeastern California resource areas.

This alternative would access renewable energy and assist in meeting goals for RPS and greenhouse gas reduction. However, to integrate intermittent renewable resources and maintain a reliable electrical system, LADWP needs to access a number of renewable resource areas. This alternative does not meet the purpose and need/objective to deliver renewable energy sources from the Tehachapi Mountains and Mojave Desert areas. LADWP would also not be able to utilize existing facilities, such as the pumped storage hydroelectric Castaic Power Plant power plant, to store energy to balance when it would enter the system. The need to access other renewable resource areas would require new transmission lines; therefore, this alternative would have similar impacts to those of the Proposed Action.

Direct Current Transmission

This alternative would utilize direct current (DC) for power transmission rather than alternating current (AC). DC conductors can transfer approximately twice the power of the proposed AC conductors and may also allow power transmission between unsynchronized AC distribution systems. This increases system stability by preventing cascading failures from propagating within a wider power transmission grid. The magnitude and direction of power flow through a DC transmission line can be directly commanded, and changed as needed to support the AC networks at either end of the DC link.

LADWP’s existing transmission network contains both AC and DC transmission. Parallel to the BR-RIN is the existing ±500 kV Pacific Direct Current Intertie (PDCI), which utilizes DC technology. The PDCI is operating at capacity and cannot accommodate additional energy. To fully incorporate a new DC line into the existing AC system, conversion facilities would have to be built at the terminal ends (the Barren Ridge Switching Station and the proposed Haskell Canyon Switching Station). The converter stations would be approximately 30 acres and include
an inverter, three-phase alternating current switchgear, transformers, capacitors or synchronous condensers, filters for harmonics, and DC switchgear.

The DC conductors have the ability to transfer a greater capacity than AC conductors. Therefore, in this alternative, a new DC line would replace the proposed double-circuit 230 kV transmission line and existing BR-RIN. The DC towers would require similar ROW, tower heights, footprints, and tower-to-tower spans as that of the proposed 230 kV transmission line. The main difference would be that the DC system would require two-phase conductors versus the three-phase conductors of an AC system.

The DC system would meet the purpose and need/objective of the Project to transfer renewable energy, and assist LADWP in meeting goals for RPS and greenhouse gas reduction, and electrical energy demands. Although this alternative would minimize the number of transmission line towers and reduce the need for ROW, converter stations and the removal of the existing BR-RIN would be required—compromising all small hydroelectric generation plants—and it may increase the potential for impacts to air quality, land use, biological resources, earth resources, water resources, and visual resources. The DC system is a point-to-point system, and tapping into it to create a multi-terminal system is technically and economically not feasible. Therefore, the DC system may limit future interconnections into the larger LADWP network and the amount of renewable energy available for LADWP in meeting RPS goals. The converter stations also come at considerably higher costs without clear benefits as compared to an AC system, and therefore make this alternative less cost-effective for LADWP.

**Quad-Circuit Towers**

LADWP considered the use of quad-circuit towers along the existing BR-RIN corridor instead of the proposed double-circuit tower and existing single-circuit BR-RIN towers. The towers would be constructed adjacent to the existing transmission towers within new ROW and would require a 50-foot by 40-foot tower footprint, and would be approximately 120 feet in height, with tower-to-tower spans of 1,000 feet (which is very similar to that of the proposed double-circuit towers). The reconductored BR-RIN circuit and two new proposed circuits would be combined onto the same quad-circuit towers, and the existing BR-RIN towers would be removed; however, quad-circuit towers were examined and determined to be not feasible in the unincorporated community of Green Valley, due to ROW constraints. One position on the new towers would remain vacant for a possible future circuit. The existing 500 kV PDCI would remain unchanged. The removal of the existing BR-RIN towers and installation of the quad-circuit towers would reduce the number of towers and ROW needs by approximately 65 feet in comparison to the proposed Project, which would require a new 200-foot-wide ROW in addition to and adjacent to the existing BR-RIN and PDCI ROWs.

LADWP does not have existing 230 kV transmission lines along Segments C, D, E, F, H, and I, and therefore LADWP would not consider the use of quad-circuit towers along these corridors. The new quad-circuit towers would be constructed adjacent to the existing ±500 kV PDCI and require an additional 135-foot ROW.

A portion of the BR-RIN conductors, from Power Plant #2 to Haskell Canyon, hang on existing quad-circuit towers. To accommodate the weight of the proposed new Barren Ridge to Haskell Canyon transmission line (two circuits) and the reconductored BR-RIN, the existing towers...
would need to be raised approximately 20 feet. To avoid an interruption of service along the BR-RIN, a temporary transmission line would need to be constructed, requiring a temporary 80- to 100-foot-wide ROW.

This alternative would require less permanent rights-of-way and minimize permanent impacts to land use and visual resources and to USFS- and BLM-managed lands. The quad-circuit structures would not meet the purpose and need/objective to increase LADWP’s system reliability and flexibility, increase delivery of renewable energy, or meet future electrical demands. Because of reduced system reliability, energy transfer capacity would be reduced, decreasing LADWP’s ability to reduce greenhouse gas emissions, to meet RPS goals, and to interconnect and expand renewable energy resources. Greater temporary impacts would result from constructing the large quad-circuit towers and removing the existing BR-RIN.

**Alternative Voltages**

The voltage of a transmission line determines how much electricity the line can transmit, with higher voltage lines transmitting more electricity. In general, as the voltage increases, the height of the supporting towers, footprint of the towers, size of the insulators, distance between conductors on towers, and ROW widths also increase.

A single-circuit 500 kV transmission line between the Barren Ridge Switching Station and the proposed Haskell Canyon Switching Station would have enough capacity to replace both the proposed 230 kV line and the existing BR-RIN line in this stretch. To construct a single-circuit 500 kV transmission line, a 200-foot-wide ROW would be required. Tower structures would require a 50-foot-square footprint and would be, on average, 150 feet tall. The proposed 230 kV line would not be constructed, and the existing BR-RIN would be removed between Barren Ridge and Haskell Canyon upon completion of the new 500 kV transmission line.

To accommodate a new 500 kV transmission line, the existing Barren Ridge and proposed Haskell Canyon Switching Stations would need to be converted from switching stations to much larger substations, which would require the incorporation of transformers and a 500 kV switchyard (approximately 600 feet by 600 feet). This option would more than double the size of the Barren Ridge and Haskell Canyon 500/230 kV Substations to approximately 1,000 feet by 600 feet each. The need for 500 kV to 230 kV conversions could also limit the number of future renewable energy projects that could interconnect to BRRTP.

A 500 kV double-circuit transmission line would require the conversion of the switching stations to substations, would have the potential to increase environmental impacts, and would deliver a capacity well beyond the needs of LADWP, and is therefore not considered. Lower voltage lines, such as double-circuit 115 kV or 69 kV transmission lines, would also require the conversion of the switching stations to substations and would have lower transfer capacities; they do not have the same power transfer capability as the Proposed Action and are therefore not considered for the Proposed Action.

The use of an alternative single-circuit 500 kV transmission line would meet the purpose and need/objective of the Project to transfer renewable energy and assist LADWP in meeting goals for RPS and greenhouse gas reduction, and electrical energy demands. However, LADWP may not be able to construct the necessary 500/230 kV substation within Haskell Canyon due to space
limitations. Additionally, the increased footprints of the substations would have the potential to increase environmental impacts.

**Underground Transmission**

This alternative would install the transmission line underground in lieu of overhead transmission. Underground transmission systems in the United States are generally used in urban areas for lower-voltage distribution lines, and high-voltage (115 kV and above) underground transmission lines have been constructed only for short distances where overhead lines were not feasible (e.g., in the vicinity of airports, urban centers).

To put a high-voltage transmission line underground, such as the proposed 230 kV line, the line would need to be installed within an underground conduit. Generally, open-cut trenching techniques would be utilized for conduit installation. The trench for the conduit would normally be a minimum of five feet deep and four feet wide along the entire length of the underground sections. Where site-specific conditions dictate that open-cut trenching could not be utilized, tunneling would be used to install the conduit. Pre-formed concrete maintenance vaults would also be installed underground. Initially, the vaults would be used to pull cable through the conduits and splice the cables together during construction of the BRRTP. During operation, the vaults would provide access to the underground cables for maintenance, inspections, and repairs.

Underground construction is more difficult and results in greater clearing, grading, and land disturbance than overhead transmission line construction. Grading and clearing of trees and vegetation would be required along the ROW prior to excavation of the entire length of the transmission line. Large areas of disturbance would result from the excavation and associated activities, such as heavy equipment use and soil storage.

The installation of an underground transmission line would require more time than construction of an equivalent length of overhead line because of the time required for excavating trenches and constructing the duct banks, fluid reservoirs, and/or stop joints, and the limitations on times of the year available for construction, which would be chosen to limit the impacts to the environment.

The land required for operation and maintenance of underground transmission lines must remain free of secondary surface development or lengthy-rooted trees planted along the line route, and only vegetation that would not cause maintenance problems would be permitted above the underground route throughout the life of the Proposed Action. This contributes to a land use similar to that of a secondary road. Also, duct banks, fluid reservoirs, stop joints, and/or retaining vaults are required for certain underground technologies, increasing the need for cleared land and continued all-weather access for operation and maintenance.

An underground high voltage transmission line would meet the purpose and need/objective of the Project to transfer renewable energy, and assist LADWP in meeting RPS goals, greenhouse gas reduction goals, and electrical energy demands. The principle environmental advantage of undergrounding a transmission line would be the mitigation of adverse visual impacts of the transmission towers and conductors. However, an underground transmission line would still require above-ground ancillary facilities on or adjacent to the ROW, and result in substantially greater ground disturbance and longer construction duration than overhead transmission lines.
would create a greater potential for impacts to transportation, traffic, soils, and socioeconomics, and archaeological, cultural, biological, and water resources. Operation of underground transmission lines is more complex, and generally underground transmission lines are considered less reliable. If an outage occurred, repair times could increase. An underground system would not result in any substantial reduction in other environmental effects, and is also not cost-effective for long distances.

New Conductor Technology

Superconductors are still in the developmental stage. The longest high-voltage transmission line utilizing superconductors is only 2,000 feet long. The technology is currently considered infeasible for longer distances. Theoretically, use of superconductor technology could replace the proposed 230 kV and existing BR-RIN transmission lines with a single circuit on a new tower between the Barren Ridge and Haskell Canyon Switching Stations and the existing BR-RIN transmission towers could be removed, similar to the single-circuit 500 kV transmission line alternative. The principal environmental advantage of superconductors would be the mitigation of adverse visual impacts of the additional transmission towers and conductors. However, superconductors would still require above-ground ancillary facilities on or adjacent to the ROW, and would result in greater ground disturbance and longer construction duration than with standard transmission lines. Superconductors would create a greater potential for impacts to transportation, traffic, soils, and socioeconomics, and archaeological, cultural, biological, and water resources.

Only Reconductor Existing Transmission Line (No New Transmission Line)

Reconductoring of the existing BR-RIN transmission line would take approximately one year and would require the transmission line to be taken out of service for much of that time. North of the Barren Ridge Switching Station, seven LADWP small-scale hydroelectric power plants transmit their renewable electrical energy output onto the BR-RIN transmission line. These power plants do not have bypass capabilities, and, typical of such plants, they must generate energy to avoid deterioration to their electrical turbines. Therefore, because bypassing the power plants or halting their electrical output are not possible, a temporary transmission line would be necessary to reconductor the existing BR-RIN transmission line between Barren Ridge and Haskell Canyon. This temporary transmission line would typically consist of temporary wood poles for carrying the existing energized conductors along the entire stretch of the BR-RIN corridor. Once the transmission line is reconductor and in service, the temporary transmission line would be removed.

Without a new double-circuit 230 kV transmission line, the transfer capacity of the utility corridor from Barren Ridge to the proposed Haskell Canyon Switching Station would remain constrained. The LADWP would have limited ability to deliver renewable energy; to meet future electrical demands, RPS goals, and greenhouse gas reductions goals; and to interconnect and expand renewable energy facilities in the Tehachapi Mountains and Mojave Desert areas. Although there are impacts associated with the temporary transmission line, permanent impacts of this alternative would be less than that of the Proposed Action.
**Only New 230 kV Transmission Line (No Reconductoring of BR-RIN)**

This alternative would include construction of a new 230 kV double-circuit transmission line from the Barren Ridge Switching Station to the proposed Haskell Canyon Switching Station, addition of a new 230 kV circuit on existing structures from the Castaic Power Plant to the proposed Haskell Canyon Switching Station, construction of the Haskell Canyon Switching Station, and expansion of the Barren Ridge Switching Station.

This alternative would allow LADWP to access renewable resources in the Tehachapi Mountains and Mojave Desert areas. Removing the reconductoring portion of the Proposed Action would minimize the potential for impacts to environmental resources and reduce cumulative impacts of the Proposed Action. However, it would limit LADWP’s ability to transfer renewable energy, meet future electrical energy demands, meet RPS goals, and reduce greenhouse gas emissions.

### 2.3.3 ROUTING ALTERNATIVES

#### Midway to Vincent Corridor

The Midway to Vincent Corridor is approximately 15.4 miles long and traverses the ANF from the designated I-5 Utility Corridor to the proposed Segment G. The Midway to Vincent Corridor is also a designated USFS utility corridor that contains two existing SCE 500 kV transmission lines (Midway – Vincent #1 and #2). During the siting study, it was identified as a potential routing segment for the siting of a new 230 kV transmission line. It was eliminated from further study because the alignment of the corridor traversed west to east across the ANF, and the purpose of the Proposed Action was to transfer energy from the north (Barren Ridge Switching Station) to the south (Haskell Canyon). The greater length of this routing segment has the potential to pose reliability issues, and additional footprint across the ANF would increase potential impacts to environmental resources.

After the 2009 Informational Public Meetings, the Midway to Vincent Corridor was reconsidered as a routing modification of a viable Segment D. It would avoid the constraints of the Castaic Power Plant, impacts to the Castaic Lake State Recreation Area and Land and Water Conservation Fund lands, and unstable terrain. The Midway to Vincent Corridor is not an end-to-end alternative; it is a routing segment through the ANF from the I-5 Utility Corridor to Segment G. In order for the Midway to Vincent Corridor to connect to the proposed Haskell Canyon Switching Station, this routing segment would require following Segment G south for 9.6 miles to the switching station (total distance of 25 miles).

The Midway to Vincent Corridor would meet the purpose and need/objective for the Project, but it would not significantly reduce or avoid impacts to land use, cultural, biological, and visual resources, or avoid geological hazards. The Midway to Vincent Corridor is much longer than the Proposed Action, and thus could potentially lead to more geographically extensive impacts. The increased length, steep topography, and limited existing access roads for construction could make the Midway to Vincent Corridor more difficult and costly to build in comparison to the Proposed Action.
Bouquet Canyon Alternative (Segment H, including the 110th and 115th Street Modifications)

The Bouquet Canyon Alternative is a routing segment for the siting of a new 230 kV transmission line from the Antelope Valley to the proposed Haskell Canyon Switching Station. This routing segment would consist of Segment H and the minor 110th and 115th Street modifications; it is not an end-to-end alternative to the Proposed Action.

Segment H was identified in the siting study as a routing segment from the Antelope Valley to the proposed Haskell Canyon Switching Station. A majority of Segment H would be on ANF lands and would mostly parallel the newly constructed SCE Antelope – Pardee transmission line. The last 1.5 miles would follow the SCE 66 kV Saugus – Del Sur transmission line that was removed. Unlike the other identified routing segments for the siting of a new transmission line, very limited access occurs along Segment H on the ANF. To minimize impacts to the area, helicopter construction would be required to construct the new transmission line. All other routing segments would be constructed via conventional ground construction (described in Section 2.2).

During the 2008 Public Scoping Meetings, residents in the western city of Lancaster area suggested the 110th Street modification to connect Segment F to Segment H, which would not follow the existing transmission lines to SCE’s Antelope Substation. This modification was proposed to avoid bisecting private property near the Antelope Substation.

In February 2009 at the Informational Public Meetings, the same residents requested re-routing the modification to follow SCE’s proposed Tehachapi Renewable Transmission Project (TRTP) alignment along 115th Street instead. This would minimize the creation of numerous new transmission line corridors and lessen impacts to residents. The 115th Street re-route is five miles long and no existing transmission lines are along this route. It would require slightly more improvements to existing access roads than the original alignment along Segments F and H.

The Bouquet Canyon Alternative would meet the purpose and need/objective for the Project. Ground disturbance and visual impacts would be minimized through the use of helicopter construction; however, impacts to air quality and noise would increase. Helicopter construction also poses construction and safety concerns that are not present for the Proposed Action. Cumulative effects for the Project would also increase because of the further disturbance of revegetated and rehabilitated areas and potential for impacts from three transmission line projects (Antelope – Pardee, TRTP and BRRTTP) in the same vicinity.

Antelope Valley Alternative (Segments C and E)

The physiography of the Project area can be broken up into two different types: the northern portion of the Project area consists of the flat desert areas of the Mojave Desert and Antelope Valley, and the southern portion contains the mountains of the Angeles National Forest.

Two routing segments from the Mojave Desert area to Antelope Valley were identified for the siting of a new 230 kV transmission line: Segment B and the combination of Segments C and E (referred to as the Antelope Valley Alternative). Segment B is part of LADWP’s Proposed Action and is approximately 27 miles long. It starts just north of the unincorporated community
of Mojave, parallel to LADWP’s existing 230 kV BR-RIN and 500 kV PDCI transmission lines, and travels south towards the Antelope Valley California Poppy Reserve. The Antelope Valley Alternative is 33 miles long and would also start just north of the unincorporated community of Mojave, parallel the Los Angeles Aqueduct southwest to Cottonwood Creek, then turn southeast and parallel three existing SCE high-voltage transmission lines to the Antelope Valley California Poppy Reserve. To identify which routing segment through the northern portion of the Project would be carried forward in the Final EIS/EIR, Segment B and the Antelope Valley Alternative were compared.

The Antelope Valley Alternative would meet the purpose and need/objective of the Project to transfer renewable energy, and assist LADWP in meeting RPS and greenhouse gas reduction goals and electrical energy demands. It would avoid impacts to residences close to the proposed Project’s Segment B, but would create a new transmission corridor and increase the potential for impacts to visual resources, biological resources, water resources, air quality, and cultural resources. This alternative would also require more new access roads and improvements to existing access roads.

Segment C would require the creation of a new utility corridor and the construction and improvement of access roads, and has the potential to increase impacts to air quality, biological resources, cultural resources, visual resources, and water resources. However, it was retained for further study to allow Segment D to have a northern connection to the Barren Ridge Switching Station.

Segment E would require an additional 6.5 miles of line in comparison to the Proposed Action and would not significantly reduce or avoid impacts to air quality or biological, cultural, visual, and water resources.

**Elizabeth Lake Tunnel**

The unincorporated community of Green Valley recommended placing an underground transmission line within the Elizabeth Lake Tunnel (also known as the Los Angeles Aqueduct) as an alternative route to Segment G for the construction of the new 230 kV transmission line. From the Antelope Valley California Poppy Reserve, the transmission line would be constructed in a new utility corridor and then placed within the tunnel through the ANF. This alternative would traverse 0.1 mile of a Back Country Non-Motorized Land Use Zone.

The aqueduct was constructed for and is used for water conveyance. It is not a viable option for the housing of underground transmission lines. The aqueduct is a well-maintained facility, and LADWP does not have plans to replace it. Installing high-voltage transmission within an active aqueduct tunnel is neither feasible nor safe.

**Haskell Canyon Switching Station Site B**

As a component of the BRRTP, LADWP proposes the construction of a new switching station in Haskell Canyon, south of the ANF, on LADWP-owned property at the convergence of several existing and proposed 230 kV transmission lines. The proposed site is referred to as Site A.
Site B was identified as a possible alternative switching station site, and is north of the city of Santa Clarita, approximately one mile south of Site A. Figure 2-3 illustrates the locations of both sites. LADWP would have to acquire additional property to build Site B.

Site B would be closer to existing and planned residential communities, and would have the potential for greater impacts to visual resources and land use. There is also a very high potential for landslide and liquefaction within this area, and it would therefore not be feasible to construct the switching station at this site.
Figure 2-3. Haskell Canyon Switching Station Alternative Site Locations.
2.3.4 SUMMARY OF ALTERNATIVES CONSIDERED AND ELIMINATED

The summary table below lists all alternatives that were considered and eliminated and identifies: 1) the alternative’s ability to meet the purpose and need/objectives of the Project; 2) the alternative’s potential to avoid or minimize environmental effects; 3) if the alternative is technically and economically feasible; 4) recommendation for analysis in this Final EIS/EIR; and 5) rationale for retention or elimination.
### Table 2-2. Summary of Alternatives Considered and Eliminated

<table>
<thead>
<tr>
<th>Alternatives</th>
<th>Meets Purpose &amp; Need</th>
<th>Potential to Avoid or Minimize Environmental Effects</th>
<th>Feasibility</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generation and Transmission Alternatives</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy Conservation &amp; Demand-Side Management</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>This alternative alone, or in combination with other listed generation alternatives, would not meet the electrical energy demands, meet RPS goals, or achieve greenhouse gas emission reduction.</td>
</tr>
<tr>
<td>Distributed Generation &amp; In-Basin Generation Expansion</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>This alternative alone, or in combination with other listed generation alternatives, would not meet the electrical energy demands, meet RPS goals, achieve greenhouse gas emission reduction, or increase overall system reliability, nor would it provide delivery of renewable energy at a level and within a timeframe necessary to meet purpose and need/objectives.</td>
</tr>
<tr>
<td>Solar Alternative</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>This alternative alone, or in combination with other listed generation alternatives, would not meet the electrical energy demands or RPS goals. Additional transmission capacity would still also be required to transfer solar energy from the Mojave Desert area to the Los Angeles Basin.</td>
</tr>
<tr>
<td>Accessing Other Renewable Resource Areas</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>This alternative does not meet the purpose and need/objective to deliver renewable energy sources from the Tehachapi Mountains and Mojave Desert areas. LADWP would also not be able to utilize existing facilities that would allow LADWP to store potential renewable energy. The need to access other renewable resource areas would likely involve the need for new transmission lines and therefore this alternative would be expected to have similar impacts to those of the Proposed Action.</td>
</tr>
<tr>
<td><strong>Design Alternatives</strong></td>
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</tr>
<tr>
<td>Direct Current Transmission</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>The DC system would meet the purpose and need/objective of the Project to transfer renewable energy, and assist LADWP in meeting RPS goals, greenhouse gas reduction goals, and electrical energy demands. The number of transmission line towers would be minimized and right-of-way expansion reduced. However, large converter stations may increase the potential for impacts to air quality, land use, biological resources, earth resources, water resources, and visual resources. A multi-terminal DC system is technically and economically not feasible and could limit the future interconnections into the system.</td>
</tr>
</tbody>
</table>
### Alternatives

<table>
<thead>
<tr>
<th>Alternatives</th>
<th>Meets Purpose &amp; Need</th>
<th>Potential to Avoid or Minimize Environmental Effects</th>
<th>Feasibility</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quad-Circuit Towers</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>This alternative would have limited transmission capacity to deliver renewable energy, and would therefore limit LADWP's ability to reduce greenhouse gas emissions, meet RPS goals and electrical demands, and allow interconnection and expansion of renewable energy resources. It would also create greater temporary impacts during construction of the temporary transmission line and removal of the existing BR-RIN.</td>
</tr>
<tr>
<td>Alternative Voltages</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>A single-circuit 500 kV transmission line would not be feasible because of the inability to construct a 500/230 kV substation within Haskell Canyon. The need for 500 kV to 230 kV conversions could also limit the number of future renewable energy projects that would interconnect to BRRTP. The increased footprints of the substations also have the potential to increase environmental impacts.</td>
</tr>
<tr>
<td>Underground Transmission</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>An underground system would not result in any substantial reduction in environmental effects because it would create new and/or different environmental impacts and is infeasible for long distances.</td>
</tr>
<tr>
<td>New Conductor Technology</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Superconductors are still in the developmental stage and considered infeasible for long distances. Superconductors would result in greater ground disturbance than standard transmission lines and a longer construction duration. They would create a greater potential for impacts to transportation, traffic, soils, and socioeconomics, and archaeological, cultural, biological, and water resources.</td>
</tr>
<tr>
<td>Reconductor Existing Transmission Line (No New Transmission Line)</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>With this alternative, transfer capacity of the utility corridor from Barren Ridge to the proposed Haskell Canyon Switching Station would be constrained, thereby limiting delivery of renewable energy, ability to meet future electrical demands, RPS goals, and greenhouse gas reduction goals, and interconnection and expansion of renewable energy in the Tehachapi Mountains and Mojave Desert areas. The construction of a temporary transmission line would not minimize or avoid impacts to environmental resources; however, the permanent impacts of this alternative would be less than that of the Proposed Action.</td>
</tr>
<tr>
<td>New 230 kV Transmission Line (No Reconductoring)</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>This alternative would allow LADWP to access renewable resources in the Tehachapi Mountains and Mojave Desert areas, but LADWP's ability to meet projected electrical energy demands would be limited.</td>
</tr>
<tr>
<td>ALTERNATIVES</td>
<td>MEETS PURPOSE &amp; NEED</td>
<td>POTENTIAL TO AVOID OR MINIMIZE ENVIRONMENTAL EFFECTS</td>
<td>FEASIBILITY</td>
<td>RATIONALE</td>
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<tr>
<td><strong>ROUTING ALTERNATIVES</strong></td>
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<tr>
<td>Midway to Vincent Corridor</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>The Midway to Vincent Corridor would not significantly reduce or avoid impacts to land use, cultural, biological, and visual resources, or avoid geological hazards. The Midway to Vincent Corridor is much longer than the Proposed Action, and thus could potentially lead to more geographically extensive impacts. The increased length, steep topography, and limited existing access roads for construction could make the Midway to Vincent sub-route more difficult and costly to build in comparison to the Proposed Action.</td>
</tr>
<tr>
<td>Bouquet Canyon Alternative (Segment H, including 110th &amp; 115th Street Modifications)</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Ground disturbance and visual impacts would be minimized through the use of helicopter construction; however, impacts to air quality and noise would increase. Helicopter construction also poses construction and safety concerns that are not present for the Proposed Action or other routing segments. Cumulative effects for the Project would also increase because of the further disturbance of revegetated and rehabilitated areas and potential for impacts from three transmission line projects in the same vicinity.</td>
</tr>
<tr>
<td>Antelope Valley Alternative (Segments C and E)</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>The Antelope Valley Alternative would avoid impacts to residences close to the Proposed Action’s Segment B, but would create a new transmission corridor and increase the potential for impacts to visual resources, biological resources, water resources, air quality, and cultural resources. This alternative would also require more new access roads and improvements to the existing access roads. RETENTION of SEGMENT C. Although Segment C would require the creation of a new utility corridor and the construction and improvement of access roads, and has the potential to increase impacts to air quality, biological resources, cultural resources, visual resources, and water resources, it is retained for further study to allow Segment D a northern connection to the Barren Ridge Switching Station. ELIMINATION of SEGMENT E. Segment E would require an additional 6.5 miles in comparison to the proposed Project and would not significantly reduce or avoid impacts to air quality or biological, cultural, visual, and water resources.</td>
</tr>
<tr>
<td>Elizabeth Lake Tunnel</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>The Elizabeth Lake Tunnel alternative is infeasible, and this alternative would not significantly reduce or avoid impacts to air quality, or biological, cultural, land use, and water resources.</td>
</tr>
</tbody>
</table>

**RETENTION of SEGMENT C.** Although Segment C would require the creation of a new utility corridor and the construction and improvement of access roads, and has the potential to increase impacts to air quality, biological resources, cultural resources, visual resources, and water resources, it is retained for further study to allow Segment D a northern connection to the Barren Ridge Switching Station.

**ELIMINATION of SEGMENT E.** Segment E would require an additional 6.5 miles in comparison to the proposed Project and would not significantly reduce or avoid impacts to air quality or biological, cultural, visual, and water resources.
<table>
<thead>
<tr>
<th>ALTERNATIVES</th>
<th>MEETS PURPOSE &amp; NEED</th>
<th>POTENTIAL TO AVOID OR MINIMIZE ENVIRONMENTAL EFFECTS</th>
<th>FEASIBILITY</th>
<th>RATIONALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haskell Canyon Switching Station Site B</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Site B has the potential for greater impacts to visual resources and land use, because it is closer to existing and planned residential communities than Site A. Site B also has a greater potential for landslide and liquefaction and it may not be feasible to construct the switching station at this site.</td>
</tr>
</tbody>
</table>
2.3.5 NEW ALTERNATIVES CONSIDERED IN RESPONSE TO COMMENTS ON THE DRAFT EIS/EIR

Three-Circuit Towers

In response to a comment received on the Draft EIS/EIR, a new three-circuit alternative has been evaluated in this Final EIS/EIR. Similar to the Quad-Circuit Alternative described above, LADWP considered the use of three-circuit towers along the existing BR-RIN corridor instead of the proposed double-circuit tower and existing single-circuit BR-RIN towers. Layout would be similar to that described for the quad-circuit towers, with the exception that there would be no vacant position available for a possible future circuit.

This alternative would require less permanent rights-of-way and minimize permanent impacts to land use and visual resources and to USFS- and BLM-managed lands. Utilizing three-circuit structures exclusively would not meet the purpose and need/objective to increase LADWP’s system reliability and flexibility, increase delivery of renewable energy, or meet future electrical demands. Because of reduced system reliability, WECC regulations would limit the transfer capacity of the three-circuit structures, therefore limiting the amount of renewable energy that would be transmitted in comparison to the Proposed Action. LADWP’s ability to reduce greenhouse gas emissions, to meet RPS goals, and to interconnect and expand renewable energy resources would all be decreased. Greater temporary impacts would result from constructing the large three-circuit towers and removing the existing BR-RIN. Because this alternative would not meet the basic project purpose and need, it is eliminated from further evaluation in the Final EIS/EIR.

Green Valley Multi-Line Relocation Alternative

In response to comments received from residents of the unincorporated community of Green Valley on the Draft EIS/EIR, the lead agencies investigated a variety of new alignments in the Green Valley area to relocate both the existing and proposed transmission lines around this community. The relocation of all the existing lines would include the 500 kV Pacific DC Intertie, which is not currently part of the Proposed Action or Alternatives, and would constitute a substantial change to the original scope of the Project. An initial investigation of alignment options was conducted that focused on transmission line constructability, transmission line reliability, and wildfire and firefighting effectiveness. This initial effort resulted in a single alignment, the Green Valley Multi-Line Relocation Alternative, for which a more detailed environmental review was conducted as described in this Final EIS/EIR.

Alternative Development

During the public review period for the Draft EIS/EIR, a total of 51 sets of comments (48 from residents and three from the Green Valley Town Council) were received referencing a new alternative around the unincorporated community of Green Valley (see Appendix R of this Final EIS/EIR). A total of three comments favored moving all transmission lines along the Alternative 2a alignment, and 47 comments favored a local re-route onto the Angeles National Forest (ANF). Nine comments (eight received at public meetings and one letter from the Green Valley Town Council) included maps of re-route suggestions. See Figure 2.3-1 for a compilation of community-submitted alignments.
FIGURE 2.3-1. GREEN VALLEY AREA ALIGNMENTS SUBMITTED IN PUBLIC COMMENTS
Public meeting comments on the Draft EIS/EIR included eight comments (six from individual residents and two from the Green Valley Town Council president) regarding an alternative around the unincorporated community of Green Valley. Increased fire risk, transmission line noise, and visual blight were the primary justifications mentioned. Of those eight public meeting comments, one comment was in favor of moving all transmission lines to the Alternative 2a alignment, five comments were in favor of a local re-route onto the ANF, and one comment supported both relocation options.

A comment letter with map was received from the Green Valley Town Council that suggested a similar new alternative around Green Valley and onto the ANF. Reasons for supporting the re-route included to increase firefighting ability and to avoid creating a transmission line-bounded island (i.e., indefensible firefighting space between transmission lines). The Proposed Action (Alternative 2), as presented in this Final EIS/EIR, does not create a transmission line-bounded island.

Forty-two comment letters were also received from individual residents regarding a new alternative around Green Valley. One letter was in favor of moving all transmission lines (existing and those proposed as part of BRRTP) along the Alternative 2a alignment, and 40 letters were in favor of a local re-route onto the ANF; one letter did not emphasize a specific preference. The primary support for a re-route was again based on the interest in increased firefighting ability and reduction of impacts to private property.

**Preliminary Feasibility Analysis**

Based on the comments received, LADWP completed an engineering evaluation for relocating the existing and proposed transmission lines around the Green Valley area. Starting from two additional alignments submitted by the Green Valley Town Council, LADWP identified two alignments that would meet engineering and constructability needs while preserving the intent of the community-submitted alignments. Figure 2.3-2 illustrates these initial alignments studied. Of these four alignments, two (Alignments B and C) were determined to be infeasible due to terrain limitations (Boyles 2011). Additionally, Alignment D was determined to be infeasible from a firefighting standpoint due to its placement on a ridge top (POWER 2012a). Ridge tops are traditionally critical firefighting points, and fire breaks are often created on ridge tops.

The remaining alignment was determined to be feasible from a construction and engineering standpoint, and this alignment was then further developed into a proposed Green Valley Multi-Line Relocation Alternative (see Figure 2.3-3). This alternative was developed as the single feasible alternative to meet the purpose and intent of the community-submitted alignments. To assist in the detailed analysis of the alignment, preliminary tower locations were mapped by an LADWP engineer. This information was provided to LADWP’s environmental contractor, POWER Engineers, Inc., whose staff added potential locations of roads based on terrain (POWER 2012b).
Figure 2.3-2. Green Valley Multi-Line Relocation Alternative Development
FIGURE 2.3-3. GREEN VALLEY MULTI-LINE RELOCATION ALTERNATIVE

- Potential Re-route
  - Proposed New ROW
  - Existing ROW to be Utilized
  - Existing ROW
  - Other Features
    - Residences
    - Aqueduct
    - Pacific Crest Trail
    - USFS Boundary

- New 600’ ROW Required
  - Proposed new double-circuit 230 kV line
  - Replace existing 230 kV line
  - Replace existing 500 kV DC line

- Additional 200’ ROW Required
  - Proposed new double-circuit 230 kV line adjacent to:
    - Existing 230 kV Line
    - Existing 500 kV DC line

- Additional 200’ ROW Required
  - Proposed three-circuit structures adjacent to existing 500 kV DC line to carry the new double-circuit 230 kV reconducred existing single-circuit 230 kV lines
Alternative Description

The proposed Green Valley Multi-Line Relocation Alternative would deviate from the Proposed Action by relocating the existing (one single circuit AC and one single circuit DC line) and proposed transmission lines to a new alignment that is northwest of the existing LADWP ROW. This new alignment is generally along the boundary of the private and public lands within the general area of Green Valley. The proposed Green Valley Multi-Line Relocation Alternative would also differ from the Proposed Action by reducing the application of the Three-Circuit Tower Mitigation as described in Section 2.4.2 of this Final EIS/EIR (see Figure 2.3-3) and by locating a portion of the Alternative outside of existing LADWP ROW. More specifically, the alternative would differ from the Proposed Action by:

- Relocating 2.4 miles of the existing 500 kV (Pacific DC Intertie) transmission line onto 2.8 miles of new single-circuit steel lattice towers. The alteration of this line, which is a high-voltage direct current transmission line that carries energy from the Pacific Northwest to Southern California, was not previously part of the Proposed Action or any Alternative;
- Relocating 2.4 miles of the existing single-circuit 230 kV transmission line (Barren Ridge-Rinaldi), proposed to be reconducted as part of the Proposed Action, onto 2.8 miles of new single-circuit steel lattice towers;
- Locating 2.4 miles of the proposed new double-circuit 230 kV transmission line (Barren Ridge-Haskell) onto 2.8 miles of new double-circuit steel lattice towers; and
- Reducing the need for and use of the Three-Circuit Tower Mitigation by 5.6 miles within Green Valley.

The Green Valley Multi-Line Relocation Alternative would require a utility corridor 2.8 miles long and approximately 600 feet wide for the proposed new double-circuit transmission line and the relocation of the two existing transmission lines. Approximately 2.4 miles of each existing transmission line would be moved from their current location. In areas where existing transmission lines would be relocated outside of LADWP’s existing 250-foot ROW, the existing transmission conductors and structures would be removed, and disturbance areas within the existing ROW would be rehabilitated. LADWP would maintain ownership of the existing ROW. Additionally, two new sections of 200-foot-wide corridor, 2.2 miles and 1.0 mile long, would be required adjacent to the two existing transmission lines just southwest and just northeast of the community of Green Valley where the application of the Three-Circuit Tower Mitigation would no longer be utilized.

Three-Circuit Tower Mitigation and Helicopter Construction

This Alternative would amend the proposed Three-Circuit Tower Mitigation, described in Section 2.4.3 of this Final EIS/EIR, which was developed primarily to avoid the displacement of private residences. The amended Three-Circuit Tower Mitigation would be applied only between mile markers 27.1 and 27.6 (Willow Springs area) and between mile markers 44.6 and 46.0 (Elizabeth Lake area). Three-Circuit Tower Mitigation would no longer be implemented between mile markers 46.0 and 51.6 (Green Valley area). This mitigation would not be needed in the Green Valley area with this alternative because the expansion of the ROW would not be expected to displace residences. With this change to the Three-Circuit Tower Mitigation, the installation of a temporary line during construction would not be required within this area.
Helicopter construction, as described in Section 2.4.4 in this Final EIS/EIR, would apply to the portion of this proposal on National Forest System (NFS) lands in areas more than 300 feet from existing roads and with slopes generally greater than 25 percent. Helicopter construction would allow the transmission towers to be installed by helicopter, eliminating the need for new access roads to tower sites. An estimated six new access roads, none longer than approximately 225 feet in length, would be constructed to provide access to the relocated transmission towers while four new towers could be accessed by existing roads. The remaining towers, an estimated 39 of the 49 new towers, would not be accessible by roads and would utilize helicopter construction. Pulling and tensioning sites and access roads to them would be required during construction. Pulling and tensioning sites would be rehabilitated following construction.

**Meeting the Purpose and Need**

The Green Valley Multi-Line Relocation Alternative would meet the Proposed Action’s basic purpose and need. It would enable the delivery of renewable energy resources, reduce greenhouse gas emissions, assist LADWP in meeting its RPS goals and electrical energy demands, allow for interconnection and expansion of renewable energy in the Tehachapi Mountains and Mojave Desert areas, and maximize the accommodation of future utility needs. However, by increasing the ROW required within the ANF and deviating from designated corridors, this alternative would lessen the ability to meet the USFS’ purpose of minimizing effects of utility corridors on federally managed lands, in comparison to the Proposed Action.

**Potential to Avoid and Minimize Environmental Effects**

While the Green Valley Multi-Line Relocation Alternative would avoid or minimize direct environmental impacts to some residents of the Green Valley area, it would not avoid or minimize overall environmental effects compared to the Proposed Action. See Table 2.3-1 for a summary of specifications for the Green Valley Multi-Line Relocation Alternative, assuming a 600-foot ROW, compared to the Proposed Action in the same area. See Figures 2.3-4 through 2.3-8 for current views of the Green Valley Multi-Line Relocation area and photo simulations of the views with implementation of the Proposed Action and this alternative.

**Table 2.3-1. Specifications of the Green Valley Multi-Line Relocation Alternative and the Corresponding Segment of the Proposed Action**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Green Valley Multi-Line Relocation Alternative</th>
<th>Corresponding Proposed Action Segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total mileage length</td>
<td>2.8</td>
<td>3.2</td>
</tr>
<tr>
<td>Total acres on NFS land (additional new ROW)</td>
<td>150.1</td>
<td>77.6</td>
</tr>
<tr>
<td>Total acres on private land (additional new ROW)</td>
<td>31.0</td>
<td>5.3</td>
</tr>
<tr>
<td>No. of homes/structures w/in 500 ft.</td>
<td>6 (4 of which are within 500 ft of both alternatives)</td>
<td>9 (9 of which are within 500 ft of both alternatives)</td>
</tr>
</tbody>
</table>
The Proposed Action (which is identified as the Federal Agency Preferred Alternative and Environmentally Superior Alternative in Sections 2.7 and 2.8 in this Final EIS/EIR) would not require new ROW within the Green Valley area. However, the Green Valley Multi-Line Relocation Alternative would require new ROW on private property, including residential parcels, and new easement on NFS lands. Acquisition of approximately 36 acres of private land impacting 13 individual parcels would be required by this alternative, and approximately 228 acres of NFS lands would be encumbered by easements under this alternative. This Alternative would move the proposed and existing lines farther from most of the 32 residents within 500 feet of the existing ROW. While 13 of these residences would be within 500 feet of the Green Valley Multi-Line Relocation Alternative ROW, 19 of these residences would no longer be within 500 feet of a transmission line ROW. The Green Valley Multi-Line Relocation Alternative ROW would be within 500 feet of a fewer number of residences than the Proposed Action, with a total of 14 residences that would be within 500 feet of the ROW. Of these, there would be one residence that would not have previously been within 500 feet of a transmission line ROW. An existing private facility on NFS land, Camp Cisquito—operating under a USFS Special Use Permit—that was not previously within 500 feet of a transmission line ROW would also be within 500 feet of the Green Valley Multi-Line Relocation Alternative ROW.
FIGURE 2.3-4. KEY OBSERVATION POINTS FOR THE GREEN VALLEY MULTI-LINE RELOCATION ALTERNATIVE
Figure 2.3-5. Key Observation Point 1: Green Valley Multi-Line Relocation Alternative

DATE: 12/30/2008
TIME: 10:13 AM
VIEW LOOKING: NORTH

Green Valley Multi-Line Relocation Alternative
Figure 2.3-6. Key Observation Point 1: Proposed Action
Figure 2.3-7. Key Observation Point 2: Green Valley Multi-Line Relocation Alternative

[Image of Green Valley Multi-Line Relocation Alternative]

Existing Conditions

Proposed Conditions

Date: 3/13/2012
Time: 1:40 PM
View Looking: Northwest
Figure 2.3-8. Key Observation Point 2: Proposed Action

DATE: 3/13/2012
TIME: 1:40 PM
VIEW LOOKING: NORTHWEST

May 21, 2012
Land Use Plan Consistency

The relocated transmission lines would fall outside of the designated utility corridor for a distance of 5.4 miles (three segments of 2.2, 1.3, and 1.9 miles) for each of the three relocated lines. This corridor is designated in both the 2005 ANF Land Management Plan (LMP) and in the Record of Decision (ROD) for the West-Wide Energy Corridor Programmatic EIS prepared pursuant to Section 368 of the Energy Policy Act of 2005. Authorization for placement of this alternative outside of the utility corridor designated by the LMP would not contribute towards meeting the desired conditions in the LMP (LMP, Part 2, p 121; Part 3, Goal 4.2, p. 59. The Proposed Action is entirely within the LMP designated corridor and the corridor identified in the West-Wide Energy Corridor Programmatic EIS.

Land Use impacts and inconsistency with the LMP would be further increased with this Alternative in comparison to the Proposed Action due to additional acreage on NFS lands, where the LMP requires projects to meet Scenic Integrity Objectives (SIOs) (LMP, Part 3, Standard S-10, p. 6). Additional areas of National Forest lands would not meet these SIOs, which would require a greater level of plan amendment to the LMP. SIOs are established through the LMP for NFS lands, and do not apply to private lands.

Wildfire and Fuels

Because improvements to fire safety were cited by the commenters as a primary reason for community support of the Green Valley Multi-Line Relocation Alternative, a focused analysis of this Alternative’s ability to avoid or minimize wildfire was completed. In-person meetings were conducted by the project team with USFS, including the ANF Forest Supervisor, Fire Management Officer, and staff, on January 13, 2012 (POWER 2012c) and with Los Angeles County Fire Department staff on February 2, 2012 (POWER 2012d). The purpose of these meetings was to introduce the new Alternative to the local firefighting agencies and to gather preliminary feedback on potential impacts relating to wildfires and firefighting. Additionally, an analysis of the three wildfire and fuels impacts that were identified as part of the fireshed assessment in this Final EIS/EIR was undertaken. The three impacts analyzed are:

Impact F-1: The presence of new or additional overhead transmission lines, including construction and maintenance activities, would pose an additional safety hazard for firefighters and reduce the effectiveness of firefighting.

Impact F-2: Construction and/or maintenance activities would increase the risk of a wildfire event where public safety is threatened.

Impact F-3: Project activities would introduce non-native plants, altering fire regimes by increasing ignition potential and rate of fire spread.

The four alternatives considered in the Final EIS/EIR evaluated the same criteria that were evaluated for the Green Valley Multi-Line Relocation Alternative.

Impact F-1

This Alternative would not improve the overall effectiveness of firefighting in the area and could compromise firefighter safety and create new obstructions to fire suppression efforts. The steep
hillsides on the ANF where the transmission lines in this Alternative would deviate from the Proposed Action alignment are considered a key area for firefighting activities; this border between the community of Green Valley and the ANF is important for firefighting to both protect the community from fire moving southward from the forest, as may occur during high wind events, and to protect the forest from fires moving northward from the community, as may occur from an ignition originating in a populated area (POWER 2012c).

This Alternative would create new obstructions in this critical transition zone between public and private properties, which is an area where ground and hose laying tactics are typically performed, and these tactics are discouraged for safety reasons within 100 feet of the power lines (NWCG 2010). The ability of firefighters to directly attack fires approaching the community would be diminished. However, some new roads proposed with this Alternative would provide some additional firefighter vehicular access to the area.

The three-circuit towers that would be constructed (Proposed Action) in Green Valley would be an average of 60 feet taller, but because of their location in the same place as the existing lines, would pose a minimal change to aerial firefighting ability. However, the wider ROW for the three sets of towers for this Alternative would be moved from the valley floor to the hillsides surrounding the community. Aerial tanker fire-suppression drops along the interface between the community of Green Valley and USFS land would be more hazardous due to the creation of a new physical obstacle along the hillside and perpendicular to the primary topographic ridges. The effect of this would be that the application of aerial fire retardant may be limited in areas (POWER 2012d). It would also make night flying along the interface zone more hazardous due to the creation of a new physical obstacle in an area that is currently open.

Compared to this Alternative, the Proposed Action would better allow aerial firefighting resources to operate safely with fewer aerial hazards while providing protection to the residents of Green Valley and surrounding area (Osby 2011).

Impact F-2
The Green Valley Multi-Line Relocation Alternative would not decrease the risk of a wildfire event as compared to the Proposed Action. Construction activities related to a transmission line are factors increasing the potential for wildfire events due to the potential of wildfire ignitions. Although the presence of a high voltage transmission line has a low likelihood to cause a fire directly, this Alternative would require one additional set of transmission structures within the Green Valley area as compared to the Proposed Action. This Alternative would locate the lines over greater acreage of fire-prone chaparral as compared to the Proposed Action. Fuels along the existing ROW, on the valley floor, are generally grassy types, and typically would not result in as intense of fires as the heavier brush on the hillsides.

Additionally, through introduction of new roads, although they would not be open to the public and would be limited in extent due to the use of helicopter construction, the potential for accidental or intentional ignition by the public would be increased.

Impact F-3
Additionally, this Alternative would not decrease wildfire ignition potential as compared to the Proposed Action. Activities associated with the construction and/or maintenance of this
Alternative may result in increased native vegetation alteration, which may increase the potential for wildfire due to the introduction of fire-prone weeds. Increased native vegetation alteration would be expected from locating this Alternative within open space and largely intact habitat, in comparison to the Proposed Action, which would be located within an existing utility corridor.

**Visual Resources**

In comparison to the Proposed Action, the Green Valley Multi-Line Relocation Alternative would cause increased impacts to some viewers, while reducing impacts to others. Overall, impacts would be reduced for a higher number of viewers using San Francisquito Canyon Road and residences located near the existing corridor. However, impacts would be increased for some residences and dispersed recreationists due to the elevated position in the landscape, obstruction of views, and increased skylining of structures in some areas. Increased visual impacts are expected with the Green Valley Multi-Line Relocation Alternative due to the contrasts of a new transmission corridor, primarily within the ANF, where no roads, structures, or lines currently exist.

Visual impacts would be primarily related to the overall visibility (opportunity for viewing) of the transmission line structures. Landform and vegetation contrasts would be minimized due to the utilization of helicopters during construction in most areas to avoid road building. Some long-term landform and vegetation contrasts would remain around structure bases that would generally be more visible than those of the Proposed Action’s due to the Green Valley Multi-Line Relocation Alternative’s elevated position in the landscape. Although this alternative would be seen against a vegetated backdrop that would allow for visual blending with the landscape, the opportunity for viewing structures would be increased due to their elevated position on the mountain slope. Application of mitigation to darken the structures may help blend these structures into the landscape, but such mitigation would also increase contrasts when viewed against the sky.

Within the ANF, the Green Valley Multi-Line Relocation Alternative would increase the acreage of “High” Scenic Integrity Objective (SIO) zones impacted by the Project compared to the Proposed Action. While the Proposed Action would be located entirely within a federally designated utility corridor on the ANF, this alternative would be located outside of a federally designated utility corridor on the ANF. Greater impacts related to non-compliance with SIOs would result due to anticipated reduction of Scenic Integrity levels along a longer distance than would result from the Proposed Action. Scenic Integrity levels would typically be substantially reduced as a result of the presence of structures and their proximity to High Concern viewers (see Table 15 of the Visual Resources Technical Report in Volume III of this Final EIS/EIR). The reduction of Scenic Integrity levels would necessitate a Project-specific plan amendment along the new corridor due to proximity to High Concern viewpoints and because the Green Valley Multi-Line Relocation Alternative would be located within the foreground, immediate foreground, and middleground distance zones from these viewpoints. These impacts could be mitigated by requiring restoration or compensation for landscape character and visual quality impacts on the ANF. This alternative would not, however, substantially affect the Project’s overall reduction of Scenic Integrity compared to the Proposed Action because Project compliance with SIOs would only occur at long distances (background and seldom seen distance zone) and due to the current High and Moderate SIO levels established on potentially impacted
areas of the ANF (see Table 16 of the Visual Resources Technical Report in Volume III of this Final EIS/EIR).

The Green Valley Multi-Line Relocation Alternative would be located higher up the mountain slopes than the Proposed Action, thereby allowing greater overall visibility and causing some additional skylining of structures. Although the Project would be generally more visible, the dominance of the structures would be somewhat reduced from many residences and from San Francisquito Canyon Road. While limited new road construction would occur, graded structure pad cuts and fills would be more evident than for the Proposed Action in cases where they are benched into the hillside and elevated in view. The exposed soil and landform contrasts would be visible to a greater number of sensitive viewers than the Proposed Action until revegetation occurs. In the long term, landform and structure contrasts and structure dominance would remain after vegetation recovers. The Proposed Action would create weaker landform and vegetation contrasts, but the structures would be more dominant for some viewers.

In some cases under the Green Valley Multi-Line Relocation Alternative, the existing 230 kV and 500 kV lines and structures would be removed from the primary viewing orientation of residences. These residences have primary views toward Green Valley, San Francisquito Canyon, Juniper Mountain, and other lands within ANF to the south and southeast. The line would also be removed from the immediate view of residences where the corridor is directly adjacent to homes, and therefore the Alternative would cause lower aesthetic impacts for these residences compared to the Proposed Action.

Photo-simulations were prepared to illustrate the variation in potential visibility and prominence between the alternatives. Figures 2.3-5 and 2.3-6 show the Green Valley Multi-Line Relocation Alternative and the Proposed Action from San Francisquito Canyon Road. As seen from this location, the Green Valley Multi-Line Relocation Alternative would reduce impacts on travelers and nearby residents, and would be less dominant in the viewshed. Figures 2.3-7 and 2.3-8 show the alternatives from Spunky Canyon Road. From this location, the Green Valley Multi-Line Relocation Alternative appears more visible than the Proposed Action due to its higher elevation, but would have the vegetated backdrop that would minimize structure contrasts. Although this simulation also shows standard dulled steel structures, the application of tower darkening mitigation along the Green Valley Multi-Line Relocation Alternative could help to reduce visibility from this viewpoint. However, such mitigation would also increase impacts where residences are located close to the line and have skylined views of the structures or where structures obstruct middleground and background views.

Biological Resources

The Green Valley Multi-Line Relocation Alternative would result in greater acreages of permanent and temporary ground disturbance and would impact a larger area of previously undisturbed habitat as compared to the Proposed Action. The total ROW for the Green Valley Multi-Line Relocation Alternative would cover an estimated 277 acres. All of this ROW would be newly acquired by LADWP and located on land not previously utilized for a transmission line. Of this, approximately 205 acres have been mapped as disturbed, 63 acres have been mapped as Southern Mixed Chaparral, seven acres have been mapped as Southern Sycamore Alder Riparian Woodland, and two acres have been mapped as agricultural. The total permanent ROW for the Proposed Action in the same area would cover an estimated 88 acres. All of this
ROW would be existing LADWP ROW and located on land previously utilized for a transmission line. Of this, approximately 78 acres has been mapped as disturbed, eight acres have been mapped as Southern Mixed Chaparral, two acres have been mapped as Southern Sycamore Alder Riparian Woodland, and one acre has been mapped as agricultural. An additional 73 acres of temporary ROW would also be required for the Proposed Action during construction for the implementation of the temporary transmission line. Of this, approximately 61 acres has been mapped as disturbed, seven acres have been mapped as Southern Mixed Chaparral, five acres have been mapped as Southern Sycamore Alder Riparian Woodland, and one acre has been mapped as agricultural.

Based on average ground disturbance estimates for construction by mileage of transmission line requiring road and helicopter access, implementation of the Green Valley Multi-Line Relocation Alternative would result in an estimated seven to nine acres of permanent ground disturbance. An estimated 90 to 100 acres of temporary disturbance would be required during construction. These estimates exclude the construction of new access roads. The implementation of the Proposed Action in the same area, including Three-Circuit Mitigation and associated the temporary transmission line, would result in less than one acre of permanent ground disturbance. An estimated 50 to 60 acres of temporary disturbance would be required during construction. No new access roads would be required for implementation of the Proposed Action. Temporary and permanent ground disturbance impacts would be expected to occur proportionately across the habitat types identified for each Alternative, with the exception of impacts to Southern Sycamore Alder Riparian Woodland. Impacts to the streams and associated riparian habitat would be limited on both the Alternative and Proposed Action, as construction would span and avoid these areas.

Other Resources

Air quality impacts during construction would be increased relative to the Proposed Action due to emissions from the use of helicopter construction for an additional three miles. Approximately 39 towers would be constructed by helicopter. A range of a approximately 146 to 480 individual helicopter trips can be assumed per tower, depending on tower type (CPUC and USFS 2010). Associated air quality emissions would represent an increase over those of the Proposed Action of approximately 30 tons per year for nitrogen oxides, seven tons per year for reactive organic gases, 28 tons per year for carbon monoxide, and two tons per year for particulate matter.

Impacts to Traffic and Transportation would decrease compared to the Proposed Action, since a temporary line along portions of the San Francisquito Canyon Highway would not be necessary. The highway would still serve as the main access road for the Project under the Green Valley Multi-Line Relocation Alternative; therefore, this decrease in impacts would be minimal.

Impacts related to cultural resources for the Green Valley Multi-Line Alternative would be moderately increased as compared to the Proposed Action. The Green Valley Multi-Line Alternative ROW would cross undisturbed areas that have not been surveyed for cultural resources. These areas would have a moderate sensitivity for containing cultural resources. Although the Proposed Action also has also been determined to have a moderate sensitivity for containing cultural resources, the Proposed Action would be contained within an existing transmission line ROW that has already been disturbed by maintenance roads. Additional
construction-related local noise impacts would also be increased by the expanded use of helicopter construction as well as for the demolition of the existing lines. Impacts to other resources from this Alternative would be similar to those from the Proposed Action as described in this Final EIS/EIR.

Feasibility
This Alternative is considered feasible.

Recommendation for Analysis in the EIS/EIR

Elimination. The Green Valley Multi-Line Relocation Alternative would meet most of the basic purpose and need of the Project and is considered to be feasible. However, this alternative would reduce the ability to meet the USFS’ purpose of minimizing effects of utility corridors on federally managed lands, and, with the exception of visual resources and traffic, would not avoid or minimize environmental impacts over the Proposed Action.

While some individual landowners would benefit from reduced local impacts through the relocation of the proposed and existing transmission lines farther from their residences, other individual land owners and users of NFS lands would experience increased impacts. Compared to the Proposed Action, this Alternative would increase inconsistency with the 2005 ANF LMP and the ROD for the West-Wide Energy Corridor Programmatic EIS. This Alternative would not improve the effectiveness of firefighting, decrease the risk of a wildfire event, or have the ability to decrease ignition potential as compared to the Proposed Action. While some decreased impacts would occur to visual resources overall and traffic during construction, increased impacts would occur to biological resources, air quality, noise, and cultural resources, and no benefits to other resources are expected. As the Green Valley Multi-Line Relocation Alternative would not meet the USFS’ purpose and need of the Project, and would not avoid or minimize overall environmental effects in comparison with the Proposed Action, it is eliminated from further discussion in the EIS/EIR.
2.4 PROPOSED ACTION

LADWP is proposing the BRRTP to access clean, renewable resources in the Tehachapi Mountains and Mojave Desert area, and to improve reliability and upgrade transmission capacity. The Project area is located in Kern and Los Angeles counties. The Proposed Action (described in this Final EIS/EIR as Alternative 2) would extend 76 miles in length from the Barren Ridge Switching Station to Rinaldi Substation and extend 12 miles from the Castaic Power Plant to the proposed Haskell Canyon Switching Station.

The sections below detail the construction process for each Project component, the construction sequence, LADWP General Practices, the construction work force and schedule, and operation and maintenance of the Project.

2.4.1 PROJECT COMPONENTS COMMON TO ALL ACTION ALTERNATIVES

Four of the BRRTP components are common to all action Alternatives analyzed in this Final EIS/EIR. These common components are described in the sections below.

Expansion of the Existing Barren Ridge Switching Station

LADWP proposes expansion of the existing Barren Ridge Switching Station to the east side by 235 feet, for a total station size of 485 feet by 500 feet (approximately 5.7 acres). The expansion area of the station would include electrical structures and equipment for the addition of transmission lines, a material staging area, roadway within the station, and a drainage area. The preliminary design layout for the station may be found in Appendix C of this Final EIS/EIR.

Expansion of the existing switching station would be very similar to the construction of the Haskell Canyon Switching Station as described below. Expansion would consist of preconstruction surveys, site preparation and grading, installation of reinforced concrete foundations, installation of electrical conduits for equipment power and control, and installation of structures and equipment.

Necessary pre-construction geotechnical on-site investigation would include two test pits excavated by a backhoe to investigate soil density and settlement, and four cone penetration test locations on-site to determine friction resistance for piers. The cone penetration test rig would be a small truck with a hydraulic ram assembly mounted on the back, which is used to push a 2.5-inch diameter cone into the ground to a depth up to 50 feet. Existing roads would be used to access the site.

It is estimated that 700 cubic yards of concrete would need to be delivered to the switching station site for the foundations. Foundation work would require approximately 80 trips to the site by 40-ton, 10-yard capacity concrete trucks over a 90-day working period. Equipment required for station construction would include graders and excavators, backhoes, drill rigs, water trucks, scrapers, sheep’s foot compactors, front end loaders, concrete trucks, trucks, and flatbed trailers. Cranes, man-lifts, portable welding units, line trucks, and mechanic trucks would also be required. An estimated eight months with approximately 60 workers would be required to expand the station.
Construction of the Haskell Canyon Switching Station

As a component of the BRRTP, LADWP proposes the construction of a new switching station in Haskell Canyon, south of the Angeles National Forest on LADWP-owned property at the convergence of several existing and proposed 230 kV transmission lines (the existing BR-RIN, the proposed double-circuit Barren Ridge – Haskell Canyon, existing Castaic – Northridge, Castaic – Sylmar, Castaic – Olive, and the proposed Castaic – Haskell Canyon). Although the station is proposed on LADWP-owned property, some adjacent private property may need to be acquired to address cut and fill requirements during station design for the stability of the slopes as well as accommodate the transmission lines that would connect to the station. (See the section headed “Right-of Way Permits and Grants” below in Section 2.4.2 for a discussion of private property acquisition.)

The station would be approximately 500 feet by 600 feet to accommodate the necessary circuit positions, which are made up of equipment, such as steel support structures, circuit breakers, disconnect switches, and associated equipment, and a relay house and control house containing control and protective relaying equipment. The relay and control houses would each be approximately 30 feet long by 12 feet wide by 10 feet high and constructed of gray concrete block. The station yard would include a paved internal access road approximately 16 feet wide and would be enclosed by chain-link fencing with barbed-wire extension for security. Figure 2-4 is a simulation of the proposed new switching station. The preliminary grading plan for the station is in Appendix C of this Final EIS/EIR.

Necessary pre-construction geotechnical investigation on-site would include six borings by a drill rig to investigate bedrock and soil stability and four cone penetration test locations after site grading to determine friction resistance for piers. The cone penetration test rig would be a small truck with a hydraulic ram assembly mounted on the back, which is used to push a 2.5-inch diameter cone into the ground to a depth up to 50 feet. Existing roads would be used to access the site.

Construction of the new Haskell Canyon Switching Station would consist of preconstruction surveys, clearing and grading of access roads, site grading and drainage development, installation of concrete foundations and steel support structures, installation of below- and above-ground electrical conduits for equipment power and control, installation of below- and above-grade grounding conductors, and installation of control and relay houses. Equipment required for station construction would include graders and excavators, backhoes, drill rigs, water trucks, scrapers, sheep’s foot compactors, front end loaders, concrete trucks, trucks, and flatbed trailers. Cranes, man-lifts, portable welding units, line trucks, and mechanic trucks would also be required. Construction would require an estimated 12 months with approximately 60 workers.

Site preparation work for the station would involve clearing and grading of access roads, clearing of the switchyard site, the cut and fill grading of the site, and placement and compaction of structural fill that would serve as a base for switching station facilities. The site would be graded to maintain current drainage patterns as much as possible. A 16-foot-wide paved road and a 100-foot by 100-foot gravel parking area would be required. The yard would be covered with crushed-rock aggregate. Native vegetation would be re-established where possible outside the switchyard fence.
Following site grading and development, reinforced concrete foundations would be installed to support the steel structures and electrical equipment and control facilities. It is estimated that 1,500 cubic yards of concrete would need to be delivered to the switching station site for the foundations. Foundation work would require approximately 180 trips to the site by 40-ton, 10-yard capacity concrete trucks over a 120-day working period. Subsequent to the foundation installation, trenches would be dug to facilitate placement of copper conductors for the station grounding mat.

Multiple transmission lines would terminate in the switching station (i.e., the new and existing Barren Ridge – Haskell and Castaic – Haskell Canyon transmission lines) and would need support and require the installation of galvanized steel structures. An existing 115 kV transmission line may need to be relocated around the proposed station. High-voltage bus work consisting of aluminum jumpers and tubing would be installed within the station.
This visual simulation is a representation of the proposed Haskell Canyon Switching station and addition of a new multi-circuit 230 kV transmission line. The tower location and heights may change pending approval of final design and engineering.
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Reconductorexisting 230kV Transmission Line

LADWP proposes the reconductoring of 76 miles of the existing BR-RIN 230 kV transmission line with larger conductors from the Barren Ridge Switching Station to Rinaldi Substation. Four miles of BLM-managed public lands, 13 miles of National Forest System (NFS) lands, and 44 miles of private property would be traversed. The existing conductors (954/2,312 kcmil) would be replaced with a new 1,433.6 kcmil “Merrimack” ACSS/TW/HS (aluminum conductor steel supported/trapezoidal wires/high strength) conductor. The new conductor would have a larger diameter that allows for greater electrical capacity.

The upgrade of the existing BR-RIN would also require many of the same activities of the new transmission line (surveying of ROW, rehabilitation of existing access and spur roads, clearing of ROW, conductor installation, and cleanup). Removal of the existing conductor would be used to string a pulling line, and this line would then be used to pull in the new conductor. All work would remain within the existing 250-foot-wide ROW, with no additional ROW required. Some of the towers would need to be modified, replaced, and/or have foundations reinforced or replaced to carry the additional weight of the new heavier conductor. Refer to Figure 2-1 for the location of the reconductoring. See Figure 2-5, Cross Section K, for a representative cross-section of the proposed ROW.
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Figure 2-5. Cross Section K
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Addition of New 230 kV Circuit

Between the proposed Haskell Canyon Switching Station and the existing Castaic Power Plant, LADWP proposes the addition of 12 miles of a new 230 kV transmission circuit onto existing Castaic – Olive 230 kV Transmission Line structures. The circuit would cross the unincorporated communities of Castaic and Saugus and the city of Santa Clarita. A total of 300 feet of BLM-managed public lands and four miles of NFS lands would be traversed; however, the new circuit would not require a new or additional ROW. This new circuit would be called Castaic – Haskell Canyon #4 and would utilize the same conductor (bundled 715.5 kcmil “Starling” ACSS/AW [aluminum conductor steel supported/aluminum-clad steel wire]) as that proposed for the new 230 kV transmission line between Barren Ridge and Haskell Canyon Switching Stations.

The addition of a new circuit on existing towers would require many of the same construction activities associated with a new transmission line (refer to Section 2.4.2 for a description of each construction activity). However, all work would be within existing ROW and no new towers would be constructed. Some towers may need to be modified or reinforced to carry the additional weight of the new conductor. Specific towers requiring reinforcement would be determined following detailed design of the Project. Tower reinforcement would not alter the general design or the location of the structures. This process would generally include reinforced foundations or steel member replacements. Refer to Figure 2-1 for a map showing the location of the new 230 kV circuit.

2.4.2 CONSTRUCTION OF NEW 230 KV DOUBLE-CIRCUIT TRANSMISSION LINE

The proposed double-circuit 230 kV transmission line component of the BRRTP would consist of two AC circuits from the Barren Ridge Switching Station to the proposed Haskell Canyon Switching Station in Haskell Canyon. The four BRRTP action Alternatives differ only in the alignment of this 230 kV double-circuit transmission line.

LADWP’s Proposed Action (Alternative 2), at 61 miles long, includes the shortest 230 kV transmission line of the action Alternatives. It would begin at the Barren Ridge Switching Station and run south, paralleling LADWP’s existing 230 kV BR-RIN and 500 kV PDCI transmission lines. It would extend south from the unincorporated community of Mojave through the Antelope Valley and approximately one mile east of the Antelope Valley California Poppy Reserve before continuing onto NFS lands and ending at the proposed Haskell Canyon Switching Station. The entire route would remain within designated utility corridors and would parallel existing transmission lines.

For the majority of the alignment, the two new 230 kV circuits would be placed on new double-circuit transmission towers, but for approximately 1.5 miles, the circuits would be placed on existing four-circuit structures that are just north of the proposed Haskell Canyon Switching Station. Between where the existing BR-RIN crosses Dry Canyon to the intersection of the Castaic transmission lines, LADWP has existing four-circuit towers with three vacant positions. The existing towers would be utilized in this section for the proposed 230 kV double circuit transmission line instead of constructing new towers. See Figure 2-6 for the location and illustration of the existing four-circuit towers to be utilized.
Figure 2-6. Four-Circuit Towers To Be Utilized for BRRTCP
Right-of-Way Permits and Grants

The new 230 kV double-circuit transmission line would generally parallel the existing 230 kV transmission line that would be reconduced for the entire length (61 miles). Nine miles of the new 230 kV transmission line and reconductoring would be constructed utilizing the Three-Circuit Tower Mitigation, described below, in which the three circuits would be placed on the same towers. Therefore, both of these Project components would cross 13 miles of the ANF, four miles of lands managed by the BLM, and 44 miles of private lands; and traverse the unincorporated communities of Mojave, Willow Springs, Antelope Acres, Green Valley, and Elizabeth Lake, and the city of Santa Clarita, with a majority of the Proposed Action in unincorporated Kern and Los Angeles Counties. For the new 230 kV transmission line, LADWP is seeking a BLM right-of-way grant and USFS Special Use Authorization for an additional 200-foot-wide ROW that would be adjacent to LADWP’s existing BR-RIN ROW. See Figures 2-7, 2-8 and 2-9, Cross-Sections A, E and F, for representative cross-sections of the proposed ROW.

Forty-four miles of private lands would be traversed by the 230 kV transmission line and require a 200-foot-wide ROW, including what may be necessary to allow the construction of the Haskell Canyon Switching Station and the connection of all existing transmission lines within the area to the station. As necessary, LADWP would seek to purchase the private property required for the Project. As soon as a property has been identified through the final design planning and after the completion of the environmental review and approval process, the property owner would be notified of the LADWP’s interest in acquiring the property. After the appraisal and inspection process, a written offer would be presented to the property owner. If an agreement could not be reached after the LADWP had exhausted all its opportunities to reach a settlement with a property owner, the City could choose to exercise its power of eminent domain. For discussion of the potential impacts of eminent domain, please see Chapter 4, Section 4.2.3, Land Use, and Section 4.2.13, Socioeconomics. In some instances, the LADWP could instead seek an easement on the property, rather than ownership in fee.
**FIGURE 2-7. CROSS SECTION A**

Cross Sections and maps are for review purposes only. Project may change pending public and regulatory review.
FIGURE 2-8. CROSS SECTION E

Cross Sections and maps are for review purposes only. Project may change pending public and regulatory review.
Figure 2-9. Cross Section F
Plan Amendments

On land under the jurisdiction of BLM, an existing utility corridor (Corridor A) would be utilized, and no California Desert Conservation Area Plan amendment would be required. Prior to the USFS issuing a Special Use Authorization, the following Project-specific amendments to the 2005 ANF Land Management Plan (LMP) would be required: Forest Standards S9 and S10 (related to meeting the Scenic Integrity Objectives on NFS lands), Forest Standard S1 (related to the Pacific Crest Trail), and Standards related to Riparian Conservation Areas.

Scenic Integrity Objective

The USFS has adopted management standards for visual resources addressing SIOs. The construction and operation of Alternative 2 would result in some conditions that would be inconsistent with the existing SIO standards. Therefore, adoption of a Project-specific ANF LMP amendment for those areas in the Record of Decision would be necessary to ensure the Project consistency with those standards.

Pacific Crest Trail

The ANF LMP has established a specific design standard for the Pacific Crest Trail (Forest-specific Design Criteria, Place-specific Standard ANF S1 - Pacific Crest Trail), which states: “Protect [the] scenic integrity of foreground views as well as from designated viewpoints. Where practicable, avoid establishing nonconforming land uses within the viewshed of the trail.” The construction and operation of a new 230 kV transmission line would not meet the Desired Condition or the SIO levels specific to the ANF LMP, and would not comply with the Standard ANF S1. Adoption of a Project-specific ANF LMP amendment would be necessary to ensure the Project consistency with this standard.

Riparian Conservation Area

Management objectives for riparian conservations areas were established in the ANF LMP to maintain or improve long-term aquatic and riparian ecosystem health, including quantity, quality, and timing of stream flows. Even with mitigation, the construction, operation, maintenance, and decommissioning of a new transmission line would be inconsistent with the management objectives. Adoption of a Project-specific ANF LMP amendment would be necessary to ensure the Project consistency with those standards.

Construction

The proposed structures for the new transmission line would primarily be self-supporting double-circuit steel lattice towers fabricated from galvanized steel members, as shown on the left side of Figure 2-10. Depending on the environmental conditions of the surrounding terrain, the height of the proposed lattice structures would range from 110 to 195 feet, with an average tower-to-tower span of 1,000 to 1,100 feet. Table 2-3 lists the structure specifications for the number of structures per mile, average span length, and average heights for towers and components. Exact structure placement would be determined during engineering surveys and detailed design studies for the selected Alternative route following the Record of Decision (ROD) on this Final EIS/EIR. A variety of engineering, constructability, existing access, and environmental issues would be considered during detailed structure siting within the permitted ROW.
**TABLE 2-3. DOUBLE-CIRCUIT STEEL LATTICE TOWER SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Tower Placement Details</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Categories 1 through 3</td>
</tr>
<tr>
<td></td>
<td>Flat (0 – 10% slope)</td>
</tr>
<tr>
<td>Towers per mile</td>
<td>±5</td>
</tr>
<tr>
<td>Average span length</td>
<td>1100 feet</td>
</tr>
<tr>
<td>Average height</td>
<td></td>
</tr>
<tr>
<td>Ground to lowest attachment</td>
<td>115 feet</td>
</tr>
<tr>
<td>Upper body height</td>
<td>52 feet</td>
</tr>
<tr>
<td>Overall tower height</td>
<td>167 feet</td>
</tr>
<tr>
<td>Typical range of heights of new towers</td>
<td>120 – 195 feet</td>
</tr>
</tbody>
</table>

“Dead-end” towers of self-supporting, steel-lattice design would be required periodically to add longitudinal strength along the line. Dead-end towers would also be used at turn (angle) locations along the line, at heavily loaded tower locations, and at specific utility crossings (e.g., other transmission lines) for added safety. Dead-ended towers are of the same basic configuration as suspension towers (non-angle structures), the difference being in the tower “arms,” insulator systems, and tower weights.

**FIGURE 2-10. TYPES OF DOUBLE-CIRCUIT TOWERS**
Self-supporting tubular steel poles (TSP) have been proposed by LADWP as an available mitigation structure where appropriate to reduce potential impacts, such as conflicts with cultivation on agricultural lands. The TSPs can reduce impacts in some cases due to a smaller footprint than the proposed self-supporting steel lattice structures; however, more TSPs per mile would be necessary due to a shorter average span between structures. The TSPs would have an average height range between 95 and 180 feet, depending on the conditions of the surrounding terrain, with an average tower-to-tower span of 700 to 800 feet. Refer to Figure 2-10 for an illustration of the double-circuit TSPs.

The self-supporting steel lattice structures and TSPs would utilize concrete foundations. Steel lattice structures would require four footings (one for each leg); TSPs would require single footings. Footings would be steel-reinforced concrete pier type and be cast in place. The typical design for the concrete footings for lattice structures would be between 2.5 and 5.0 feet in diameter, with an average depth of 20 feet depending on soil conditions. Typical design for single foundations for TSPs would include augured holes approximately five to seven feet in diameter and 15 to 30 feet deep, depending on conditions. Formwork steel reinforcing would be assembled in the hole prior to casting concrete in place. Reinforcing steel would become integral to the lower leg of the steel lattice structure during assembly. An above-ground concrete form placed over each hole would result in a final concrete foundation height of 0.5 to 2.0 feet above ground level.
Figure 2-11. Typical Foundation Design for the Double-Circuit Steel Lattice Towers
Figure 2-12. Typical Foundation Design for Tubular Steel Poles
As illustrated in Figure 2-13, Typical Tower Components, each tower carries conductors ("wires"), insulators, and ground wires. The conductor being considered for the new double-circuit 230 kV transmission line and installation of the Castaic – Haskell Canyon #4 circuit on existing structures is a bundled 715.5 kcmil “Starling” ACSS/AW. The reconductoring of the BR-RIN transmission line between Barren Ridge Switching Station and Rinaldi Substation would require a bundled 1,433.6 kcmil “Merrimack” ACSS/TW/HS conductor.

**Figure 2-13. Typical Tower Components**

![Typical Tower Components Diagram]

Each circuit would consist of three phases ("wires") as illustrated in Figure 2-10. To increase the current-carrying capability of the transmission lines and reduce power loss, the Proposed Action (Alternative 2) would utilize bundled conductors installed for each phase. The bundled conductors would consist of two conductor cables connected by a spacer. The new 230 kV double-circuit transmission line would consist of a total of six double-bundled (12 individual) wires.

Minimum conductor height above the ground, under normal operation of the line, is 30 feet. Greater clearances may be required in certain areas to allow for clearances over trees or other vegetation that could pose a risk to the operation of the transmission line. Minimum conductor clearance would dictate the exact height of each tower based on topography and safety clearance requirements.

Insulators are used to provide the physical connection of conductors to structures. These system components are made of very low conducting materials (polymer insulators) that inhibit the flow of electric current from energized conductors to ground or to other energized system elements. Insulators and their associated hardware are to be configured in an “I” assembly to support conductors while maintaining required distances between phases and grounded structures. Each “I” string would consist of six-inch diameter insulators between six and eight feet long.

To shield conductors from the hazard of direct lightning strikes by transferring lightning currents into the ground, overhead ground wires (shield wires) or fiber optic ground wire would be installed on top of new structures.
Construction Sequence

Construction of a transmission line involves the following general sequence of events: surveying the centerline; identifying and constructing access roads; clearing ROW and tower sites (including construction yards and batch plants); installing foundations; assembling and installing the towers; clearing, pulling, tensioning, and splicing sites; installing ground wires and conductors; installing counterpoise; switching station tie-in; and cleanup and site reclamation. Various phases of construction would occur at different locations throughout the construction process for the BRRTTP. This would require several contractors operating at the same time and in different locations.

The following section describes the construction components necessary for the assembly and installation of the proposed double-circuit transmission line. The description of transmission line construction sequencing and estimates for construction sites would also be relevant for the additional transmission line construction activities associated with the installation of the Castaic – Haskell Canyon #4 circuit on existing structures, and the reconductoring of the BR-RIN transmission line between the Barren Ridge Switching Station and the Rinaldi Substation.

Surveying Activities

The LADWP must first obtain survey permits for the portion of the Project crossing federal lands managed by the USFS and the BLM and rights-of-entry for private lands. This would include the issuance of a 50-year term Special Use Authorization to LADWP by the USFS and a 30-year term (renewable) right-of-way grant issued by the BLM. For survey on affected private lands, LADWP would need to negotiate rights-of-entry with the local landowners. Once survey permits are obtained, construction survey work would consist of locating the centerline, tower center hubs, ROW boundaries, and tower access roads, some of which would be outside of the ROW boundaries. Whenever possible, location of the ROW and Project facilities would be laid out to avoid identified sensitive resources. All of these activities would begin approximately one year prior to the start of construction. Cultural resources and necessary additional threatened and endangered species intensive surveys would be conducted once the survey of the centerline and access roads is completed and clearly marked.

Necessary pre-construction geotechnical investigations would include geological field mapping of each tower site, and borings by drill rig for soil sampling and bedrock corings to determine soil densities and bedrock strength. Test locations would include angle points between the Barren Ridge Switching Station and the ANF and five to ten locations along the selected alignment within the ANF. Seismic analysis of tower sites for slope stability would also be necessary in mountainous areas of the ANF. Existing roads would be used as much as possible, but some new roads could be required.

Construction of Access Roads

The construction, operation, maintenance, and decommissioning of the proposed transmission line would require that heavy vehicles access tower sites along the ROW. Where new access roads are required, they would be constructed to support the weight of these vehicles and would typically be 16 feet wide, consisting of a 14-foot driving surface with a side drainage system between one and two feet in width. Permanent roads would be constructed where necessary for
operation or maintenance. LADWP Access and Patrol Road Standards are included in Appendix C, and project road standards would be addressed specifically in the Construction, Operation, and Maintenance Plan (COM Plan) and the Plan of Development (POD) during the engineering phase of the Project, and prior to a Notice to Proceed from the USFS and BLM.

Existing paved and unpaved highways and roads would be used where possible. Roads along existing utility corridors would also be used where possible to minimize new access road construction. In locations where existing roads could be used, that are close to the proposed or existing ROW centerlines, only new spur roads to the tower sites would be constructed. The specific locations and design of all new access and spur roads would be determined during final Project design. Table 2-4 lists the estimated ground disturbance of access and spur roads based on terrain.

### Table 2-4. Access and Spur Road Ground Disturbance Estimates

<table>
<thead>
<tr>
<th>Ground Disturbance Categories</th>
<th>Access Roads</th>
<th>Spur Roads (average width 16 feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Miles of Roads Per Mile of Transmission Line</td>
<td>Average Acres of Disturbance Per Mile of Transmission Line*</td>
</tr>
<tr>
<td>1. Existing roads or agricultural land; no widening anticipated</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2. Existing 8-foot wide roads that require an additional 8 feet of widening</td>
<td>1.0 to 2.5</td>
<td>Permanent 0.9 to 2.4</td>
</tr>
<tr>
<td>3. Construct new road on flat terrain (0-10%)</td>
<td>1.0 to 2.5</td>
<td>Permanent 1.9 to 4.8</td>
</tr>
<tr>
<td>4. Construct new road on sloping terrain (10-20%)</td>
<td>2.5 to 4.0</td>
<td>Temporary 7.3 to 11.6 Permanent 4.8 to 7.7</td>
</tr>
<tr>
<td>5. Construct new road on steep terrain (20-30%)1,2</td>
<td>4.0 to 6.0</td>
<td>Temporary 23.3 to 34.9 Permanent 7.7 to 11.6</td>
</tr>
<tr>
<td>6. Construct road on very steep terrain (greater than 30%)1,2</td>
<td>6.0 to 8.0</td>
<td>Temporary 69.8 to 93.1 Permanent 11.6 to 15.5</td>
</tr>
</tbody>
</table>

1 After construction of the transmission line, all access roads in Categories 4 through 6 would be re-vegetated back to 16 feet wide.

2 On steep terrain (approximately 25% or higher) with limited access on the Angeles National Forest, the USFS may require Helicopter Mitigation as described in Section 2.4.4 of this Chapter.

Wherever possible, roads would be built at right angles to streams and washes. Culverts or other drainage structures would be installed as necessary across drainages, but the roads would usually follow the natural grade. In addition, road construction would include dust control and erosion control measures in sensitive areas. All existing roads would be left in a condition equal to or better than their condition prior to the construction of the transmission line without changing their service level. Gates would be installed where required at fenced property lines to restrict general vehicular access from or to the ROW. Where identified within the environmental studies for mitigation purposes, access roads may be excluded or limited within specific sensitive areas, such as Riparian Conservation Areas (RCAs) on the Angeles National Forest.
Clearing Right-of-Way

The clearing of some natural vegetation may be required. However, selective clearing would be performed only when necessary to provide for surveying, electrical safety clearances, line reliability, and maintenance. Trimming or removal of mature vegetation, under or near the conductors, would be done to provide adequate electrical clearance as required by the National Electrical Safety Code, the North American Electrical Reliability Corporation, and California Public Utilities Commission General Order 95 standards.

Trees that could fall onto the lines or affect lines during wind-induced line swing would be removed. Normal clearing procedures are to top or remove large trees and not disturb smaller trees. Where there is a direct conflict between trees and clearance standards, the removal of trees would be jointly reviewed and agreed upon between LADWP and the owners or managers of the property. Rights-of-way would not be chemically treated unless necessary to comply with requirements of a permitting agency. On NFS lands and on public lands managed by the BLM, approved herbicides would be utilized within the Project area on select invasive plant species. Invasive plant surveys and control would continue for the life of the Project.

Tower Site Clearing

After access roads are developed, preparation of individual structure sites would be required prior to installation of the structures. At tower locations, work areas of up to 200 feet square in flat terrain and up to 200 by 250 feet in areas with slopes greater than eight percent may be needed. Within the work areas, at some tower locations, a level cleared area (pad) may be necessary to complete the construction of the towers. However, many tower sites would be considerably smaller depending on the size of the tower, the terrain, resource considerations, and whether helicopter construction was used, among other factors. The work area would be required for the location of tower footings, assembly of the tower, and the necessary crane maneuvers. Vegetation would be mostly crushed, and cleared only when necessary. All pads not needed for normal transmission line maintenance would be graded to blend as near as possible with the natural contours, and revegetated where required by a permitting agency. See Table 2-7 for estimated temporary and permanent ground disturbance associated with the double-circuit steel lattice towers.

Staging Areas and Batch Plants

It is anticipated that one or two construction yards or staging areas would be required for materials storage, construction equipment, construction vehicles, and temporary construction offices. Staging areas would be approximately five acres in size, and located centrally or near each end of the transmission line route. The staging areas would be on previously disturbed private land and would be level and surfaced with crushed aggregate base. The LADWP would negotiate with landowners for specific locations of the staging areas.

Concrete for use in constructing foundations would be dispensed from a portable concrete batch plant located at approximately 15 mile intervals along the proposed line route. A rubber-tired flatbed truck and tractor would be used to relocate each plant along the ROW. Commercial ready-mix concrete would be used when access to tower construction sites is economically feasible.
The construction yards and batch plants would be located on private land and serve as field offices, reporting locations for workers, parking space for vehicles and equipment, sites for material storage, and stations for equipment maintenance. Facilities would be fenced and their gates locked. Security guards would be stationed where needed. See Table 2-5 for estimated ground disturbance associated with the staging sites and batch plants.

### Table 2-5. Staging Sites and Batch Plant Ground Disturbance Estimates

<table>
<thead>
<tr>
<th>Disturbance Description</th>
<th>Categories 1 through 3 Flat (0 – 10% slope)*</th>
<th>Maximum Estimated Disturbance Dimension per site</th>
<th>Average Disturbance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material staging sites (2 sites)</td>
<td>400 x 540 feet (5 acres)</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Concrete batch plants (3 sites maximum)</td>
<td>2 acres, 30 mile haul distance</td>
<td>0.2 acre per mile</td>
<td></td>
</tr>
<tr>
<td>Total Average Disturbance</td>
<td></td>
<td>0.2 acre per mile</td>
<td></td>
</tr>
</tbody>
</table>

*Material staging sites and concrete batch plants would not be built on terrain above 10% slope.

**Foundation Installation**

Tower foundations for the lattice structures would consist of drilled concrete piers. The foundation process would start with the boring of four holes for each lattice structure or one hole for each TSP. The holes would be bored using truck- or track-mounted excavators with various diameter augers to match diameter and depth requirements of the foundation sizes.

For a typical suspension lattice tower, each hole would typically be 2.5 feet in diameter and 20 feet deep, depending on soil conditions. For the larger angle or dead-end structures, foundations could be up to 30 or more feet deep, depending on soil conditions. Each foundation would extend above the ground line between six inches and four feet. In extremely sandy soils, soil stabilization by water or a gelling agent may occur before excavation, and steel casings may be used for the excavation. Excavated material would be spread around the tower site.

Following excavation of the foundation holes, each footing would be constructed by placing formwork, reinforcing steel and a tower stub into the foundation hole, positioning the stub, and encasing it in concrete. Reinforcing steel cages would be assembled at laydown yards and delivered to each structure location by flatbed truck. Spoil material would be spread around the tower site and used for fill where suitable. The foundation excavation and installation would require access to the site by a power auger or drill, a crane, material trucks, and ready-mix trucks. Typical suspension structures would require approximately 25 to 40 cubic yards of concrete, and dead-end structures would require approximately 120 cubic yards of concrete.

**Tower Assembly and Installation**

The size of the work areas for structures (assembly and installation sites) would be approximately 40,000 to 50,000 square feet (1 acre = 43,560 ft²) depending on terrain. The location of these sites has not yet been determined, but exact locations would be identified within the COM Plan and POD prior to a Notice to Proceed from the agencies. Lattice towers would be
assembled at each site, installed, and bolted to the foundations. Bundles of steel members and associated parts would be transported to each tower site by truck. Steel members would be assembled into subsections of convenient size and weight on the ground. Assembly would be facilitated with a small rough-terrain crane. The assembled subsections would be erected into place by a large crane and then fastened together in the air to form a complete tower. See Figure 2-14 for an illustration of typical tower assembly and installation activities.

**Figure 2-14. Typical Tower Assembly and Installation Activities**

Conductor Installation

After the towers are installed, insulators, hardware, and stringing sheaves would be delivered to each tower site. The towers would be rigged with insulator strings and stringing sheaves at each ground wire and conductor position. Sheaves are rollers that are temporarily attached to the lower end of the insulators to allow the conductor to be pulled, or “strung,” along the line.

For public protection during wire installation, temporary guard structures would be built next to highways, railroads, power lines, structures, and other major obstacles. Guard structures would consist of H-frame poles placed on either side of an obstacle. These structures would prevent ground wire, conductor, or equipment from falling on an obstacle. Equipment for installing guard structures would include augers, line trucks, pole trailers, and cranes. A guard structure would be anticipated to be necessary every five miles. The amount of ground disturbance would
typically be 200 feet by 300 feet. The guard structures would be left in place until conductors and ground wires were strung, tensioned, and clipped; this time frame would be approximately three weeks or longer depending on conditions. Guard structures may not be necessary for small roads. In such cases, other safety measures, such as barriers, flagmen, or other traffic control, would be used.

Pilot lines would be pulled (strung) from tower to tower by a helicopter and threaded through the stringing sheaves at each tower. The pilot line is used to pull in a larger-diameter, stronger pulling line for the conductor, and can also be used to pull in the ground wire. The larger-diameter, stronger line—pulling line—would be attached to the conductors to pull them onto towers. This process would be repeated until the ground wire or conductor is pulled through all sheaves. Bundled conductors would be pulled together with the assistance of a running board. The running board attaches the bundled conductor to the pulling line.

Ground wire and conductors would be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end of a conductor segment as shown on Figure 2-15. Sites for tensioning equipment and pulling equipment would be approximately 2.5 miles apart.

To the greatest extent practical, pulling and tensioning sites would be within the transmission ROW. However, some pulling and tensioning sites may occur outside the ROW. The tensioning and pulling sites could be as large as 200 feet by 500 feet, but they would be limited in size depending on each specific location and what is reasonable for safe construction practices. The size of each site would be limited as much as possible and would be designed in coordination with the responsible property owner or land management agency. Depending on topography, some grading may be required at pulling and tensioning sites to create level pads for equipment. Tensioners, line trucks, wire trailers, and tractors needed for stringing and anchoring the ground wire or conductor would be at the tensioning sites. A puller, line trucks, sag cat, and tractors would be needed for pulling and temporarily anchoring the ground wire and conductor. Table 2-7 includes ground disturbance estimates for conductor installation (helicopter fly yards, portable helicopter landing pads, pulling and stringing sites, and sleeving and stringing operations).

After installing the conductor ground wire or fiber optic shield wire, sagging, clipping, and dead-ending activities, terminating the conductors at dead-end structures, would be performed. This process would involve adjusting the position of the conductors and shield wires, removing stringing sheaves, and permanently attaching the conductor to the insulators with specialized hardware. FAA requirements may necessitate the installation of spherical markers, or similar type marker balls, for obstruction marking on some conductor spans. This would occur in locations where potential aircraft flight obstruction could be caused by conductors located over 200 feet above ground level. While specific locations of required markers cannot be determined prior to final design, obstruction marking for aircraft safety is expected to occur in only limited locations on conductor spans over major drainages or canyons. Installation of spherical markers would occur either prior to conductor installation or by lift or helicopter installation after conductor installation. Based on preliminary design, no transmission line towers are expected to exceed 200 feet in height or trigger requirements for obstruction marking or lighting.
Counterpoise Installation and Grounding Practices

Part of standard construction practice prior to wire installation would involve measuring the resistance of tower footings and installation of counterpoise (grounds) as needed. To determine if a tower would require counterpoise, ground resistance measurements would be taken at towers sites after the installation of the foundations and structures. The measurements would be evaluated to determine the numbers and locations of structures requiring counterpoise. If the resistance to remote earth for each transmission tower is greater than 10 ohms, counterpoise (grounds) would be installed to lower the resistance to 10 ohms or less. Counterpoise would consist of a bare copper-clad or galvanized steel cable buried a minimum of 12 inches deep, extending horizontally from one or more tower legs for approximately 200 feet. Typical counterpoise installation would include two installations per structure on opposite tower legs. Four installations per tower could be required in certain circumstances.

In addition to counterpoise installation, standard grounding practices during construction would include both temporary and permanent grounding of equipment and structures, such as fences or pipelines, as necessary to reduce any potential magnetically induced voltages to harmless levels. Such practices could include electrical isolation of equipment or structures and the installation of grounding wires.
Switching Station Tie-in
At the proposed Haskell Canyon Switching Station, the transmission lines would be connected into and out of the switching station through dedicated station structures within the switching station, commonly referred to as “buses.”

Upkeep of Construction Sites
Construction sites, material storage yards, and access roads would be kept in an orderly condition throughout the construction period. Refuse and trash would be removed from the sites and disposed of in an approved manner. Oils and fuels would not be dumped. 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.

Microtrash would be cleaned daily from all work areas within known California condor habitat. Microtrash is a term used to describe small bits of debris like bottle caps, rags, screws, bolts, wires, glass, and other refuse materials found in condor habitat.

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

Hazardous materials would not be drained onto the ground or into streams or drainage areas. Totally enclosed containment would be provided for all trash. 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, maintenance, and decommissioning activities would comply with all applicable federal, State, and local laws and regulations regarding the use of hazardous substances.

The construction or maintenance crew foreman would ensure that all applicable laws are obeyed. In addition, an on-site inspector would be present during construction to make sure that all hazardous materials are used and stored properly. A health and safety plan would be developed as part of the COM Plan and POD during the engineering and preconstruction phase of the Project.

Site Reclamation
The ROW, including temporary construction sites, and any temporary ground disturbance outside of the ROW that may have been caused during or due to the construction of the Project (e.g., temporary access roads, staging sites, and assembly yards) would be restored as required by the property owner or land management agency. All practical means would be used to restore the land to its original contour and to restore natural drainage patterns along the ROW. Because revegetation would be difficult in many areas of the Project, disturbance would be minimized.
during construction. All practical means would be used to increase the chances of vegetation reestablishment in disturbed areas.

The total construction period would be approximately two years. The COM Plan, which would be completed during the engineering and preconstruction phase of the Project, would address specific site reclamation of all disturbed areas.

Fire Protection
A Fire Management Plan would be developed for the Project, and 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.

2.4.3 THREE-CIRCUIT TOWER MITIGATION
In areas where there are ROW expansion constraints and where LADWP has existing 230 kV transmission lines, LADWP is adopting mitigation to construct three-circuit towers within the existing ROW to carry the existing BR-RIN circuit and the two proposed Barren Ridge to Haskell Canyon (BR-HC) circuits. This would reduce various impacts, as discussed in Chapter 4 of this Final EIS/EIR, including adverse wildfire and fuels impacts and the acquisition of residential property in the unincorporated communities of Willow Springs (milepost 27.1 to 27.6) and Elizabeth Lake and Green Valley (milepost 44.6 to 51.7). Refer to Figure 2-16 for an illustration of three-circuit tower types, and to Figure 2-17, the Three-Circuit Tower Mitigation Map, for proposed locations.

**Figure 2-16. Three-Circuit Tower Types**

![Diagram of three-circuit towers](image)
FIGURE 2-17. THREE-CIRCUIT TOWER MITIGATION

Three-circuit Tower Mitigation

ALT. 2
ALT. 2a
ALT. 3

Alternative Routes for 230kV Transmission Line
- Alternative 1
- Alternative 2 - Proposed Action
- Alternative 2a
- Alternative 3

Utilize existing 4-Circuit towers within ROW for Alt 2 & Alt 2A: ~Mile 58.5 - 60.1
New 3-Circuit towers within new ROW for Alt 2 & Alt 2A: ~Mile 60.1 - 60.3

New 3-Circuit towers within existing ROW for Alt 2 & Alt 2A: Mile 44.6 - 51.7

Existing Four-Circuit Towers

Project Component Applicable for each Alternative
- New 230 kV Circuit
- Reconductoring of Existing 230 kV Transmission Line (Barren Ridge - Rinaldi)
LADWP must maintain the electrical service along the existing BR-RIN transmission line to avoid impacts to the hydroelectric power plants north of the Barren Ridge Switching Station. Therefore, a temporary transmission line would be constructed to keep the BR-RIN circuit energized during construction of the three-circuit towers. After the temporary line is constructed, the existing BR-RIN single-circuit towers would be removed to allow the new three-circuit towers to be constructed within the existing ROW. Once construction of the three-circuit towers is completed, the temporary transmission line would be removed.

The temporary transmission line would be 7.5 miles long and would consist of wood and steel single poles with an average height of 95 feet, a 3-foot by 3-foot footprint, and an average of eight poles per mile. Construction would occur within a temporary 80- to 100-foot ROW. Refer to Table 2-6 for specifications and to Table 2-7 for ground disturbance estimates. The majority of the temporary transmission line would be constructed along San Francisquito Road. Portions would also be constructed along Elizabeth Lake Road and Johnson Road. Pole placement would be adjacent to public roadways wherever possible. If necessary, temporary ROW on private property would be needed where poles could not be placed within public road ROW. The majority of poles would be direct-embedded when set in place and would not require a permanent foundation. Where additional strength is necessary at larger angle points, steel poles would be required, which could require an excavation approximately 6 feet in diameter by 20 feet deep to accommodate the concrete pier foundation that would be cast in place. Once all the poles have been constructed and the conductor installed, the existing BR-RIN circuit would be connected into the temporary line and energized. The construction would require establishment of a staging area, work areas around poles, and pull and tension sites. Access to pole sites and pull and tension sites would be from the adjacent roadways.

Approximately seven miles of the existing BR-RIN single-circuit towers would be removed, with existing ROW utilized to access the existing towers. The new three-circuit towers would be placed within the existing ROW, utilizing existing access roads (refer to Figure 2-8, Cross Section E, for a representation of the proposed ROW). Helicopter Mitigation, as described in this section below, would be applied in steeper terrain crossing the Angeles National Forest if additional access is required. If additional access roads, considered to be longer than 300 feet, are necessary, specific locations and construction method (either helicopter or conventional) would be coordinated with the USFS. The new three-circuit tower would require a 25-foot by 30-foot structure footprint and an average of seven structures per mile; the average structure height would be 170 feet, with a maximum tower-to-tower span length of 780 feet. Within the limits of standard tower design, new structures would be installed in the same locations as the existing BR-RIN structures. However, additional towers may be required due to design requirements. As such, towers may be placed in locations where there are currently no towers. Refer to Table 2-6 for specifications and to Table 2-7 for ground disturbance estimates for the Three-Circuit Mitigation. The construction process for the new three-circuit towers would be the same as the double-circuit towers discussed above. After completion of construction of the three-circuit towers, the temporary transmission line would be removed and all temporary staging and work area land disturbances would be restored as close to previous conditions as possible and revegetated as required.

Utilization of the temporary transmission line was determined by LADWP to be the only feasible method to construct the Three-Circuit Tower Mitigation. Without the temporary line, a lengthy
outage of the existing BR-RIN line would be required for the duration of the demolition of the existing towers and installation of the new three-circuit towers. Such an outage would require LADWP to shut down existing hydroelectric and wind energy plants in the Owens Valley, as LADWP would have no alternative means to transmit the energy to the Los Angeles basin. The loss of these sources of renewable energy would need to be compensated for by the increased utilization of non-renewable energy sources, and LADWP’s achievement of renewable energy goals would be impacted.

**Table 2-6. Three-Circuit Tower Specifications**

<table>
<thead>
<tr>
<th>Tower Placement Details</th>
<th>Specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Triple-Circuit</td>
<td>Temporary Transmission Line</td>
</tr>
<tr>
<td>ROW acquisition</td>
<td>None (within existing)</td>
<td>80-100 feet</td>
</tr>
<tr>
<td>Structures per Mile</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Average span length</td>
<td>750 feet</td>
<td>650 feet</td>
</tr>
<tr>
<td>Average height (feet)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground to lowest attachment</td>
<td>120</td>
<td>60</td>
</tr>
<tr>
<td>Upper body height</td>
<td>50</td>
<td>45</td>
</tr>
<tr>
<td>Overall tower height</td>
<td>170</td>
<td>105</td>
</tr>
<tr>
<td>Typical range of heights of new towers</td>
<td>150 - 180 feet</td>
<td>95 - 105 feet</td>
</tr>
</tbody>
</table>

**2.4.4 HELICOPTER MITIGATION**

Within the ANF where the terrain is steep and access is limited, the USFS would require that the new double-circuit 230 kV structures be constructed with the use of helicopters (such as the Hughes 500, Bell 212, or Sikorsky Skycrane). Although no specific locations for this mitigation have been identified for this Alternative, USFS is expected to require the helicopter mitigation for construction in any area more than 300 feet from an existing road and with slopes greater than approximately 25 percent. The use of helicopters for the construction of transmission tower structures would eliminate the need for new access roads to structure locations, and would therefore minimize land disturbance associated with crane pads, structure laydown areas, and the trucks and tractors used for delivery of structures to sites. However, the following site and ground disturbing construction activities would be required to construct the new transmission line within the identified helicopter construction areas: portable landing pads, helicopter fly yards/staging areas and associated temporary access roads, tower structure vegetation clearing, guard structures at major crossings, and access road pullouts. Refer to Table 2-7 for ground disturbance estimates for the Helicopter Mitigation.

The transmission line materials (tower steel, conductor reels, structure hardware, etc.) would be delivered by truck to the helicopter fly yards/staging areas. Vegetation clearing may be required at these sites to ensure safe working conditions. The fly yards/staging areas would serve as helicopter support yards for fueling and maintenance, as well as for the transport of materials and personnel. Towers may also be assembled in sections at these yards prior to delivery to the tower sites. Heavy lift helicopters would then fly the towers from the yards to the tower sites.
Portable landing pads would be at each tower site. These pads would allow helicopters to load and unload personnel, tools, and equipment necessary for construction of foundations and assembly of tower structures. Helicopter-constructed towers that would not be close to existing access roads would utilize micropile foundations. For each tower leg, micropile foundations would use a group of three to eight 6- to 9-inch diameter casings that would be drilled and grouted into the ground. The exposed portion of the pile group would be encased in a reinforced concrete cap from the top of the casings to a depth anywhere from one to eight feet below the ground surface, depending on the terrain. Figure 2-18 illustrates the plan view and sections of a micropile foundation.

**Figure 2-18. Micropile Foundation**

Conductor installation would proceed as for double-circuit tower installation. The equipment necessary for conductor installation would be large, heavy construction equipment that could only be brought in by truck. Some NFS roads could need maintenance or improvement to allow pulling and tensioning, but no new access or spur roads would be created for conductor installation on the helicopter-constructed towers.
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**Ground Disturbance Estimates for the Proposed 230 kV Double-Circuit Transmission Line**

<table>
<thead>
<tr>
<th>Disturbance Description</th>
<th>Double-Circuit Steel Lattice Towers with Helicopter Stringing</th>
<th>Three-Circuit Tower Mitigation (Three-Circuit Steel Lattice Towers with Helicopter Stringing)</th>
<th>Helicopter Mitigation (Steel Lattice Towers with Helicopter Installation of Towers and Stringing)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimated Disturbance Dimension</td>
<td>Average Disturbance</td>
<td>Estimated Disturbance Dimension</td>
</tr>
<tr>
<td><strong>Temporary Disturbance During Installation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tower installation</td>
<td>300 x 200 feet (0.9 acre) per tower ±5 towers per mile¹</td>
<td>4.6 acres per mile</td>
<td>200 x 200 feet (0.9 acre) per tower ±7 towers per mile</td>
</tr>
<tr>
<td>Guard structures at major crossings</td>
<td>200 x 300 feet (1.4 acres) One crossing every 5 miles</td>
<td>0.3 acre per mile</td>
<td>200 x 300 feet (1.4 acres) One crossing every 5 miles</td>
</tr>
<tr>
<td>Helicopter fly yards / staging areas (includes fueling station at one of the sites)</td>
<td>200 x 200 feet (0.9 acre) One site every 5 miles</td>
<td>0.2 acre per mile</td>
<td>200 x 200 feet (0.9 acre) One site every 5 miles</td>
</tr>
<tr>
<td>Landing area/Portable helicopter landing pads (includes vegetation clearing for site)</td>
<td>50 x 50 feet (0.06 acre) per site One site every 3.5 miles</td>
<td>0.02 acre per mile</td>
<td>50 x 50 feet (0.06 acre) per site One site every 3.5 miles</td>
</tr>
<tr>
<td>Pulling and tensioning sites</td>
<td>200 x 500 feet (2.3 acres) per site One site every 2.5 miles²</td>
<td>0.9 acre per mile</td>
<td>200 x 500 feet (2.3 acres) per site One site every 2.5 miles</td>
</tr>
<tr>
<td>Sleev ing and miscellaneous stringing operations</td>
<td>100 x 200 feet (0.5 acre) per site One site every 2.5 miles</td>
<td>0.2 acre per mile</td>
<td>100 x 200 feet (0.5 acre) per site One site every 2.5 miles</td>
</tr>
<tr>
<td><strong>Total Average Temporary Disturbance³</strong></td>
<td>6.2 acres per mile</td>
<td>8 acres per mile</td>
<td>2.1 acres per mile</td>
</tr>
<tr>
<td><strong>Permanent Disturbance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tower sites, including vegetation clearance within a 10-foot radius around base of towers in accordance with state law</td>
<td>65 X 60 feet (0.08 acre) ±5 towers per mile</td>
<td>0.2 acre per mile</td>
<td>45 x 50 feet (0.05 acre) ±7 towers per mile</td>
</tr>
<tr>
<td><strong>Total Average Permanent Disturbance⁴</strong></td>
<td>0.2 acre per mile</td>
<td>0.14 acre per mile</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Information based on LADWP and POWER Engineers, Inc. estimates. Actual disturbance areas may be smaller based on final engineering design.

¹ For slopes over 10% (ground disturbance categories 4-6), site dimensions would be 200 x 250 feet (1.2 acres) and have an average disturbance of 5.8 acres per mile.
² For slopes over 10% (ground disturbance categories 4-6), sites would be every 2 miles and have an average disturbance of 1.2 acres per mile.
³ Access and spur road disturbances included in Table 2-4.
⁴ Ibid.
2.4.5 BRRTP GENERAL PRACTICES

LADWP would commit to the application of BRRTP General Practices (GPs) on a Project-wide basis. LADWP would incorporate these design features, measures, and procedures to avoid or reduce impacts from Project construction or operation. The GPs are considered a commitment by LADWP, and implementation of each GP would be monitored by the Lead Agencies if the Proposed Action or an Alternative were approved. GPs that would be integrated into Project construction and operations processes are listed in the table below. These GPs would also be incorporated into BLM and USFS authorizations.

**Table 2-8. BRRTP GENERAL PRACTICES**

<table>
<thead>
<tr>
<th>General Practice</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-1</td>
<td>Plan of Development &amp; Construction, Operation and Maintenance Plans. In consultation with the Forest Service and BLM Authorizing Officers prior to construction, LADWP shall develop a Construction, Operation and Maintenance Plan (COM Plan) with the Forest Service and Plan of Development (POD) with BLM. These plans shall be attached to and become a part of the Special Use and Right-of-Way Authorizations. The COM Plan and POD shall include, at a minimum, road maintenance specifications, vegetation treatment and rehabilitation specifications, and conditions on maintenance and replacement of improvements. The agencies may combine the POD and COM plans into a single document for the Project.</td>
</tr>
<tr>
<td>GP-2</td>
<td>Traffic Control Plan. Prior to the start of construction, LADWP shall submit a Traffic Control Plan (TCP) to agencies with jurisdiction over public roads that would be directly affected by construction activities (where road closures or encroachments would be necessary). The Plan shall define the locations of all roads that would need to be temporarily closed due to construction activities, and also define the use of flag persons, warning signs, lights, barricades, cones, etc. for each construction closure. The plan shall include measures to avoid disruptions or delays in access for emergency service vehicles and to keep emergency service agencies informed of road closures, detours, and delays. Police departments, fire departments, ambulance services, and paramedic services shall be notified in advance of each closure by LADWP. The Plan shall also include contact information for those agencies, assign responsibility for notifying the service providers, and specify coordination procedures. Copies of the Plan shall be provided to all affected police departments, fire departments, ambulance and paramedic services.</td>
</tr>
<tr>
<td>GP-3</td>
<td>Hazardous Materials/Waste Management Plan. A project-specific hazardous materials management and hazardous waste management program will be developed prior to initiation of the project. The program will outline proper hazardous materials use, storage and disposal requirements as well as hazardous waste management procedures. The program will identify types of hazardous materials to be used during the project and the types of wastes that will be generated. All project personnel will be provided with project-specific training. This program will be developed to ensure that all hazardous materials and wastes were handled in a safe and environmentally sound manner. Hazardous wastes will be handled and disposed of according to applicable rules and regulations. Employees handling wastes will receive hazardous materials training and shall be trained in hazardous waste procedures, spill contingencies, waste minimization procedures and Treatment, Storage and Disposal Facility (TSDF) training in accordance with OSHA Hazard Communication Standard and 22 CCR. If degraded soil or groundwater is encountered during excavation (e.g., there is an obvious sheen, odor, or unnatural color to the soil or groundwater), it shall be excavated, tested, and disposed of in accordance with state hazardous waste disposal requirements. The Plan shall also include procedures detailing emergency responses to releases of hazardous materials. It will prescribe hazardous materials handling procedures for reducing the potential for a spill during construction, and will include an emergency response program to ensure quick and safe cleanup of accidental spills. All hazardous materials spills or threatened release, including petroleum products such as gasoline, diesel, and hydraulic fluid, regardless of the quantity spilled, will be immediately reported to the appropriate agency as outlined in the Plan if the spill has entered a navigable water, stream, lake, wetland, or storm drain, if the spill impacted any sensitive area including conservation areas and wildlife preserves,</td>
</tr>
<tr>
<td>General Practice</td>
<td>Description</td>
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<tr>
<td>------------------</td>
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</tr>
<tr>
<td>GP-4</td>
<td><strong>Health and Safety Plan.</strong> A Health and Safety Plan shall be prepared and implemented. The Plan shall address emergency medical services available on-site and within the project area. The Plan shall also address specific emergency response and evacuation measures.</td>
</tr>
<tr>
<td>GP-5</td>
<td><strong>Stormwater Pollution Prevention Plan.</strong> A project-specific Construction Stormwater Pollution Prevention Plan (SWPPP) will be prepared and implemented prior to the start of construction. The SWPPP will utilize Best Management Practices (BMPs) to address the storage and handling of hazardous materials and sediment runoff during construction activities.</td>
</tr>
<tr>
<td>GP-6</td>
<td><strong>Spill Prevention, Countermeasure, and Control Plan.</strong> LADWP will prepare or update existing Spill Prevention, Countermeasure, and Control Plan (SPCC Plan) for proposed and/or expanded switching stations if necessary or required by EPA guidelines. The plans will include engineered and operational methods for preventing, containing, and controlling potential fluid releases, and provisions for quick and safe cleanup.</td>
</tr>
<tr>
<td>GP-7</td>
<td><strong>Soil Management Plan.</strong> A Soil Management Plan will be developed and implemented for construction of the proposed Project. The objective of the Soil Management Plan is to provide guidance for the proper handling, onsite management, and disposal of impacted soil that might be encountered during construction activities. The plan will include practices that are consistent with California Title 8, Occupational Safety and Health Administration (Cal-OSHA) regulations, as well as appropriate remediation standards that are protective of the planned use. The Plan will provide guidelines for identification of impacted soil, assessing impacted soil, soil excavation, impacted soil storage, verification sampling, and impacted soil characterization and disposal. In the event that potentially contaminated soils are encountered within the footprint of construction, soils will be tested and stockpiled. The appropriate Certified Unified Program Agency (CUPA) will determine whether further assessment is warranted.</td>
</tr>
<tr>
<td>GP-8</td>
<td><strong>Avian Protection Plan.</strong> An Avian Protection Plan (APP) shall be developed and implemented for the construction and operation of the Project. The APP will outline measures and protocols that will be undertaken to protect avian species and is intended to protect local and migratory bird species that may occur within the Project area.</td>
</tr>
</tbody>
</table>

### Design

<table>
<thead>
<tr>
<th>General Practice</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-9</td>
<td>A “dulled” metal finish shall be used on new towers or rebuilt portions of existing towers to reduce visual impacts except where otherwise dictated by visual mitigation measures.</td>
</tr>
<tr>
<td>GP-10</td>
<td>Nonspecular conductors shall be used to reduce visual impacts.</td>
</tr>
<tr>
<td>GP-11</td>
<td>Project features will be placed so as to avoid sensitive features including, but not limited to, riparian areas, water courses, and cultural sites, and/or to allow conductors to clearly span the features, within limits of standard tower design. This will minimize the amount of sensitive features disturbed and/or reduce visual contrast.</td>
</tr>
<tr>
<td>GP-12</td>
<td>Drainage control features will be installed, as appropriate, to minimize the amount of stormwater flow from areas of active construction. Details would be described in the SWPPP.</td>
</tr>
</tbody>
</table>

### Construction Vehicles/Equipment

<table>
<thead>
<tr>
<th>General Practice</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-13</td>
<td>Only clean-burning on-road and off-road diesel engines shall be used. Where feasible, heavy-duty diesel powered construction equipment manufactured after 1996 (with federally mandated “clean” diesel engines) shall be used.</td>
</tr>
<tr>
<td>GP-14</td>
<td>Construction workers shall carpool to and from the construction site when possible.</td>
</tr>
<tr>
<td>GP-15</td>
<td>All trucks hauling soils or other loose materials shall be covered, or maintain at least two feet of freeboard (distance between the material and the top of the truck).</td>
</tr>
<tr>
<td>GP-16</td>
<td>Where visible soil material is carried onto adjacent public streets, the affected streets shall be cleaned daily with water sweepers.</td>
</tr>
<tr>
<td>GP-17</td>
<td>All vehicles and equipment operating within 100 feet of an active stream will be inspected daily to ensure they are free of any leaks of fuel, cooling, or lubricating fluids.</td>
</tr>
<tr>
<td>GP-18</td>
<td>All construction vehicles shall maintain a hazardous materials spill kit, which shall include absorbent materials, tarps, small storage containers or waterproof bags, and latex gloves. Field personnel shall be made aware of these kits and instructed on how to use them.</td>
</tr>
</tbody>
</table>
### General Practice

<table>
<thead>
<tr>
<th>General Practice</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-19</td>
<td>Refueling, or addition or changing of oil and other fluids for equipment and heavy machinery shall be performed only at approved staging and construction yards. Staging and construction yards will be located on upland sites and spill containment measures will be used to minimize risk of spill or drainage into waterways. Oil and other fluids will be disposed of as required by California law. Emergency refueling, or emergency addition or changing of oil or other fluids shall not be performed within 500 feet of natural stream channels or wetlands.</td>
</tr>
<tr>
<td>GP-20</td>
<td>Helicopters utilized for construction will be refueled at helicopter staging areas or local airports. Procedures will include the use of drop cloths made of plastic and drip pans and trays to be placed under refilling areas to ensure that chemicals do not come into contact with the ground. Refueling areas will be located in designated areas where absorbent pads and trays are available.</td>
</tr>
<tr>
<td>GP-21</td>
<td>LADWP shall contact Angeles National Forest (ANF) dispatch seven days prior to helicopter use and shall provide ANF with radio frequencies being used by the aircraft, aircraft identifiers, the number of helicopters that will be used while working on National Forest System (NFS) lands at any given time, and the flight pattern of helicopters used on NFS lands. If a wildfire occurs in the Project area, upon contact from the Forest Aviation Officer, helicopters in use by LADWP shall immediately cease construction activities and not restart aerial operations until the Forest Aviation Officer provides clearance.</td>
</tr>
<tr>
<td>GP-22</td>
<td>The Applicant shall clear brush and dead and decaying vegetation that would pose a fire hazard from the work area prior to starting construction and/or maintenance work. The work area includes areas of construction (e.g., tower sites, switching station site) within the transmission ROW, construction laydown areas, pull sites, access roads, parking pads, and any other sites adjacent to the ROW where personnel are active or where equipment is in use or stored. Cleared vegetation shall either be removed or chipped and spread onsite in piles no higher than six inches. This will be determined in consultation with individual appropriate land management agencies.</td>
</tr>
</tbody>
</table>

### Access Roads

<table>
<thead>
<tr>
<th>General Practice</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-23</td>
<td>The alignment of any new access roads or overland routes shall follow the designated area’s landform contours where possible, providing that such alignment does not additionally impact resource values.</td>
</tr>
<tr>
<td>GP-24</td>
<td>To the extent practical, any re-grading of access roads shall be the minimum necessary to provide safe access of construction equipment, and erosion control measures.</td>
</tr>
<tr>
<td>GP-25</td>
<td>Construction vehicles shall use paved roads to access the construction site when available.</td>
</tr>
<tr>
<td>GP-26</td>
<td>The design and use of roadways or access trails within the ANF shall be coordinated with the District and Forest Supervisor’s office. The ANF may specify conditions under which use of the Forest system roads and lands shall be permitted. These conditions may include restoring or blocking access at some service trails and repairing any roadway damage or erosion damage caused by construction activities or traffic. Any project-related damage to existing Forest system roads shall be repaired at LADWP’s cost.</td>
</tr>
<tr>
<td>GP-27</td>
<td>Any construction or installation work requiring the crossing of a roadway or railway right-of-way would incorporate the use of guard poles, netting, or similar means to protect moving traffic and structures from the activity. If necessary on state highways, continuous traffic breaks would be planned and provided.</td>
</tr>
<tr>
<td>GP-28</td>
<td>To minimize traffic congestion and delays during construction to the extent feasible, LADWP shall restrict all necessary lane closures or obstructions on major roadways associated with Project construction activities to off-peak periods, as feasible. Lane closures should be avoided during the 6:00 a.m. to 9:00 a.m. timeframe and the 3:30 p.m. to 6:30 p.m. timeframe, or as otherwise defined within the TCPs.</td>
</tr>
<tr>
<td>GP-29</td>
<td>Where Project construction and/or maintenance access could close one or multiple lanes, and where significant degradations in roadway operations could result, roadway diversions should be provided to restore the travel lanes through temporary roadway restriping.</td>
</tr>
<tr>
<td>GP-30</td>
<td>Where Project construction and/or maintenance access could close bicycle lanes or trails, temporary diversions should be provided where feasible to provide continued access around the construction or maintenance area.</td>
</tr>
<tr>
<td>GP-31</td>
<td>Where Project construction and/or maintenance access could cut-off access to nearby recreation areas, and where no alternate route exists to the recreation areas, measures should be used to provide a minimum of one lane reversible access (with flagmen) through the construction/maintenance area, or work should only be conducted during off-peak hours or evening hours only.</td>
</tr>
<tr>
<td>GP-32</td>
<td>Any damage to local paved roadways caused by Project construction and/or maintenance should be repaired and the roadways should be restored to their previous condition.</td>
</tr>
</tbody>
</table>
### General Practice | Description
--- | ---
GP-33 | In areas where soils and vegetation are particularly sensitive to disturbance, existing access roads would be repaired only in areas where they are otherwise impassable or unsafe.

### Construction Areas

| General Practice | Description |
--- | ---
GP-34 | Construction activities shall be limited to the designated right-of-way and approved access and work areas as identified in the ROD and POD. Any deviations from the approved areas must be cleared with the jurisdictional agency and/or landowner. |
GP-35 | Grading areas shall be clearly marked and no equipment or vehicles shall disturb slopes or drainages outside of the grading area. |
GP-36 | No paint or permanent discoloring agents will be applied to rocks or vegetation to indicate survey or construction activity limits. |
GP-37 | In construction areas (e.g., marshalling yards, tower sites, spur roads from existing access roads) where ground disturbance is significant or where recontouring is required, surface restoration shall occur as required by the landowner or land management agency. The method of restoration will normally consist of returning disturbed areas back to their natural contour, reseeding, installing cross drains for erosion control as necessary, placing water bars in the road as necessary, and filling ditches. |
GP-38 | Soil excavated from construction activities shall not be left at work areas where the slopes exceed 10 percent or where the work area is within 100 feet of a natural stream or waterbody (receiving water). In these situations, loose soil shall be used elsewhere within the immediate area or stockpiled at the staging area. Stockpiled soil shall be managed as required by the SWPPP. No stockpiling or spreading of soil or other materials shall occur within stream channels. |
GP-39 | During grading or excavation work for the Project, the contractor shall observe the exposed soil for visual evidence of contamination. If visual contamination indicators are observed during construction, the contractor shall stop work until the material is properly characterized and appropriate measures are taken to protect human health and the environment. The contractor shall document the exact location of the contamination and shall immediately notify a designated Environmental Monitor and propose actions for addressing the contamination in accordance with the Soil Management Plan. |
GP-40 | Existing watering facilities (e.g., tanks, developed springs, water lines, wells, etc.) will be repaired or replaced, if they are damaged or destroyed by construction activities, to their pre-disturbed condition as required by the landowner or land management agency. |
GP-41 | Allow natural vegetation to reoccur on temporarily disturbed areas following the completion of construction. |
GP-42 | Weed control measures on non-federal lands shall be implemented as determined in consultation with CDFG and the Counties of Los Angeles and Kern Agricultural Commissions. |
GP-43 | Every effort will be made to minimize vegetation removal and permanent loss at construction sites. Native vegetation will be flagged for protection or stockpiled for recontouring use at the discretion of the Biological Monitor and the Construction Supervisor. |
GP-44 | In construction areas where recontouring is not required, vegetation will be left in place wherever possible and the original contour will be maintained to avoid excessive root damage and allow for resprouting. Disturbance will be limited to overland driving where feasible to minimize changes in the original contours. |
GP-45 | Use of heavy equipment within a flowing channel will be avoided if possible; however, should it be necessary, the Environmental Monitor will be notified prior to initiation of construction activities to allow adequate time for site visits and surveys, if necessary. |
GP-46 | Asphalt or cement equipment will not be rinsed in, nor excess products deposited into any stream or other waterway. Asphalt or concrete effluent will not be allowed to enter into stream or RCA. Effluent will be removed from standing water and prevented from entering a waterway. |
GP-47 | Fill material, including brush, loose soils, and other similar debris will not be deposited within a stream channel or on a stream bank. |
<table>
<thead>
<tr>
<th>General Practice</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Surveys/Monitoring</strong></td>
<td></td>
</tr>
<tr>
<td>GP-48</td>
<td>Biological Monitor. For areas identified as environmentally sensitive, such as streams, wetlands, riparian areas, and other environmentally sensitive areas, a biological monitor shall be present during ground disturbing construction activities. The qualified biologist shall conduct monitoring for any area subject to disturbance from construction activities that may impact biological resources. The biological monitor’s duties include minimizing impacts to special-status species, native vegetation, wildlife habitat, and unique resources, as well as to identify potential issues or impacts to biological resources and report those to the authorized biologist. Where appropriate, the monitor will flag the boundaries of biologically sensitive areas and monitor any construction activities in these areas to ensure that ground disturbance activities and impacts occur within designated limits.</td>
</tr>
<tr>
<td><strong>Coordination/Permits</strong></td>
<td></td>
</tr>
<tr>
<td>GP-49</td>
<td>Worker Environmental Awareness Program. A Worker Environmental Awareness Program (WEAP) will be implemented to educate all construction personnel of the area’s environmental conditions and the environmental protection measures that must be adhered to. An environmental training program will be established to communicate environmental concerns and appropriate work practices, including spill prevention, emergency response measures, protection of biological and cultural resources, and proper Best Management Practice (BMP) implementation, to all construction and maintenance personnel.</td>
</tr>
<tr>
<td>GP-50</td>
<td>Prior to construction, LADWP shall consult with all federal, state, and local agencies, including local agency consortiums, having jurisdiction over lands affected by the proposed Project’s ROW and ancillary facilities to ensure that no permanent restrictions or preclusions of their land management practices occur.</td>
</tr>
<tr>
<td>GP-51</td>
<td>Construction activities shall be designed to minimize work on or use of local streets. In the event that local streets must be used for more than normal traffic purposes, an encroachment permit or similar authorization shall be obtained from the County (or other agency, as applicable). Any work requiring an encroachment permit shall include preparation of a traffic control plan or other management plan to minimize effects on local streets. Any damage to local streets will be repaired, and the street system will be restored.</td>
</tr>
<tr>
<td>GP-52</td>
<td>Consistent with Los Angeles County Code (Section 12.08.440), no construction activities shall occur in a residential area between 7:00 p.m. and 7:00 a.m. on weekdays and Saturdays, or at any time on Sundays or holidays. In the event that construction needs to occur outside the specified hours, a variance shall be obtained beforehand.</td>
</tr>
<tr>
<td>GP-53</td>
<td>Incorporate riparian area avoidance and permit measures. The following actions and all permit conditions detailed within the individual or Nationwide 404 permit and RWQCB 401 water quality certification (subject to separate approval) would be implemented by the construction manager and environmental compliance monitor(s). Before construction, qualified resource specialists would stake and flag or fence exclusion zones around all identified riparian areas. Such exclusion zones would include a 10-foot buffer to preclude sediment intrusion into the riparian areas. Earth-moving activities would be restricted from these zones, although essential vehicle operation and foot travel would be permitted on existing roads, bridges, and crossings. All other construction activities, vehicle operation, material and equipment storage, and other surface-disturbing activities would be prohibited within the exclusion zone. In areas where riparian habitats are unavoidable, the construction manager in consultation with the lead environmental compliance inspector would narrow the width of the centerline to the maximum extent allowable. New spur roads and existing access road improvements would be constructed and implemented using methodology that preserves existing hydrology. Tower pad clearance would be minimized to the maximum extent allowable. All temporarily disturbed riparian areas that would not be utilized for future routine operation and maintenance activities would be restored to ensure no net loss of habitat functions and values. Following construction activities, the areas would be restored as soon as practicable.</td>
</tr>
<tr>
<td>GP-54</td>
<td>Construction crews will avoid impacting the streambeds and banks of any streams along the route to the extent feasible. When construction or maintenance work affects the bed, bank or margins of a stream under CDFG jurisdiction, LADWP will notify CDFG as required under Fish and Game Code Section 1602, which may include securing a Streambed Alteration Agreement.</td>
</tr>
<tr>
<td>GP-55</td>
<td>Local emergency service providers shall be coordinated with to ensure that construction activity and any associated lane closures or traffic impacts will not significantly affect emergency response vehicles.</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>General Practice</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-56</td>
<td>LADWP would obtain appropriate Tree Removal Permits when necessary from the appropriate government agencies. In accordance with the obtained permits, LADWP shall avoid or minimize impacts to protected trees.</td>
</tr>
<tr>
<td>GP-57</td>
<td>LADWP shall obtain permits/approvals from any affected railway operators to ensure construction activities comply with each company’s safety requirements and to avoid disruption to or congestion of rail traffic.</td>
</tr>
<tr>
<td>GP-58</td>
<td>LADWP shall coordinate with the City of Santa Clarita at least 30 days prior to construction in the service territory to reduce the potential interruption of bus transit services.</td>
</tr>
<tr>
<td>GP-59</td>
<td>All residences adjacent to the project area shall be notified at least seven days in advance of local construction of the construction schedule and the type and expected duration of local impacts, including air quality and noise impacts. The notice shall also include a phone number for construction noise questions.</td>
</tr>
</tbody>
</table>

**Noise**

<table>
<thead>
<tr>
<th>General Practice</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-60</td>
<td>Noise reduction features (e.g., mufflers and engine shrouds) that are no less effective than those originally installed by the manufacturer shall be used on construction equipment.</td>
</tr>
<tr>
<td>GP-61</td>
<td>Temporary sound walls or acoustic blankets around stationary noise sources (e.g., generators, pumps) shall be installed to shield adjacent sensitive receptors. Where feasible, these sound walls or acoustic blankets shall have a height of no less than eight feet, a Sound Transmission Class (STC) of 27 or greater, and a surface with a solid face from top to bottom without any openings or cutouts.</td>
</tr>
<tr>
<td>GP-62</td>
<td>Unnecessary construction vehicle idling time shall be minimized (see also Mitigation Measure AIR-2D, Restrict diesel engine idling to 5 minutes). The ability to limit construction vehicle idling time is dependent upon the sequence of construction activities and when and where vehicles are needed or staged. A “common sense” approach to vehicle use shall be applied; if a vehicle is not required for use immediately or continuously for construction activities, its engine shall be shut off. It should be noted that certain equipment, such as large diesel-powered vehicles, shall require extended idling for warm-up and repetitive construction tasks and would therefore not be subject to being shut off when not in use.</td>
</tr>
</tbody>
</table>

### 2.4.6 CONSTRUCTION WORK FORCE AND SCHEDULE

Construction of the BRRTP is anticipated to begin no sooner than late 2012, with a target in-service date of early 2015. These dates are subject to change based on actual completion of design.

The following construction estimates were based on preliminary engineering and the number of workers and construction duration values are estimates; therefore, they are subject to change based on final engineering and design. The new double-circuit 230 kV transmission line from the Barren Ridge Switching Station to the proposed Haskell Canyon Switching Station would require 16.5 months and 134 workers. The installation of a 230 kV circuit on existing double-circuit towers from the Castaic Power Plant to the proposed Haskell Canyon Switching Station would require a month and a half and 35 workers. The upgrade and reconductoring of the existing BR-RIN would require nine months and 155 workers. The construction of a new 400-foot by 600-foot Haskell Canyon Switching Station would require 15.4 months and 63 workers. The expansion of the existing Barren Ridge Switching Station would require 15 months and 60 workers.

The BRRTP components are anticipated to be constructed in the staggered sequence illustrated below in Tables 2-9 and 2-10. The construction of all Project components would take approximately two years and 447 total workers, with 173 workers at the peak of construction. Table 2-10 summarizes the BRRTP’s anticipated construction workforce and schedule based on the most current information available. To allow for any delays in the Project, three weeks of
float time were included for the new 230 kV transmission line and reconductoring efforts, and an additional two weeks of float time were included for the stringing of the second circuit between Castaic Power Plant and Haskell Canyon.

### Table 2-9. **Anticipated Construction Sequence**

<table>
<thead>
<tr>
<th>PROJECT COMPONENT</th>
<th>ANTICIPATED CONSTRUCTION SEQUENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansion of Barren Ridge Switching Station</td>
<td>Weeks 8 – 73</td>
</tr>
<tr>
<td>New Haskell Canyon Switching Station</td>
<td>Weeks 1 – 67</td>
</tr>
<tr>
<td>New 230 kV Transmission Line</td>
<td>Weeks 42 – 113</td>
</tr>
<tr>
<td>Recondutor BR-RIN</td>
<td>Weeks 55 – 88</td>
</tr>
<tr>
<td>Addition of 230 kV Circuit</td>
<td>Weeks 51 – 56</td>
</tr>
</tbody>
</table>

### Table 2-10. **Construction Workforce and Schedule**

<table>
<thead>
<tr>
<th>PROJECT COMPONENT</th>
<th>CONSTRUCTION (START AND END WEEKS)</th>
<th>CONSTRUCTION DURATION (MONTHS)</th>
<th>TOTAL # OF WORKERS</th>
<th>PEAK # OF WORKERS AT ANY GIVEN TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansion of Barren Ridge Switching Station</td>
<td>8 – 73</td>
<td>15</td>
<td>60</td>
<td>38</td>
</tr>
<tr>
<td>New Haskell Canyon Switching Station</td>
<td>1 – 67</td>
<td>15.4</td>
<td>63</td>
<td>38</td>
</tr>
<tr>
<td>New 230 kV Transmission Line</td>
<td>42 – 113</td>
<td>16.5</td>
<td>134</td>
<td>131</td>
</tr>
<tr>
<td>Recondutor BR-RIN</td>
<td>55 – 88</td>
<td>9</td>
<td>155</td>
<td>120</td>
</tr>
<tr>
<td>Addition of 230 kV Circuit</td>
<td>51 – 56</td>
<td>1.5</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td><strong>ALL COMPONENTS</strong></td>
<td><strong>Weeks 1 – 113</strong></td>
<td><strong>26.1 months</strong></td>
<td><strong>447 Total Workers</strong></td>
<td><em><em>173</em> Peak Workers</em>*</td>
</tr>
</tbody>
</table>

*The value represents the total for the staggered construction of the Project components; it is not reflective of the sum of all the components.

### 2.4.7 **Operation and Maintenance of BRRTP**

#### Interconnection Process

The BRRTP must provide open access to the transmission system. As such, LADWP’s process for approving generator interconnection to BRRTP would follow the FERC’s approved Large Generator Interconnection Procedures (LGIP). Per FERC requirements, LADWP is required to treat all Interconnection Customers (IC) equally. While all current ICs of the BRRTP are either wind or solar projects, LADWP does not have the ability to preferentially treat renewable energy ICs over other non-renewable generators should they request interconnection. LADWP processes interconnection requests in the order received until all applications have been processed or facility capacity has been reached. If one project withdraws, the next queued request processed.

LADWP’s LGIP consists of five sequential steps: application processing, technical scoping meeting, technical studies, interconnection agreement, and project implementation.
Application Processing

An application is deemed completed when an IC submits a complete application with the proposed point of interconnection (POI), proposed commercial operation day (COD), maximum expected output, facility technology, site diagram, single electric line diagram, application fee, and site control or in-lieu financial security.

Technical Scoping Meeting

A technical scoping meeting is held to ensure common understanding of the IC’s project and of the LGIP. Also, in the technical scoping meeting, ICs and LADWP come to agreement on POI/alternate POI, COD, and generator size. LADWP advises what studies need to be conducted. After the technical meeting, the IC must provide confirmation on the POI, COD, and generator size.

Technical Studies

Technical studies assess the impact of the IC’s project on the LADWP electric system and scope of capital improvements to ensure the safety, reliability, and integrity of the grid. There are three main studies that need to be completed for each interconnection request. The three studies are: Feasibility Study, System Impact Study, and Facilities Study. Each study requires the interconnection customer to execute a study agreement and submit the corresponding study fee to LADWP. Following the receipt of the executed agreement, LADWP executes the agreement, and the study can begin. When each study is completed, LADWP sends a study report to the IC and meets with the IC to review it.

Interconnection Agreement

After a draft Facilities Study report is provided to the IC, LADWP tenders the Interconnection Agreement (IA) to the IC. The IA is negotiated and agreed to by LADWP and the IC.

Project Implementation

Once LADWP and the IC execute the IA, LADWP and the IC begin designing, procuring, engineering, and constructing the electrical interconnection. LADWP engineers the capital improvements as agreed in the IA. The IC engineers the electrical system on the IC side. LADWP and the IC coordinate a parallel inspection and commissioning process to attain the planned COD. Prior to procurement, installation, or construction of LADWP’s interconnection facilities/upgrades, the IC posts a form of security in the amount equal to the cost of LADWP’s interconnection facilities/upgrades.

Facility Maintenance

Regular inspection and maintenance of overhead facilities is crucial for maintaining uniform, adequate, safe, and reliable service. The 230 kV transmission line would be inspected several times annually by both ground and air patrols. Maintenance would be performed as needed. When access would be required for non-emergency maintenance and repairs, LADWP would adhere to the same precautions and procedures that were taken during the original construction.
Emergency maintenance would involve prompt movement of repair crews to repair or replace any damaged equipment or infrastructure. Crews would be instructed to protect crops, plants, wildlife, and other resources of significance. Restoration procedures following completion of repair work would be similar to those prescribed for normal 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 and POD.

**Vegetation Management**

Vegetation management along the transmission line ROW would be required by the North American Reliability Council (NERC). In compliance with the NERC’s Standard FAC-003-I, LADWP would prepare a Vegetation Management Plan for the BRRTP. The Vegetation Management Plan would be included in the COM Plan to be completed prior to the issuance of a Notice to Proceed from the USFS and BLM. Vegetation management would consist of routine tree trimming to maintain the required minimum 10-foot clearance from conductors to vegetation (California Public Resources Code [PRC] 4293); clearance of flammable brush vegetation within a 10-foot radius around the base of transmission line towers in accordance with California PRC 4292; and clearance immediately adjacent to access roads to permit adequate access to the facilities.

**Access Road Maintenance**

Ongoing access road maintenance would be conducted in accordance with existing or new road authorizations issued to LADWP. Access road maintenance consists of those activities necessary to allow continued access to the ROW and/or each tower structure. These activities may include grading, and maintenance of drainage systems, bridges, culverts, fences, gates, and signs. Motor graders, backhoes, dump trucks, and pickups are used to maintain access roads.

**Permitted Uses**

After the transmission line has been energized, land uses that are compatible with safety regulations (such as agriculture and grazing) would be permitted in and adjacent to the ROW. Incompatible land uses within the ROW 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 on public lands that comply with local regulations would be permitted adjacent to or within the ROW, with approval from the appropriate agency. Permission to use the ROW on private lands would have to be obtained by LADWP.

**Safety**

Safety is a primary concern in the design of the 230 kV transmission line. The AC transmission line would be protected with power circuit breakers and related line relay protection equipment. If conductor failure occurs, power would be automatically removed from the line. Lightning protection would be provided by overhead ground wires along the line. Electrical equipment and fencing at the switching station would be grounded. All fences, metal gates, pipelines, and other metal components that cross or are within the transmission line ROW would be grounded to prevent electrical shock. If applicable, grounding outside of the ROW may also occur.
Decommissioning

At the end of the useful life of the proposed Project, if the facilities are no longer required, or if extension of the authorizations are not granted by federal land agencies at the time they expired, the transmission line would be decommissioned in accordance with applicable current rules and regulations. Conductors, insulators, and hardware would be dismantled and removed from the ROW. Tower structures would be removed and foundations broken off below ground surface. Project materials would be reused or recycled as possible.

If the line and associated ROW are abandoned at some future date, the ROW may be available for the same uses that existed prior to construction of the Project. Following decommissioning, any areas disturbed to dismantle the line would be restored and rehabilitated as near as possible to their original condition.

2.5 ALTERNATIVES ANALYZED IN THE EIS/EIR

After environmental review, preliminary electrical system studies, and public input, the BLM, USFS, and LADWP have identified four end-to-end routing alternatives for the proposed 230 kV double-circuit transmission line between Barren Ridge Switching Station and the proposed Haskell Canyon Switching Station, which were developed into the four action Alternatives for the Project. Descriptions of the five Project Alternatives, including the four action Alternatives and the No Action Alternative, follow in the sections below. These Alternatives were identified as the reasonable range of alternatives for the Project that would feasibly attain most of the basic objectives of the Project. In addition, CEQA requires the consideration of how to avoid or substantially lessen any of the significant or adverse effects of the Project.

2.5.1 NO ACTION ALTERNATIVE

NEPA Regulations (40 CFR 1502.14(d)) and CEQA Guidelines (Section 15126.6(e)) require the analysis of the No Action Alternative. Under the No Action Alternative, the construction of a new 230 kV transmission line, the addition of a new circuit on existing structures from Haskell Canyon to the Castaic Power Plant, the reconductoring of the existing BR-RIN transmission line, the construction of a new Haskell Canyon Switching Station, and the expansion of the existing Barren Ridge Switching Station would not occur. LADWP currently maintains an estimated 147 miles of existing access roads in the project area, 97 of which are within ANF. Current, ongoing operation and maintenance activities for existing facilities in the Project area would continue. This Final EIS/EIR must address the resulting environmental effects from taking no action and compare it to the effects of permitting the Proposed Action or an Alternative to the Proposed Action. Potential environmental impacts of the No Action Alternative are presented in Chapter 4 of this Final EIS/EIR.

2.5.2 ACTION ALTERNATIVES

As described in Section 2.3.2, Alternatives Development Process, nine preliminary routing segments (Segments A through I) were identified for the new 230 kV double-circuit transmission line. Some of these Segments were adjusted or modified based on public input, preliminary environmental review, and preliminary electrical system studies. Segments E and H were
recommended for elimination as discussed in Section 2.3.3, Alternatives Considered and Eliminated from Detailed Analysis. The remaining seven routing segments (Segments A, B, C, D, F, G, and I) were combined to create four end-to-end routing Alternatives for the proposed transmission line between the Barren Ridge and Haskell Canyon switching stations as described below. These four routing Alternatives were used in the development of the four action Alternatives for the proposed Project.

In addition to a new double-circuit 230 kV transmission line between the Barren Ridge and Haskell Canyon switching stations, whose route would vary among the action Alternatives, the four action Alternatives would include the following common components: the expansion of the existing Barren Ridge Switching Station, construction of a new Haskell Canyon Switching Station, reconductoring of the existing 230 kV transmission line from the Barren Ridge Switching Station to Rinaldi Substation, and the addition of a new 230 kV circuit on existing towers between the Castaic Power Plant and Haskell Canyon Switching Station.

Please refer to Section 2.4, Proposed Action (Alternative 2), for the detailed discussion of common Project components (Section 2.4.1), as well as for discussion of LADWP’s General Practices (Section 2.4.5), construction work force (Section 2.4.6), and operation and maintenance of BRRTP (Section 2.4.7), which would also be applicable to all action Alternatives.

Refer to Figure 2-1 for a map of the action Alternatives. A full set of representative cross-sections along all action Alternatives is provided in Appendix L to this Final EIS/EIR; selected cross-sections are provided within this chapter below. A summary of LADWP existing and proposed ROWs at each cross-section location is provided in Table ROW-1.

**TABLE ROW-1. WIDTH OF EXISTING AND PROPOSED LADWP ROW AT CROSS-SECTION LOCATIONS**

<table>
<thead>
<tr>
<th>Cross-Section</th>
<th>Existing ROW (feet)</th>
<th>Additional Proposed ROW (feet)</th>
<th>Total Proposed ROW (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Common to all action Alternatives</td>
<td>200</td>
<td>200</td>
<td>400</td>
</tr>
<tr>
<td>B: Alternative 1</td>
<td>N/A</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>C: Alternative 1</td>
<td>None</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>D: Common to all action Alternatives</td>
<td>105</td>
<td>200</td>
<td>410</td>
</tr>
<tr>
<td>E: Alternatives 2, 2a, and 3</td>
<td>250</td>
<td>200</td>
<td>450</td>
</tr>
<tr>
<td>F: Alternatives 2 and 2a</td>
<td>125</td>
<td>None</td>
<td>250</td>
</tr>
<tr>
<td>G: Alternatives 2 and 2a</td>
<td>None</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>H: Alternative 3</td>
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<tr>
<td>I: Alternative 3</td>
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<td>J: Alternative 3</td>
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</tr>
<tr>
<td>K: Common to all action Alternatives</td>
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</tr>
</tbody>
</table>

**Proposed Action (Alternative 2)**

LADWP’s Proposed Action (Alternative 2) includes the preliminary routing Segments A, B, and G. Refer to Section 2.4, Proposed Action, for a full discussion of this Alternative.
Alternative 1

The Alternative 1 230 kV double-circuit transmission line includes the preliminary routing Segments A, C, and D, and is the longest Alternative, at 83 miles long. It would run from the Barren Ridge Switching Station to the unincorporated community of Mojave, while paralleling LADWP’s existing 230 kV BR-RIN and 500 kV PDCI transmission lines. It would continue south-southwest to parallel the Los Angeles Aqueduct to Lancaster Road, where it would travel west to the I-5 utility corridor. It would then run southeast along LADWP’s existing Castaic – Rinaldi corridor to the proposed Haskell Canyon Switching Station. This Alternative was retained for analysis because it would meet the Project purpose and need/objectives, be feasible, and have the potential to reduce or minimize environmental impacts associated with the new 230 kV double-circuit transmission line by avoiding the unincorporated communities of Elizabeth Lake, Green Valley, Leona Valley, Agua Dulce, and Antelope Acres.

Right-of-Way Permits and Grants

The new 230 kV double-circuit transmission line in Alternative 1 would traverse 16 miles of ANF lands; LADWP would seek a 200-foot-wide ROW through a Special Use Authorization from the USFS in order to implement Alternative 1. The new line would traverse four miles of BLM-managed lands (under the jurisdiction of the Ridgecrest Field Office); LADWP would seek an additional 200-foot-wide ROW adjacent to the existing BR-RIN transmission line through a right-of-way grant from the BLM. See Figures 2-19, 2-20 and 2-21, Cross-Sections B, C, and D, for representative cross-sections of the proposed ROW.
**Figure 2-19. Cross Section B**
**Figure 2-20. Cross Section C**

Cross Sections and maps are for review purposes only. Project may change pending public and regulatory review.
Figure 2-21. Cross Section D
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A majority of this Alternative would be in unincorporated Kern and Los Angeles Counties, with two miles on State Lands, and 61 miles on private lands. The new 230 kV transmission line would cross the unincorporated communities of Mojave, Holiday Valley Estates, and Castaic and the City of Santa Clarita.

As necessary, LADWP would seek to purchase the private property required for the Project. As soon as a property has been identified through the final design planning and after the completion of the environmental review and approval process, the property owner would be notified of the LADWP’s interest in acquiring the property. After the appraisal and inspection process, a written offer would be presented to the property owner. If an agreement could not be reached after the LADWP had exhausted all its opportunities to reach a settlement with a property owner, the City could choose to exercise its power of eminent domain. For discussion of the potential impacts of eminent domain, please see Chapter 4, Section 4.2.3, Land Use, and Section 4.2.13, Socioeconomics. In some instances, the LADWP could instead seek an easement on the property, rather than ownership in fee.

The new 230 kV transmission line corridor associated with Alternative 1 would have separate impacts from reconductoring in the existing BR-RIN corridor. Also, some areas of Alternative 1 would not parallel existing LADWP transmission lines or the aqueduct; therefore, LADWP would be required to patrol and maintain an additional 25 miles of isolated ROW.

**Plan Amendments**

On land under the jurisdiction of BLM, an existing utility corridor would be utilized and would not require a California Desert Conservation Area Plan amendment. Prior to the USFS issuing a Special Use Authorization, Project-specific ANF LMP amendments would be required to exempt the Project from Scenic Integrity Objectives, Land Use Zone compatible uses, and Riparian Conservation Areas. The USFS has adopted management standards for visual resources addressing SIOs. The construction and operation of Alternative 1 would result in conditions inconsistent with existing SIO standards. Therefore, a Project-specific ANF LMP amendment would be necessary to exempt the Project from those standards. The management objectives for the Riparian Conservation Areas were established in the ANF LMP to maintain or improve long-term aquatic and riparian ecosystem health, including quantity, quality, and timing of stream flows. The construction, operation, maintenance, and decommissioning of a new transmission line would be inconsistent with the management objectives and require a plan amendment to exempt the Project from those standards. A portion of Alternative 1 would cross the Back County Non-Motorized land use zone. Utility corridors are not considered a suitable use in that area, and a Project-specific ANF LMP amendment would be required.

**Helicopter Mitigation**

Within the ANF where the terrain is steep and access is limited, the USFS would require that the new double-circuit 230 kV structures be constructed with the use of helicopters (such as the Hughes 500, Bell 212, or Sikorsky Skycrane). Refer to Figure 2-22, the Identified Helicopter Mitigation Locations Map, which illustrates the identified locations for this mitigation. The use of helicopters for the construction of transmission tower structures would eliminate the need for new access roads to structure locations, and would therefore minimize land disturbance associated with crane pads, structure laydown areas, and the trucks and tractors used for delivery
of structures to sites. However, the following site and ground disturbing construction activities would be required to construct the new transmission line within the identified helicopter construction areas: portable landing pads, helicopter fly yards/staging areas, tower structure vegetation clearing, guard structures at major crossings, wire stringing sites, pullouts, and temporary access roads. The estimated sizes of these auxiliary sites (temporary and permanent) and additional construction information are detailed above in the description of the Proposed Action (Alternative 2) and Table 2-7.
FIGURE 2-22. IDENTIFIED HELICOPTER MITIGATION LOCATIONS
Alternative 2a

The 230 kV double-circuit transmission line in Alternative 2a includes the preliminary routing Segments A, B, and G, but includes a re-route avoiding the unincorporated community of Green Valley. It is 63 miles long and would be very similar to the Proposed Action (Alternative 2), with 56 miles of the same alignment. Alternative 2a would begin at the Barren Ridge Switching Station and run south, paralleling LADWP’s existing 230 kV BR-RIN and 500 kV PDCI transmission lines. It would travel south from unincorporated community of Mojave through the Antelope Valley and approximately one mile east of the Antelope Valley California Poppy Reserve before continuing onto NFS lands and ending at the proposed Haskell Canyon Switching Station. The route would remain within designated utility corridors and would parallel existing transmission lines, with the exception of the nearly seven miles that would be routed around the unincorporated community of Green Valley. The Green Valley Re-route would run outside of existing utility corridors through the ANF. The re-route would rejoin Segment G south of the unincorporated community of Green Valley before continuing south and ending at the proposed Haskell Canyon Switching Station. This Alternative was retained for analysis because it would meet the Project purpose and need/objectives, be feasible, and have the potential to avoid or minimize environmental effects by avoiding the unincorporated community of Green Valley.

Right-of-Way Permits and Grants

The new 230 kV transmission line would generally parallel the existing 230 kV transmission line that would be reconducted, and traverse the unincorporated communities of Mojave, Willow Springs, Antelope Acres, and Elizabeth Lake and the City of Santa Clarita. Reconductoring would extend to the cities of Santa Clarita and Los Angeles; the new transmission line would bypass the unincorporated community of Green Valley. The following jurisdictions would be also be traversed: 16 miles of the Angeles National Forest for the new 230 kV transmission line (13 miles for reconductoring) and four miles of lands managed by the BLM. For the new 230 kV transmission line, LADWP would seek a BLM right-of-way grant and USFS Special Use Authorization for an additional 200-foot-wide ROW that would be adjacent to LADWP’s existing BR-RIN ROW. See Figure 2-7, Cross-Section A, for a representative cross-section of the proposed ROW.

The new 230 kV transmission line would traverse forty-three miles of private land and would require a 200-foot-wide ROW. As necessary, LADWP would seek to purchase the private property required for the Project. As soon as a property has been identified through the final design planning and after completion of the environmental review and approval process, the property owner would be notified of the LADWP’s interest in acquiring the property. After the appraisal and inspection process, LADWP would present a written offer to the property owner. If an agreement could not be reached after the LADWP had exhausted all its opportunities to reach a settlement with a property owner, the City could choose to exercise its power of eminent domain. For discussion of the potential impacts of eminent domain, please see Chapter 4, Section 4.2.3, Land Use, and Section 4.2.13, Socioeconomics. In some instances, the LADWP could instead seek an easement on the property, rather than ownership in fee.

For the majority of the alignment, the two new 230 kV circuits would be placed on new double-circuit transmission towers, but for approximately 1.5 miles the circuits would be placed on
existing four-circuit structures that are just north of the proposed Haskell Canyon Switching Station (see Figure 2-4). Similar to Alternative 2, most impacts would be concentrated within the same corridor as the reconductoring. However, approximately six miles of proposed new 230 kV transmission line would deviate from the proposed reconductoring alignment and require a new corridor within the ANF. Impacts would occur within each corridor for the six-mile deviation from the BR-RIN corridor, resulting in additional impacts.

Plan Amendments

On land under the jurisdiction of BLM, an existing utility corridor (Corridor A) would be utilized and no California Desert Conservation Area Plan amendment would be required. Prior to the USFS issuing a Special Use Authorization, the following Project-specific amendments to the 2005 ANF LMP would be required: Forest Standards S9 and S10 (related to meeting the Scenic Integrity Objectives on NFS lands), Forest Standard S1 (related to the Pacific Crest Trail), and Standards related to Riparian Conservation Areas and Back Country Non-Motorized land use zones.

Scenic Integrity Objective

The USFS has adopted management standards for visual resources addressing SIOs. The construction and operation of Alternative 2a would result in conditions that would be inconsistent with the existing SIO standards. Therefore, a Project-specific ANF LMP amendment would be necessary to exempt the Project from those standards.

Pacific Crest Trail

The ANF LMP has established a specific design standard for the Pacific Crest Trail to protect the scenic integrity of foreground views as well as from designated viewpoints. The construction and operation of a new 230 kV transmission line would not meet the Desired Condition or the SIO levels specific to the ANF LMP. A Project-specific ANF LMP amendment would be required to exempt the Project from this standard.

Riparian Conservation Area

Management objectives for riparian conservations areas were established in the ANF LMP to maintain or improve long-term aquatic and riparian ecosystem health, including quantity, quality, and timing of stream flows. Even with mitigation, the construction, operation, maintenance, and decommissioning of a new transmission line would be inconsistent with the management objectives and require a Project-specific ANF LMP amendment to exempt the Project from those standards.

Back Country Non-Motorized land use zone

A portion of the new transmission line would cross within the Back Country Non-Motorized land use zone. Utility corridors are not a suitable use for that area, and a Project-specific ANF LMP amendment would be necessary to exempt the Project from that standard.
Three-Circuit Tower Mitigation

Similar to the Proposed Action (Alternative 2), in areas where there are ROW expansion constraints and where LADWP has existing 230 kV transmission lines, LADWP is proposing to construct three-circuit towers to carry the existing BR-RIN circuit and two new BR-HC circuits. This would avoid various impacts, as discussed in Chapter 4 of this Final EIS/EIR, including the acquisition of residential property in the unincorporated communities of Willow Springs (milepost 27.1 to 27.6), Elizabeth Lake, and Green Valley (milepost 44.6 to 46 and milepost 50.8 to 51.7). This mitigation would be utilized in the same areas that were identified for Three-Circuit Tower Mitigation for Alternative 2, with the exception of approximately five miles through the unincorporated community of Green Valley, which would not utilize this mitigation. These areas are illustrated in Figure 2-17, the Three-Circuit Tower Mitigation Map.

Helicopter Mitigation

Within the ANF where the terrain is steep and access is limited, the USFS would require that the new double-circuit 230 kV structures be constructed by the use of helicopter. Refer to Figure 2-22, Identified Helicopter Mitigation Locations, which illustrates the identified locations for this mitigation. The use of helicopters for the construction of transmission tower structures would eliminate the need for new access roads to structure locations, and would therefore minimize land disturbance associated with crane pads, structure laydown areas, and the trucks and tractors used for delivery of structures to sites. However, the following site and ground disturbing construction activities would be required to construct the new transmission line within the identified helicopter construction areas: portable landing pads, helicopter fly yards/staging areas, tower structure vegetation clearing, guard structures at major crossings, wire stringing sites, pullouts, and temporary access roads. The estimated sizes of these auxiliary sites (temporary and permanent) and additional construction information are detailed above in the description of the Proposed Action (Alternative 2) and Table 2-7.

Alternative 3

The proposed 230 kV double-circuit transmission line in Alternative 3 includes preliminary routing Segments A, B, F, and I. It is 76 miles long and would begin at the Barren Ridge Switching Station and run south, paralleling LADWP’s existing 230 kV BR-RIN and 500 kV PDCI lines. It would travel south from the unincorporated community of Mojave through the Antelope Valley and approximately one mile east of the Antelope Valley California Poppy Reserve before continuing southeast past SCE’s Antelope Substation. The route would then travel toward the city of Palmdale, parallel to SCE’s existing high-voltage transmission lines. It would turn sharply south to parallel LADWP’s existing Victorville – Rinaldi 500 kV and Adelanto – Rinaldi 230 kV transmission lines. This Alternative would then parallel these transmission lines west, crossing two miles of the ANF. The Alternative would then parallel LADWP’s 500 kV PDCI line north to the proposed Haskell Canyon Switching Station. This Alternative was retained for analysis because it would meet the Project purpose and need/objectives, be feasible, and have the potential to avoid or minimize environmental effects by avoiding an eligible Wild and Scenic River and resulting in fewer impacts to the ANF.
Right-of-Way Permits and Grants

The new 230 kV transmission line would traverse four miles of the ANF, and four miles of lands managed by the BLM; LADWP would seek a BLM right-of-way grant adjacent to LADWP’s existing BR-RIN ROW and USFS Special Use Authorization of an additional 200-foot-wide ROW. See Figures 2-23 and 2-24, Cross-Sections H and J, for representative cross-sections of the proposed ROW.
FIGURE 2-23. CROSS SECTION H
Figure 2-24. Cross Section J
The new transmission line would traverse 68 miles of private lands, with a majority of this Alternative in unincorporated Kern and Los Angeles Counties and potentially affecting the unincorporated communities of Mojave, Willow Springs, Leona Valley, Antelope Acres, and Agua Dulce, and the cities of Lancaster, Palmdale, and Santa Clarita. As necessary, LADWP would seek to purchase the private property required for the Project. As soon as a property has been identified through the final design planning and after the completion of the environmental review and approval process, the property owner would be notified of the LADWP’s interest in acquiring the property. After the appraisal and inspection process, LADWP would present a written offer to the property owner. If an agreement could not be reached after the LADWP had exhausted all its opportunities to reach a settlement with a property owner, the City could choose to exercise its power of eminent domain. For discussion of the potential impacts of eminent domain, please see Chapter 4, Section 4.2.3, Land Use, and Section 4.2.13, Socioeconomics. In some instances, the LADWP could instead seek an easement on the property, rather than ownership in fee. Alternative 3 is the only Alternative expected to result in take of residential structures, as seven single-family homes were noted directly within the ROW.

Approximately 38 miles of Alternative 3’s northern alignment would parallel the reconductoring of BR-RIN and impacts would be concentrated within the same corridor. Thirty-four miles of the southern portion of the Alternative would be placed in a separate utility corridor from the reconductoring; 11 miles of Alternative 3 would be within an existing utility corridor that currently contains only SCE lines, and would add new areas for LADWP to patrol and maintain.

**Plan Amendments**

On land under the jurisdiction of BLM, an existing utility corridor (Corridor A) would be utilized and no California Desert Conservation Area Plan amendment would be required. Prior to the USFS issuing a Special Use Authorization, the following Project-specific amendments to the 2005 ANF LMP would be required: Forest Standards S9 and S10 (related to meeting the Scenic Integrity Objectives on NFS lands), Forest Standard S1 (related to the Pacific Crest Trail, and Standards related to Riparian Conservation Areas.

**Scenic Integrity Objective**

The USFS has adopted management standards for visual resources addressing SIOs. The construction and operation of Alternative 3 would result in conditions that would be inconsistent with the existing SIO standards. Therefore, a Project-specific ANF LMP amendment would be necessary to exempt the Project from those standards.

**Pacific Crest Trail**

The ANF LMP has established a specific design standard for the Pacific Crest Trail to protect the scenic integrity of foreground views as well as from designated viewpoints. The construction and operation of a new 230 kV transmission line would not meet the Desired Condition or the SIO levels specific to the ANF LMP. A Project-specific ANF LMP amendment would be required to exempt the Project from this standard.

**Riparian Conservation Area**

Management objectives for riparian conservations areas were established in the ANF LMP to maintain or improve long-term aquatic and riparian ecosystem health, including quantity, quality,
and timing of stream flows. Even with mitigation, the construction, operation, maintenance, and decommissioning of a new transmission line would be inconsistent with the management objectives and require a Project-specific ANF LMP amendment to exempt the Project from those standards.

**Three-Circuit Tower Mitigation**

In areas where there are ROW expansion constraints and where LADWP has existing 230 kV transmission lines, LADWP is proposing to construct three-circuit towers to carry the existing BR-RIN circuit and two new BR-HC circuits. This would avoid various impacts, as discussed in Chapter 4 of this Final EIS/EIR, including the acquisition of residential property in the unincorporated communities of Willow Springs (milepost 27.1 to 27.6). Please refer to the small inset map on Figure 2-17.

**Avenue L Re-Route**

To avoid acquisition of private property, a portion of Alternative 3 from mile marker 45.2 to 46.7 was moved to parallel a smaller distribution line south along 90th Street West and then east along West Avenue “L.” Refer to Figure 2-25 for an illustration of the Avenue L Re-Route.
FIGURE 2-25. AVENUE L RE-ROUTE ON ALTERNATIVE 3
2.6 ALTERNATIVES COMPARISON SUMMARY

The following sections offer a comparison of the potential environmental impacts associated with the five Project Alternatives: the No Action Alternative and the four action Alternatives. As the Project common components (the expansion of the existing Barren Ridge Switching Station, construction of a new Haskell Canyon Switching Station, reconductoring of the existing 230 kV transmission line from the Barren Ridge Switching Station to Rinaldi Substation, and the addition of a new 230 kV circuit on existing towers between the Castaic Power Plant and Haskell Canyon Switching Station) are shared by all action Alternatives, their associated impacts would be the same for each action Alternative; therefore, this discussion focuses on the impacts of the proposed 230 kV double-circuit transmission line for each action Alternative.

Table 2-11 contains a summary of the impacts for the proposed new 230 kV double-circuit transmission line for each action Alternative by environmental resource.

2.6.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the construction of a new 230 kV transmission line, the addition of a new circuit on existing structures from Haskell Canyon to the Castaic Power Plant, the reconductoring of the existing BR-RIN transmission line, the construction of a new Haskell Canyon Switching Station, and the expansion of the existing Barren Ridge Switching Station would not occur. Current, ongoing operation and maintenance activities for existing facilities in the Project area would continue. Impacts of the No Action Alternative would include impacts from the continuation of ongoing activities, but new impacts associated with the implementation of the No Action Alternative are not anticipated. Relative to Alternatives 1, 2, 2a, and 3, all impacts associated with the construction, operation, and maintenance of BRRTP would be avoided.

2.6.2 PROPOSED ACTION (ALTERNATIVE 2)

The proposed double-circuit transmission line of Alternative 2 is the shortest transmission line among the Alternatives, at 61 miles. Its length is similar to the Alternative 2a transmission line (63 miles), 15 miles shorter than the Alternative 3 transmission line, and 22 miles shorter than the Alternative 1 transmission line. Thirteen miles of USFS land would be crossed by the Alternative 2 transmission line, less than Alternative 1 and 2a (16 miles each) and notably more than Alternative 3 (four miles). The Alternative 2 transmission line would cross the least private land at 44 miles. While this is similar to the Alternative 2a transmission line, at 43 miles, it is considerably less than the Alternative 1 (61 miles) or Alternative 3 (67 miles) transmission lines.

As on Alternative 2a, new access roads would only be required for the construction of 0.1 mile of the proposed double-circuit transmission line, while approximately one half mile of the Alternative 3 transmission line and seven miles of the Alternative 1 transmission line would require new access roads. Although specific areas for Helicopter Mitigation have not been identified for Alternative 2, Helicopter Mitigation may be identified during final design for steep areas with limited access, further reducing the amount of transmission line requiring new access roads. Three-Circuit Tower Mitigation would be utilized for eight miles, the most for any Alternative. Temporary ground disturbance impacts for the Alternative 2 transmission line are
estimated to be around 400 acres and permanent ground disturbance impacts are estimated to be between 57 and 70 acres, similar to Alternative 2a, but less than Alternative 1 or Alternative 3.

**Land Use and Recreation**

The Alternative 2 transmission line centerline would be within 1,000 feet of 156 residences, more than for the transmission line of Alternatives 1 or 2a, but less than for the Alternative 3 transmission line. The transmission line centerline would be within an Eligible Wild and Scenic River Corridor for three miles, the most for any Alternative. Similar to the Alternatives 1 and 2a transmission lines, there would be a single crossing of the Pacific Crest National Scenic Trail. No USFS-designated Back Country Non-Motorized Land Use Zones are crossed. To address incompatibilities with the ANF Land Management Plan, Project-specific amendments to the ANF Land Management Plan would be required for Scenic Integrity Objectives, a specific Pacific Crest National Scenic Trail standard, and Riparian Conservation Area objectives. The Alternative 2 transmission line would be within an Agency Designated Utility Corridor for 15 miles, which represents 87% of the federal land crossed.

**Cultural Resources**

Because few recent cultural resources surveys have been completed for any of the Alternatives, the analysis presented in this document is largely based on known sites identified in past surveys. Previous surveys conducted on 12 miles of the Alternative 2 transmission line centerline within a 500-foot corridor indicate that the centerline would cross within 500 feet of 15 previously recorded cultural resource sites determined or assumed to be eligible to be listed to the National Register of Historic Places (NRHP), the same as for Alternative 2a and less than for either Alternatives 1 or 3. The Olive Power Plant 1 Transmission Line, which would be crossed by the transmission line in all Alternatives, is eligible to be listed to the NRHP and is listed on the California Register of Historic Resources. The centerline of the Alternative 2 transmission line would cross two miles identified with high resource sensitivity levels for paleontological resources, similar to Alternative 2a and less than for either Alternatives 1 or 3.

**Wildfire and Fuels**

The Alternative 2 transmission line would have the least mileage of modeled very high risk conditions for native vegetation alteration and, along with the Alternative 2a transmission line, would have the least mileage of very high risk conditions for potential for wildfire, at 1.5 miles and 2.5 miles respectively. At 4.5 miles of modeled very high risk conditions for firefighter safety and obstruction to suppression, the Alternative 2 transmission line would have less mileage than for either the Alternative 1 or 2a transmission line, but more than for the Alternative 3 transmission line.

**Traffic and Transportation**

The construction of the Alternative 2 transmission line would cause 16 miles of significant traffic impacts, less than for Alternatives 1 and 3 but more than for Alternative 2a. Additionally, the construction would include five USFS Roads that may require temporary improvements to the Objective Maintenance Levels, less than for Alternative 1, the same as for Alternative 2a, and more than for Alternative 3. No public roadway crossings would have poor Levels of Service during construction.
Visual Resources

Twelve miles of the Alternative 2 transmission line would result in moderate residual visual impacts and five miles would result in high residual visual impacts. Among the Alternatives, Alternative 2 would have the least mileage of both moderate and high residual impacts. Thirteen miles of the transmission line would be non-compliant with ANF SIOs; only the Alternative 3 transmission line would have fewer miles of non-compliance with the SIOs. No part of the line would be constructed within an ANF Land Use Zone determined to be not suitable for a major utility corridor. The Alternative 2 transmission line would be visible from the Pacific Crest National Scenic Trail in the foreground in the ANF for two miles; only the Alternative 2a transmission line would be visible for more miles from the Pacific Crest National Scenic Trail. Sixty-three residences, the most among the Alternatives, would be within 500 feet of the centerline of the Alternative 2 transmission line and would be assumed to have visual impacts.

Air Quality and Greenhouse Gas

All Alternatives would exceed air quality emission thresholds for CO, NOx and PM10 in the Antelope Valley Air Quality Management District (AVAQMD) and for CO, NOX, PM10 and PM2.5 in the South Coast Air Quality Management District (SCAQMD). Annual construction emissions for the portion of Alternative 2 on federal lands would be less than the de minimis thresholds for all pollutants in both the South Coast Air Basin (SCAB) and the Mojave Desert Air Basin (MDAB) during 2012 and 2013. In 2014, emissions of NOx would be above the de minimis threshold for NOx of 10 tons per year.

Biological Resources

Like the Alternatives 2a and 3 transmission lines, the Alternative 2 transmission line would cross four miles with a known Federal and State Endangered Species Act-listed wildlife species, the desert tortoise. This is slightly less than for the Alternative 1 transmission line, which would cross lands with two known listed species, the desert tortoise and the California condor. Alternative 2 would have the only transmission line that crosses an area, 0.1 mile, with a known NFS special-status wildlife species, the coastal rosy boa. Similar to the Alternatives 2a and 3 transmission lines, the proposed Alternative 2 transmission line has one mile identified as high avian risk, less high avian risk mileage than the Alternative 1 transmission line. The proposed Alternative 2 transmission line is the only one identified with no mileage of high condor risk.

Similar to the Alternative 2a transmission line, the Alternative 2 transmission line would cross three miles with known NFS threatened, endangered, or special-status plant species, including areas identified with short-joint beavertail and slender mariposa lily. This is a greater distance with known sensitive plant species than would be crossed by the Alternatives 1 or 3 transmission lines. The Alternative 2 transmission line would cross 77 acres of riparian vegetation, similar to the Alternative 1 transmission line and less than the Alternatives 2a and 3 transmission lines. Like Alternatives 2a and 3, the Alternative 2 transmission line would cross 320 acres of Joshua tree woodland, which would be less than that crossed by the Alternative 1 transmission line. The Alternative 2 transmission line would cross 66 Riparian Conservation Areas (RCAs) and have 71 acres of RCAs within 500 feet of the centerline, less than Alternatives 1 and 2a, but more than Alternative 3. Four miles of the proposed Alternative 2 transmission line are identified as having noxious weeds or invasive species present within the 500-foot corridor, the most among the Alternatives.
**Geology and Seismicity**

The proposed Alternative 2 transmission line centerline crosses 10 miles identified for high levels of earthquake ground shaking, the least among the Alternatives. It would cross perpendicular to the San Andreas fault zone and thus would require a shorter distance than the other action Alternatives to traverse the high ground shaking areas. Two miles of liquefaction hazard zone would be crossed, similar to Alternatives 1 and 2a but less than Alternative 3. The transmission line would cross only 0.2 mile of potential landslides and 2.0 miles of earthquake-induced landslide hazard zones, the same as for Alternative 2a and less than for either Alternatives 1 or 3. The Alternative 2 transmission line would cross 20 miles identified with high soil erosion potential, similar to Alternative 3, more than Alternative 2a, and less than Alternative 1.

**Water Resources**

The Alternative 2 transmission line centerline would include 78 stream crossings and 95 perennial and intermittent streams within the 500-foot corridor, similar to Alternative 2a and less than Alternatives 1 and 3. While all Alternatives would cross the California Aqueduct, a National Wetland Inventory (NWI) wetland, only Alternatives 2 and 2a would also cross an NWI vegetated wetland. Three miles of Significant Ecological Areas would be crossed, similar to Alternative 2a and less than Alternatives 1 and 3.

**Noise**

The Alternative 2 transmission line would have the second greatest number of residences (156) within 1,000 feet of the alignment centerline; however, to implement the three-circuit tower mitigation, it would require removal of 5 miles of the existing BR-RIN, construction of a 7-mile temporary transmission line, and construction of three-circuit towers. Helicopter construction may be required in steep areas with limited access within ANF, but these areas would be expected to be near residences. Residents in the unincorporated community of Green Valley would experience longer construction noise impacts than would be expected for the construction of a new double-circuit transmission, without the three-circuit tower mitigation, and reconductoring of the existing BR-RIN. Areas close to the helicopter construction areas and along the flight paths would experience higher construction noise levels of 90 to 100 dB(A) for longer durations. Sensitive receptors near conventional ground construction areas, with the exception of conductor stringing activities, would experience construction noise levels of 65 to 95 dB(A).

**Electrical Effects**

The Alternative 2 transmission line would parallel existing transmission lines that would produce approximately the same level of electric fields; therefore, no significant difference between existing and proposed calculated electric fields would be anticipated. In areas along the alignment where the new transmission line would be close to the 500 kV PDCI transmission lines, the calculated electric fields would be significantly higher at the edge of the ROW (0.1 to 0.16 kV/m).
2.6.3 ALTERNATIVE 1

The proposed double-circuit transmission line of Alternative 1 is the longest transmission line among the Alternatives, at 83 miles. It would be seven miles longer than the Alternative 3 transmission line, 20 miles longer than the Alternative 2a transmission line, and 22 miles longer than the Alternative 2 transmission line. Sixteen miles of USFS land would be crossed by the Alternative 1 transmission line, similar to Alternative 2a, but more than either Alternative 2 (13 miles) or Alternative 3 (four miles). The transmission line of each Alternative would cross four miles of land under the management of BLM, but only the Alternative 1 transmission line would cross State Land (for two miles). The Alternative 1 transmission line would cross less private land (61 miles) than Alternative 3 (67 miles), but more than Alternative 2 (44 miles) or Alternative 2a (43 miles).

New access roads would be required for the construction of seven miles of the proposed Alternative 1 double-circuit transmission line, while approximately one-half-mile or less of the transmission line requires new access roads for Alternatives 2, 2a, and 3. Eight miles of the transmission line have been identified for Helicopter Mitigation. Additional Helicopter Mitigation areas may be identified during final design for steep areas with limited access, further reducing the amount of transmission line requiring new access roads. The temporary and permanent ground disturbing impacts are estimated to be the greatest among the Alternatives, at between 576 and 599 acres and between 120 and 199 acres, respectively.

Land Use and Recreation

The Alternative 1 transmission line centerline would be within 1,000 feet of 106 residences, exceeding only the number of residences within 1,000 feet of Alternative 2a (70 residences). The Alternative 1 transmission line would be the only one to cross a State Park Recreation Area, with a two-mile crossing of the Castaic Lake State Recreation Area. No Eligible Wild and Scenic River Corridors would be crossed. Similar to the Alternatives 2 and 2a transmission lines, there would be a single crossing of the Pacific Crest National Scenic Trail. Two miles of the transmission line would be within a USFS-designated Back Country Non-Motorized Land Use Zone, the most for any Alternative. To address incompatibilities with the ANF Land Management Plan, Project-specific amendments to the ANF Land Management Plan would be required to address Scenic Integrity Objectives, Riparian Conservation Area objectives, and the Back Country Non-Motorized Land Use Zone. The Alternative 1 transmission line would be within an Agency Designated Utility Corridor for 14 miles, which represents 73% of the federal land crossed.

Cultural Resources

Because few recent cultural resources surveys have been completed for any of the Alternatives, the analysis presented in this document is largely based on known sites identified in past surveys. Previous surveys conducted on 31 miles of the Alternative 1 transmission line centerline within a 500-foot corridor indicate that the centerline would cross within 500 feet of 33 previously recorded cultural resource sites determined or assumed to be eligible to be listed to the NRHP, the most for any Alternative. The transmission line would cross the only NRHP-listed site among the Alternatives, the Old Ridge Route and its associated sites: the Halfway Inn, the Reservoir Summit Service Center, and the National Forest Inn. The Olive Power Plant 1 Transmission line, which would be crossed by the transmission line in all Alternatives, is eligible.
to be listed to the NRHP and is listed on the California Register of Historic Resources. The centerline of the Alternative 1 transmission line would cross 25 miles identified with high resource sensitivity levels for paleontological resources, significantly more than for any other Alternative.

**Wildfire and Fuels**

The Alternative 1 transmission line would include the most miles of modeled very high risk conditions for firefighter safety and obstructions to suppression with 10 miles modeled as such. It would also have the greatest mileage of modeled very high risk conditions for potential for wildfire and native vegetation alteration, with 8 and 13.5 miles respectively for each.

**Traffic and Transportation**

The construction of the Alternative 1 transmission line would cause the most miles of significant traffic impacts, with 21 miles of significant impacts. Additionally, the construction would include the eight USFS Roads that may require temporary improvements to their Objective Maintenance Levels, the most for any Alternative. No public roadway crossings would have poor Levels of Service during construction.

**Visual Resources**

Eighteen miles of the Alternative 1 transmission line would result in moderate residual visual impacts and 20 miles would result in high residual visual impacts. Among the Alternatives, only Alternative 3 would have more miles of moderate residual impacts, and the Alternative 1 transmission line would have the most miles of high impacts. Fifteen miles of the transmission line would be non-compliant with ANF SIOs; only the Alternative 2a transmission line would have more miles of non-compliance with the SIOs. Two miles of the line would be constructed within an ANF Land Use Zone determined to be not suitable for a major utility corridor, the greatest such mileage among the Alternatives. The Alternative 1 transmission line would be the only Alternative not visible from the Pacific Crest National Scenic Trail (PCT) within ANF. Sixty-three residences, the most among the Alternatives, would be within 500 feet of the centerline of the Alternative 1 transmission line; only Alternative 3 would have fewer residences within 500 feet.

**Air Quality and Greenhouse Gas**

All Alternatives would exceed air quality emission thresholds for CO, NOx and PM10 in the AVAQMD and for CO, NOx, PM10 and PM2.5 in the SCAQMD. Annual construction emissions for the portion of Alternative 1 on federal lands would be less than the de minimis thresholds for all pollutants in both the SCAB and the MDAB during 2012. In 2013 and 2014, emissions of NOx would be above the de minimis threshold for NOx of 10 tons per year.

**Biological Resources**

The Alternative 1 transmission line would cross four miles with known Federal and State Endangered Species Act-listed wildlife species, the desert tortoise and the California condor. This would be slightly more distance of listed wildlife species crossings than the Alternatives 2, 2a and 3 transmission lines, which would cross lands with one known listed species, the desert
tortoise. The Alternative 1 transmission line would cross six miles identified as high avian risk and six miles identified as high condor risk, the highest among the Alternatives.

Similar to the Alternative 3 transmission line, the Alternative 1 transmission line would cross one mile with known NFS threatened, endangered, or special-status plant species, including areas identified with short-joint beavertail and slender mariposa lily. This is a shorter distance with known sensitive plant species than would be crossed by the Alternatives 2 or 2a transmission lines. The Alternative 1 transmission line would cross 79 acres of riparian vegetation, similar to the Alternative 2 transmission line and less than the Alternatives 2a and 3 transmission lines. The Alternative 1 transmission line would cross 334 acres of Joshua tree woodland, the most among the Alternatives. The transmission line would cross 151 RCAs and have 100 acres of RCAs within 500 feet of the centerline, the most among the Alternatives.

**Geology and Seismicity**

The Alternative 1 transmission line centerline would cross 13 miles identified for high levels of earthquake ground shaking, more than Alternatives 2 and 2a but less than Alternative 3. It would traverse the San Andreas fault zone diagonally and thus would require a longer distance to traverse the high impact area. One mile of liquefaction hazard zone would be crossed, similar to Alternatives 2 and 2a but less than Alternative 3. The transmission line would cross seven miles of potential landslides, the most among the Alternatives. It would cross nine miles of earthquake-induced landslide hazard zones, more than Alternatives 2 and 2a, but less than Alternative 3. The Alternative 1 transmission line would cross 26 miles identified with high soil erosion potential, the most among the Alternatives.

**Water Resources**

The Alternative 1 transmission line centerline would include 146 stream crossings and 168 perennial and intermittent streams within the 500-foot corridor, the most among the Alternatives. There would be a single NWI wetland crossed, the California Aqueduct. Eight miles of Significant Ecological Areas would be crossed, the most among the Alternatives.

**Noise**

The Alternative 1 transmission line would have the second least number of residences (106) within 1,000 feet of the alignment centerline, but would require the most miles (8.5 miles) of helicopter construction. Sensitive receptors near helicopter construction areas and along the helicopter flight paths would experience the highest noise levels (90 to 100 dB(A)) for longer durations. Sensitive receptors near conventional ground construction areas, with the exception of conductor stringing activities, would experience construction noise levels of 65 to 95 dB(A).

**Electrical Effects**

In areas that have existing transmission lines along the Alternative 1 transmission line alignment, the calculated electric field levels with the addition of the new line would not change relative to the existing corridors, because the existing high voltage transmission lines would produce approximately the same electric field levels. In areas where there are currently no existing high voltage transmission lines, the electric field levels would have a very minor increase at the edge of the ROW (0.06 to 0.2 kV/m).
2.6.4 ALTERNATIVE 2A

The proposed double-circuit transmission line of Alternative 2a, at 63 miles, is two miles longer than the shortest transmission line among the Alternatives (Alternative 2, at 61 miles). It would be 20 miles shorter than the Alternative 1 transmission line and 13 miles shorter than the Alternative 3 transmission line. Sixteen miles of USFS land would be crossed by the Alternative 2a transmission line, similar to Alternative 1, but more than either Alternative 2 (13 miles) or Alternative 3 (4 miles). The Alternative 2a transmission line would cross 43 miles of private land, similar to the Alternative 2 transmission line (44 miles), but considerably less than the Alternative 1 (61 miles) or the Alternative 3 (67 miles) transmission lines. The Alternative 2a transmission line would bypass the unincorporated community of Green Valley, which would be traversed by the Alternative 2 transmission line.

Similar to Alternative 2, new access roads would only be required for the construction of 0.1 mile of the proposed double-circuit transmission line, while approximately one half mile of the Alternative 3 transmission line and seven miles of the Alternative 1 transmission line would require new access roads. Four miles of the Alternative 2a transmission line have been identified for Helicopter Mitigation. Additional Helicopter Mitigation areas may be identified during final design for steep areas with limited access, further reducing the amount of transmission line requiring new access roads. Three-Circuit Tower Mitigation would be utilized for three miles. Temporary and permanent ground disturbance impacts for the Alternative 2a transmission line are estimated to be between 405 and 409 acres and between 59 and 75 acres, respectively, similar to Alternative 2, but less than either Alternative 1 or Alternative 3.

Land Use and Recreation

The Alternative 2a transmission line centerline would be within 1,000 feet of 70 residences, the fewest among the Alternatives. The transmission line centerline would be within an Eligible Wild and Scenic River Corridor for two miles, similar to Alternative 2. Similar to the Alternatives 1 and 2 transmission lines, there would be a single crossing of the Pacific Crest National Scenic Trail. One mile of the transmission line would be within a USFS-designated Back Country Non-Motorized Land Use Zone. To address incompatibilities with the ANF Land Management Plan, Project-specific amendments to the ANF Land Management Plan would be required for Scenic Integrity Objectives, a specific Pacific Crest National Scenic Trail standard, Riparian Conservation Area objectives, and the Back County Non-Motorized Land Use Zone. The Alternative 2a transmission line would be within an Agency Designated Utility Corridor for 14 miles, which represents 59% of the federal land crossed.

Cultural Resources

Because few recent cultural resources surveys have been completed for any of the Alternatives, the analysis presented in this document is largely based on known sites identified in past surveys. Previous surveys conducted on 14 miles of the Alternative 2a transmission line centerline within a 500-foot corridor indicate that the centerline would cross within 500 feet of 15 previously recorded cultural resource sites determined or assumed to be eligible to be listed to the NRHP, similar to Alternative 2 and less than either Alternatives 1 or 3. The Olive Power Plant 1 Transmission line, which would be crossed by the transmission line on all Alternatives, is eligible to be listed to the NRHP and is listed on the California Register of Historic Resources. The centerline of the Alternative 2a transmission line would cross two miles identified with high
resource sensitivity levels for paleontological resources, similar to Alternative 2 and less than either Alternatives 1 or 3.

**Wildfire and Fuels**

With 6.5 miles of modeled high risk conditions for firefighter safety and obstruction to firefighting along the Alternative 2a transmission line, it would have the greatest such mileage of all Alternatives except the Alternative 1 transmission line. The Alternative 2a transmission line, along with the Alternative 2 transmission line, would have the least mileage of modeled very high risk conditions for potential for wildfire, with 2.5 miles modeled as such. With 2.5 miles of modeled very high risk conditions for native vegetation alteration, only the Alternative 2 transmission line would have fewer such miles among the Alternatives.

**Traffic and Transportation**

The construction of the Alternative 2a transmission line would cause 12 miles of significant traffic impacts, the least among the Alternatives. Additionally, the construction would include five USFS Roads that may require temporary improvements to their Objective Maintenance Levels, more than Alternative 3, the same as Alternative 2, and less than Alternative 1. No public roadway crossings would have poor Levels of Service during construction.

**Visual Resources**

Thirteen miles of the Alternative 2a transmission line would result in moderate residual visual impacts and five miles would result in high residual visual impacts. Among the Alternatives, only Alternative 2 would have fewer miles of moderate and high residual impacts. Sixteen miles of the transmission line would be non-compliant with ANF SIOs, the highest mileage of non-compliance with the SIOs among the Alternatives. One mile of the Alternative 2a transmission line would be constructed within an ANF Land Use Zone determined to be not suitable for a major utility corridor. With three miles visible from the PCT within ANF, Alternative 2a would have the greatest visibility from the PCT within ANF among the Alternatives. Thirty-two residences would be within 500 feet of the centerline of the Alternative 2a transmission line; only Alternative 2 would have more residences within 500 feet.

**Air Quality and Greenhouse Gas**

All Alternatives would exceed air quality emission thresholds for CO, NOx and PM10 in the AVAQMD and for CO, NOX, PM10 and PM2.5 in the SCAQMD. Annual construction emissions for the portion of Alternative 2a on federal lands would be less than the *de minimis* thresholds for all pollutants in both the SCAB and the MDAB during 2012 and 2013. In 2014, emissions of NOx would be above the proposed *de minimis* threshold for NOx of 10 tons per year.

**Biological Resources**

Like the Alternatives 2 and 3 transmission lines, the Alternative 2a transmission line would cross four miles with a known federal and State Endangered Species Act-listed wildlife species, the desert tortoise. This would be slightly less than the Alternative 1 transmission line, which would cross mileage with two known listed species, the desert tortoise and the California condor. Similar to the Alternatives 2 and 3 transmission lines, the Alternative 2a transmission line has
one mile identified as high avian risk, less high avian risk mileage than the Alternative 1 transmission line. The proposed Alternative 2a transmission line has three miles identified as high condor risk, more than Alternatives 2 and 3, but less than Alternative 1.

Similar to the Alternative 2 transmission line, the Alternative 2a transmission line would cross three miles with known NFS threatened, endangered, or special-status plant species, including areas identified with short-joint beavertail and slender mariposa lily. This is a greater distance with known sensitive plant species than would be crossed by the Alternatives 1 or 3 transmission lines. The Alternative 2a transmission line would cross 161 acres of riparian vegetation, less than the Alternative 3 transmission line and more than the Alternatives 1 and 2 transmission lines. Like Alternatives 2 and 3, the Alternative 2a transmission line would cross 320 acres of Joshua tree woodland, less than would be crossed by the Alternative 1 transmission line. The transmission line would cross 94 RCAs and have 88 acres of RCAs within 500 feet of the centerline, less than Alternative 1, but more than Alternatives 2 and 3. Three miles of the proposed Alternative 2a transmission line are identified as having noxious weeds or invasive species present within the 500-foot corridor, more than for Alternatives 1 and 3.

**Geology and Seismicity**

The Alternative 2a transmission line centerline would cross 12 miles identified for high levels of earthquake ground shaking, less than all Alternatives except Alternative 2. It would cross perpendicular to the San Andreas fault zone. Two miles of liquefaction hazard zone would be crossed, similar to Alternatives 1 and 2 but less than Alternative 3. The transmission line would cross only 0.2 mile of potential landslides and 2.0 miles of earthquake-induced landslide hazard zones, the same as Alternative 2 and less than either Alternatives 1 or 3. The Alternative 2a transmission line would cross 17 miles identified with high soil erosion potential, the least among the Alternatives.

**Water Resources**

The Alternative 2a transmission line centerline would include 79 stream crossings and 97 perennial and intermittent streams within the 500-foot corridor, similar to Alternative 2 and less than Alternatives 1 and 3. While all Alternatives would cross the California Aqueduct, an NWI wetland, only Alternatives 2 and 2a would also cross an NWI vegetated wetland. Two miles of Significant Ecological Areas would be crossed, similar to Alternative 2a and less than Alternatives 1 and 3.

**Noise**

The Alternative 2a transmission line would have the fewest number of residences (70) within 1,000 feet of the alignment centerline, but four miles of the seven miles that would be re-routed around the unincorporated community of Green Valley would be constructed by helicopter. Noise impacts similar to those for the Alternative 2 transmission line would be anticipated for the Alternative 2a transmission line; helicopter construction areas, however, including flight paths, would experience higher construction noise levels of 90 to 100 dB(A) for longer durations. Sensitive receptors near conventional ground construction areas, with the exception of conductor stringing activities, would experience construction noise levels of 65 to 95 dB(A).
Electrical Effects

The Alternative 2a transmission line would be similar to the Alternative 2 transmission line except in the area of the re-route around the community of Green Valley where a new seven-mile transmission line corridor would be created and introduce new electric fields. However, there would be no sensitive receptors in this area. The electric fields from the Alternative 2a transmission line in the area where a new corridor is created (re-route around Green Valley) would be less than for the Alternative 2 transmission line, because it would not be close to the 500 kV PDCI line.

2.6.5 ALTERNATIVE 3

The proposed double-circuit transmission line of Alternative 3 is 76 miles long. It is seven miles shorter than the Alternative 1 transmission line, 13 miles longer than the Alternative 2a transmission line, and 15 miles longer than the Alternative 2 transmission line. Four miles of USFS land would be crossed by the Alternative 3 transmission line, notably less than Alternative 2 (13 miles), Alternative 1 (16 miles), or Alternative 2a (16 miles). The Alternative 3 transmission line would cross the most private land (67 miles) and would result in the acquisition of seven residential structures. While the transmission lines of Alternative 1, Alternative 2 and Alternative 2a would all cross private land (61, 44, and 43 miles, respectively), no other Alternative would result in the acquisition of residential structures.

New access roads would be required for the construction of approximately one half mile of the proposed double-circuit transmission line on Alternative 3, slightly more than the 0.1 mile of transmission line requiring new access roads for Alternatives 2 or 2a, and considerably less than the 7 miles of transmission line requiring new access roads for Alternative 1. Although specific areas for Helicopter Mitigation have not been identified for Alternative 3, Helicopter Mitigation may be identified during final design for steep areas with limited access, reducing the amount of transmission line requiring new access roads. The Three-Circuit Tower Mitigation would be utilized for one-half mile. Temporary and permanent ground disturbance impacts for the Alternative 3 transmission line are estimated to be between 512 and 520 acres and between 91 and 135 acres, respectively, a little less than Alternative 1 but considerably more than Alternative 2 or Alternative 2a.

Land Use and Recreation

The Alternative 3 transmission line centerline would be within 1,000 feet of 242 residences, the most among the Alternatives. The Alternative 3 transmission line would be the only one to cross Mountains Recreation Conservation Authority parkland, with one mile crossed. No Eligible Wild and Scenic River Corridors or USFS-designated Back Country Non-Motorized Land Use Zones would be crossed. The transmission line would cross the Pacific Crest National Scenic Trail three times; it is the only Alternative that would have more than one crossing. To address incompatibilities with the ANF Land Management Plan, Project-specific amendments to the ANF Land Management Plan would be required to address Scenic Integrity Objectives, a specific Pacific Crest National Scenic Trail standard, and Riparian Conservation Area objectives. The Alternative 3 transmission line would be within an Agency Designated Utility Corridor for eight miles, which represents 99% of the federal land crossed.
Cultural Resources

Because few recent cultural resources surveys have been completed for any of the Alternatives, the analysis presented in this document is largely based on known sites identified in past surveys. Previous surveys conducted on 18 miles of the Alternative 3 transmission line centerline within a 500-foot corridor indicate that the centerline would cross within 500 feet of 26 previously recorded cultural resource sites determined or assumed to be eligible to be listed to the NRHP, the most for any Alternative. The Olive Power Plant 1 Transmission line, which would be crossed by the transmission line on all Alternatives, is eligible to be listed to the NRHP and is listed on the California Register of Historic Resources. The centerline of the Alternative 3 transmission line would cross six miles identified with high resource sensitivity levels for paleontological resources, more than Alternatives 2 and 2a and less than Alternative 1.

Wildfire and Fuels

With only 1.5 miles of modeled very high risk conditions for firefighter safety and obstruction to suppression, the Alternative 3 transmission line would have the least such mileage among the Alternatives. With 4 miles modeled as very high risk conditions for potential for wildfire, the Alternative 3 transmission line would have more such mileage than either Alternative 2 or 2a, but less than for Alternative 1. With 9.5 miles of modeled very high risk conditions for native vegetation alteration, only the Alternative 1 transmission line would have greater such mileage.

Traffic and Transportation

The construction of the Alternative 3 transmission line would cause 17 miles of significant traffic impacts, more than Alternatives 2 and 2a and less than Alternative 1. The construction would include one USFS Road that may require temporary improvements to its Objective Maintenance Level, the fewest of any Alternative. Two public roadway crossings would have poor Levels of Service during construction; the Alternative 3 transmission line construction would be the only Alternative to include such crossings.

Visual Resources

Twenty-nine miles of the Alternative 3 transmission line would result in moderate residual visual impacts and nine miles would result in high residual visual impacts. Among the Alternatives, it would have the most miles of moderate residual impacts, and the second most miles of high residual impacts. Four miles of the transmission line would be non-compliant with ANF SIOs. No part of the line would be constructed within an ANF Land Use Zone determined to be not suitable for a major utility corridor. With less than one mile visible from the PCT within ANF, Alternative 3 would have the least visibility from the PCT within ANF among the visible Alternatives (Alternative 1 would not be visible). Twenty-three residences, the least among the Alternatives, would be within 500 feet of the centerline of the Alternative 3 transmission line and would be assumed to have visual impacts.

Air Quality and Greenhouse Gas

All Alternatives would exceed air quality emission thresholds for CO, NOx and PM10 in the AVAQMD and for CO, NOX, PM10 and PM2.5 in the SCAQMD. Annual construction emissions for the portion of Alternative 3 on federal lands would be less than the de minimis thresholds for all pollutants in both the SCAB and the MDAB during 2012 and 2013. In 2014,
emissions of NOx would be above the proposed *de minimis* threshold for NOx of 10 tons per year

**Biological Resources**

Like the Alternatives 2 and 2a transmission lines, the Alternative 3 transmission line would cross four miles with a known federal and State Endangered Species Act-listed wildlife species, the desert tortoise. This would be slightly less than the Alternative 1 transmission line, which would cross mileage with two known listed species, the desert tortoise and the California condor. Similar to the Alternatives 2 and 2a transmission lines, the Alternative 3 transmission line has one mile identified as high avian risk, less high avian risk mileage than the Alternative 1 transmission line. The proposed Alternative 3 transmission line has one mile identified as high condor risk, more than Alternative 2, but less than Alternatives 1 and 2a.

Similar to the Alternative 1 transmission line, the Alternative 3 transmission line would cross one mile with known threatened, endangered, or special-status plant species, including areas identified with short-joint beavertail and slender mariposa lily. This is a shorter distance with known sensitive plant species than would be crossed by the Alternatives 2 or 2a transmission lines. The Alternative 3 transmission line would cross 406 acres of mapped riparian vegetation, by far the most among the Alternatives. Like Alternatives 2 and 2a, the Alternative 3 transmission line would cross 320 acres of Joshua tree woodland, less than the Alternative 1 transmission line. Due in part to the fact that the Alternative 3 transmission line would cross only two miles of USFS land, the transmission line would cross only six RCAs, and would have 0.6 acre of RCAs within 500 feet of the centerline, the least among the Alternatives. One-tenth of a mile of the proposed Alternative 3 transmission line is identified as having noxious weeds or invasive species present within the 500-foot corridor, the least among the Alternatives.

**Geology and Seismicity**

The Alternative 3 transmission line centerline would cross 17 miles identified for high levels of earthquake ground shaking, the most among the Alternatives. It would traverse the San Andreas fault zone diagonally and thus would require a longer distance to traverse the high impact area. Ten miles of liquefaction hazard zone would be crossed, the most among the Alternatives. The transmission line would cross four miles of potential landslides, less than Alternative 1, but more than Alternatives 2 and 2a. It would cross 19 miles of earthquake-induced landslide hazard zones, the most among the Alternatives. The Alternative 3 transmission line would cross 20 miles identified with high soil erosion potential, similar to Alternative 2, more than Alternative 2a, and less than Alternative 1. Only Alternative 3 would cross a distinctive geologic feature in addition to the San Andreas fault zone, with a 0.4-mile crossing of white tuff marker beds.

**Water Resources**

The Alternative 3 transmission line centerline would include 92 stream crossings and 113 perennial and intermittent streams within the 500-foot corridor, more than Alternatives 2 and 2a, but less than Alternative 1. There would be a single NWI wetland crossed, the California Aqueduct. Five miles of Significant Ecological Areas would be crossed, more than Alternatives 2 and 2a, but less than Alternative 1.
Noise

The Alternative 3 transmission line would have the greatest number of sensitive noise receptors (242 residences) within 1,000 feet of the alignment centerline. Most of these residences would be in the Agua Dulce area. Sensitive receptors near conventional ground construction areas, with the exception of conductor stringing activities, would experience construction noise levels of 65 to 95 dB(A).

Electrical Effects

The Alternative 3 transmission line would be in the same corridor as numerous existing high voltage transmission lines, and the calculated electric fields for the existing and proposed ROWs would be similar because the existing transmission lines produce approximately the same level of electric fields.

2.6.6 ALTERNATIVES COMPARISON SUMMARY TABLE

Table 2-11 below summarizes the impacts within a 500-foot corridor for the proposed new 230 kV double-circuit transmission line for each action Alternative by environmental resource. The No Action Alternative represents a no-build scenario and does not include the 230 kV transmission line. As such, it has not been included in this summary table. As the Project common components (the expansion of the existing Barren Ridge Switching Station, construction of a new Haskell Canyon Switching Station, reconductoring of the existing 230 kV transmission line from the Barren Ridge Switching Station to Rinaldi Substation, and the addition of a new 230 kV circuit on existing towers between the Castaic Power Plant and Haskell Canyon Switching Station) are shared by all action Alternatives, their associated impacts would be the same for each action Alternative; therefore, they have not been included in the summary table.
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### Table 2-11. Comparison Table for Action Alternatives

| Issues or Concerns | Proposed New 230 kV Double-Circuit Transmission Line For Each Action Alternative |
|--------------------|-------------------------------------------------------------------------------------------------
<p>| Jurisdiction Crossed (miles) | Alternative 1 | Alternative 2 Proposed Action | Alternative 2a1 | Alternative 3 |
| United States Forest Service | 15.9 | 13.0 | 15.5 | 4.4 |
| Bureau of Land Management | 3.7 | 3.7 | 3.7 | 3.7 |
| State Land | 2.4 | 0.9 | 0.3 | 0.9 |
| Private | 60.0 | 44.0 | 43.3 | 67.4 |
| TOTAL | 83.1 | 52.4 | 46.3 | 75.5 |
| Miles Within Access Road Ground Disturbance Categories (percentage of Alternative) | | | | |
| 1. Existing roads or agricultural land, no proposed road widening anticipated | 34.4 (41.3%) | 8.3 (13.7%) | 8.6 (13.7%) | 27.8 (36.7%) |
| 2. Existing 8-foot wide roads that require an additional 8 feet of width | 6.4 (7.7%) | 0 | 0 | 0 |
| 3. Construct new road on flat terrain (0-10%) | 0 | 0 | 0 | 0 |
| 4. Construct new road on steep terrain (10-30%) | 0.4 (0.5%) | 0.1 (0.2%) | 0.1 (0.2%) | 0.5 (0.7%) |
| 5. Construct new road on steep terrain (30-50%) | 0.3 (0.6%) | 0 | 0 | 0.1 (0.1%) |
| 6. Construct road on very steep terrain (greater than 30%) | 0.4 (0.5%) | 0.1 (0.2%) | 0.1 (0.2%) | 0.1 (0.1%) |
| Number of Eligible Sites (determined or assumed) within 500-foot Corridor | 8.4 (10.1%) | 0 | 3.6 (5.8%) | 0 |
| Identified Helicopter Mitigation areas | 7.3 | 0.1 | 0.1 | 0.8 |
| Miles of transmission line requiring new access roads | 576 – 599 | 398 – 399 | 405 – 409 | 512 – 520 |
| Permanent (acres) | 120 – 199 | 57 – 70 | 59 – 75 | 91 – 135 |
| Temporary (acres) | 106 | 156 | 70 | 242 |
| Miles of Centerline with Previous Survey within 500-foot Corridor | 0 | 0 | 0 | 7 |
| Number of Pacific Crest Trail Crossings | 0 | 1 | 1 | 3 |
| USFS Back Country Non-Motorized Crossed | 2.4 | 0.0 | 1.0 | 0 |
| Requires a Project-specific ANF LMP amendment | 0.0 | 0 | 0 |
| Miles of Centerline within Eligible Wild and Scenic River Corridor | 0.0 | 2.7 | 2.1 | 0.0 |
| Miles of State Park/Recreation Area Crossed | 2.4 (Centerline) | 0.0 | 0.0 | 0.0 |
| Castaic Lake State Recreation Area | 2.9 (within 500-foot corridor) | 0.0 | 0.0 | 0.0 |
| Miles of Mountains Recreation and Conservation Authority Parkland Crossed | 0.0 | 0.0 | 0.0 | 0.0 |
| Miles of Centerline within Agency-Designated Utility Corridor | 14.2 | 8.0 | 8.6 | 0.8 |
| 72.5% of federal land crossed | 14.5 | 13.6 | 13.6 | 8.0 |
| 86.8% of federal land crossed | 13.6 | 13.6 | 13.6 | 8.0 |
| Cultural Resources | | | | |
| Number of Eligible Sites (determined or assumed) within 500-foot Corridor, including Resources Listed or Eligible to be listed to the National Register of Historic Places (NRHP) or California Register of Historic Resources (CRHR) | 33 (Eligible or assumed eligible to be listed to the NRHP) | 15 (Eligible or assumed eligible to be listed to the NRHP) | 15 (Eligible or assumed eligible to be listed to the NRHP) | 26 (Eligible or assumed eligible to be listed to the NRHP) |
| Resources listed to the NRHP: Old Ridge Route, which includes the National Forest Inn, Halfway Inn, Summit Service Center, Forest Inn, Halfway Inn, Reservoir Summit Service Center | 15 (Eligible or assumed eligible to be listed to the NRHP) | 15 (Eligible or assumed eligible to be listed to the NRHP) | 15 (Eligible or assumed eligible to be listed to the NRHP) | 26 (Eligible or assumed eligible to be listed to the NRHP) |
| Resources listed to the CRHR and eligible to be listed to the NRHP: Olive Power Plant I Transmission Line | 31.1 | 11.5 | 13.6 | 18 |
| Miles of Centerline with Previous Survey within 500-foot Corridor | 10.2 | 7.1 | 8.7 | 15.4 |
| Miles (Percentage) Surveyed Without Known Resources | (33%) | (62%) | (65%) | (68%) |</p>
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<tr>
<th>Issues or Concerns</th>
<th>Alternative 1 Proposed Action</th>
<th>Alternative 2 Proposed Action</th>
<th>Alternative 2a Proposed Action</th>
<th>Alternative 3 Proposed Action</th>
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<td>Traffic and Transportation</td>
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<td></td>
<td>8N04 – Old Ridge Route (ObML 2)</td>
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<td>8N05 – Tumble Inn Rd (ObML 2)</td>
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<td>8N17 – San Francisquito Motorway (ObML 2)</td>
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<td></td>
<td>6N21 – City Highline Rd (or City Highline Motorway Rd) (ObML 2)</td>
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<td>6N29 – Dry Canyon Rd (ObML 3)</td>
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<td>6N32.5 – Templin Highway (ObML 2)</td>
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<td>Visual Resources</td>
<td>Residual Impact Level (miles)</td>
<td>H = 20.4 M = 18.1</td>
<td>H = 4.5 M = 11.7</td>
<td>H = 8.0 M = 29.1</td>
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<td></td>
<td>Pacific Crest National Scenic Trail, trails, and ANF Templin vista point</td>
<td>Residences, Pacific Crest National Scenic Trail (generally parallel alignment within the foreground visibility zone for approximately two miles), the ANF Green Valley Camp Site and transportation viewpoints</td>
<td>Residences, Pacific Crest National Scenic Trail, minor trails, Mountains Recreation and Conservation Authority, Ritter Ranch, Vekuzal Motion Picture Ranch</td>
<td></td>
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<td></td>
<td>Non-Compliance with ANF SIOs</td>
<td>14.5</td>
<td>13.3</td>
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<td></td>
<td>Miles of ANF Land Use Zone Not Suitable for Major Utility Corridor</td>
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<td>Miles within the ANF visible from the Pacific Crest National Scenic Trail (PCT) within the Foreground</td>
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<td>Conformance with South Coast Air Quality Management District (SCAQMD) and Antelope Valley Air Quality Management District (AVAQMD) (NOx, Exceeding Thresholds)</td>
<td>Conformance with South Coast Air Quality Management District (SCAQMD) and Antelope Valley Air Quality Management District (AVAQMD) (NOx, Exceeding Thresholds)</td>
<td>29</td>
<td>63</td>
<td>32</td>
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<td></td>
<td>AAVAQMD: Emissions above the daily CO, NOx, and PM10 threshold.</td>
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<td></td>
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<tr>
<td></td>
<td>SCAQMD: Emissions above the daily CO, NOX, and PM10 threshold.</td>
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<td></td>
<td>Federal Conformity Determination Requirement</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Air Quality</td>
<td>Annual construction emissions for the portion of Alternative 1 on federal lands would be less than the de minimis thresholds for all pollutants in both the SCAB and the MDAB during 2012. In 2013 and 2014, emissions of NOX would be above the de minimis threshold for NOX of 10 tons per year.</td>
<td>Annual construction emissions for the portion of Federal Conformity Determination Requirement</td>
<td>Annual construction emissions for the portion of Alternative 2a on federal lands would be less than the de minimis thresholds for all pollutants in both the SCAB and the MDAB during 2012 and 2013. In 2014, emissions of NOX would be above the de minimis threshold for NOX of 10 tons per year.</td>
<td>Annual construction emissions for the portion of Federal Conformity Determination Requirement</td>
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<td>Fish and Wildlife Resources</td>
<td>Total Miles Crossed with Known Federal and State Endangered Species Act (ESA) Listed Species</td>
<td>4.2</td>
<td>3.7</td>
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<tr>
<td>Issues or Concerns</td>
<td>Alternative 1</td>
<td>Alternative 2</td>
<td>Alternative 2a</td>
<td>Alternative 3</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------</td>
<td>--------------</td>
<td>---------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Miles Crossed with Known Federal and State ESA Listed Species on BLM lands</td>
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<td>0.1 BLM (Desert Tortoise)</td>
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<tr>
<td>Miles Crossed with Known Federal ESA Listed Species on NFS lands</td>
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<tr>
<td>Miles Crossed with Known Federal and State ESA Listed Animal Species on Private lands</td>
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<tr>
<td>Miles Crossed with Known USFS Special Status Wildlife Species</td>
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<td>0.0</td>
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<tr>
<td>Miles of Designated USFWS or CDFG Wildlife Habitats</td>
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<tr>
<td>Miles of Designated BLM Habitats</td>
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<tr>
<td>Miles of Designated NFS Habitat</td>
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<tr>
<td>Miles of Avian Risk</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Miles of Condor Risk</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Miles Crossed with Known USFS Sensitive Plants</td>
<td>1.3</td>
<td>1.3</td>
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<tr>
<td>Miles Crossed with Known Federal and State Threatened, Endangered, Candidate, and Proposed Plant (TECP) Species</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Acreage of Riparian Vegetation Crossed</td>
<td>136 acres</td>
<td>136 acres</td>
<td>136 acres</td>
<td>136 acres</td>
</tr>
<tr>
<td>Acreage of Joshua Tree Woodland Crossed</td>
<td>334 acres</td>
<td>334 acres</td>
<td>334 acres</td>
<td>334 acres</td>
</tr>
<tr>
<td>Acreage of Reclamation Sage Scrub Crossed</td>
<td>488 acres</td>
<td>488 acres</td>
<td>488 acres</td>
<td>488 acres</td>
</tr>
<tr>
<td>Number of Riparian Conservation Areas (RCA) Crossed</td>
<td>151</td>
<td>151</td>
<td>151</td>
<td>151</td>
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<tr>
<td>Acres of RCA within 500-foot Corridor</td>
<td>70.9 acres</td>
<td>70.9 acres</td>
<td>70.9 acres</td>
<td>70.9 acres</td>
</tr>
<tr>
<td>Miles with Mountain Weeds or Invasive Species identified within 500 foot corridor during BRRTP Botanical Survey</td>
<td>1.4</td>
<td>1.4</td>
<td>1.4</td>
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<td>Distinctive Geologic Features</td>
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<td>None</td>
<td>None</td>
<td>None</td>
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<tr>
<td>Miles Crossed of High Levels of Earthquake Ground Shaking</td>
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<td>1.2</td>
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<tr>
<td>Miles Crossed of Liquefaction Hazard Zones (ratio to available data)</td>
<td>0.1 (13.6%)</td>
<td>0.1 (13.6%)</td>
<td>0.1 (13.6%)</td>
<td>0.1 (13.6%)</td>
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<tr>
<td>Miles Crossed of Potential Landslides (ratio to available data)</td>
<td>0.6 (25.4%)</td>
<td>0.6 (25.4%)</td>
<td>0.6 (25.4%)</td>
<td>0.6 (25.4%)</td>
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<td>Miles Crossed with Known Federal and State ESA Listed Species on NFS lands</td>
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<td>0.2 BLM (Desert Tortoise)</td>
<td>0.2 BLM (Desert Tortoise)</td>
<td>0.2 BLM (Desert Tortoise)</td>
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<tr>
<td>Miles Crossed with Known Federal ESA Listed Species on Private lands</td>
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<td>0.0</td>
<td>0.0</td>
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<tr>
<td>Miles Crossed with Known Federal and State ESA Listed Animal Species on Private lands</td>
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<td>0.0</td>
<td>0.0</td>
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<tr>
<td>Miles Crossed with Known USFS Special Status Wildlife Species</td>
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<td>0.0</td>
<td>0.0</td>
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<tr>
<td>Miles of Designated USFWS or CDFG Wildlife Habitats</td>
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<td>Miles of Designated BLM Habitats</td>
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<td>Miles of Designated NFS Habitat</td>
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<tr>
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<td>4.4</td>
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<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
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<td>1.3</td>
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<tr>
<td>Distinctive Geologic Features</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
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<tr>
<td>Miles Crossed of High Levels of Earthquake Ground Shaking</td>
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<td>Miles Crossed of Liquefaction Hazard Zones (ratio to available data)</td>
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<tr>
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<td>0.6 (25.4%)</td>
<td>0.6 (25.4%)</td>
<td>0.6 (25.4%)</td>
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<td>Miles Crossed with Known Federal and State ESA Listed Species on BFS lands</td>
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</tr>
<tr>
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<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Miles Crossed with Known USFS Special Status Wildlife Species</td>
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<tr>
<td>Miles of Designated USFWS or CDFG Wildlife Habitats</td>
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<tr>
<td>Miles of Designated BLM Habitats</td>
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<tr>
<td>Miles of Designated NFS Habitat</td>
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<tr>
<td>Miles of Avian Risk</td>
<td>4.4</td>
<td>4.4</td>
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<tr>
<td>Miles of Condor Risk</td>
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### Issues or Concerns

<table>
<thead>
<tr>
<th>Water Resources</th>
<th>Issues or Concerns</th>
<th>Proposed New 230 kV Double-Circuit Transmission Line For Each Action Alternative</th>
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<tr>
<td></td>
<td>Miles Crossed of Earthquake Induced Landslide Hazard Zone (ratio to available data)</td>
<td>Alternative 1</td>
</tr>
<tr>
<td></td>
<td>Miles Crossed of High Soil Erosion Potential (% of total length)</td>
<td>8.5 (63.6%)</td>
</tr>
<tr>
<td>Miles Slope % Crossed</td>
<td>0-10</td>
<td>11</td>
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<tr>
<td></td>
<td>10-20</td>
<td>14</td>
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<tr>
<td></td>
<td>20-30</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>&gt;30</td>
<td>14</td>
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<tr>
<td>Number of Stream Crossings (perennial &amp; intermittent) by Centerline</td>
<td>146</td>
<td>78</td>
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<tr>
<td>Number of Streams within 500-foot Corridor (perennial &amp; intermittent)</td>
<td>168</td>
<td>95</td>
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<tr>
<td>Number of National Wetlands Inventory (NWI) wetlands crossed by Centerline or 500-foot Corridor</td>
<td>1 (California Aqueduct)</td>
<td>2 (Vegetated Wetland and California Aqueduct)</td>
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<tr>
<td>Miles of Significant Ecological Areas (SEA) crossed</td>
<td>8.1</td>
<td>2.6</td>
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</tbody>
</table>

**NOTES:**
NA = Not applicable
M=Moderate impact
H=High impact
L=Low impact
¹ Environmental Resources are summarized from Barren Ridge Switching Station to the proposed Haskell Canyon Switching Station.
² All other annual emission standards are met.
2.7 NEPA FEDERAL AGENCY PREFERRED ALTERNATIVE

Pursuant to NEPA Regulations (40 CFR 1505.2(b)), the environmentally preferable alternative or alternatives must be identified in the Record of Decision (ROD) for the Project. In this Final EIS/EIR, the BLM and USFS have identified the No Action Alternative and Alternative 2 as environmentally preferable. The No Action Alternative avoids the impacts associated with the action Alternatives and would be the environmentally preferable alternative among all the Alternatives. No Action does not meet the purpose and need of the Project, including the transmission and storage of renewable energy. Alternative 2, the Proposed Action, has the least overall impacts of the action Alternatives, and is the environmentally preferable action alternative.

NEPA Regulations require the lead agency to identify the agency’s preferred alternative, if one of more exists, in the Draft EIS (40 CFR 1502.14). The BLM and USFS have selected Alternative 2, the Proposed Action, as the agency preferred alternative.

2.8 CEQA ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Consistent with CEQA Guidelines Section 15126.6(e)(2), Alternative 2, the Proposed Action, has been identified by the CEQA Lead Agency, LADWP, as the environmentally superior Alternative. For a full comparison of the Alternatives, please refer to Section 2.6, Alternatives Comparison Summary, and Table 2-11, Comparison Table for Action Alternatives, in this chapter of this Final EIS/EIR.

Alternative 2 has several unique advantages, including containing all Project components within a single utility corridor within the ANF and the immediate surrounding communities, which would limit the impact footprint of the Project. The Alternative 2 230 kV double-circuit transmission line would be located on federal land entirely within a federally designated utility corridor identified by the 2009 West-Wide Energy Corridor Final Programmatic EIS (PEIS). Alternative 2 would also consolidate all Project components with existing LADWP facilities, minimizing ongoing operation and maintenance impacts. Additionally, Alternative 2 would utilize approximately two miles of existing four-circuit structures in the southern portion of the ANF for the proposed transmission line, reducing the need for new towers. The consolidation of facilities would allow LADWP to utilize the existing network of access roads, resulting in the least ground disturbing impacts among the action Alternatives. The Alternative 2 230 kV double-circuit transmission line would traverse the unincorporated community of Green Valley. To minimize impacts to this community, Three-Circuit Tower Mitigation would be implemented, combining the existing BR-RIN line onto a single tower with the proposed transmission line.

Alternative 1 would include the longest transmission line and greatest temporary and permanent ground disturbing impacts among the action Alternatives. It would also create impacts to the only cultural resource in the Project study area currently listed on the National Register of Historic Places, the Old Ridge Route and its contributing components. Additionally, it would create unique impacts to the Castaic Lake State Recreation Area.

Alternative 2a, similar to the Proposed Action (Alternative 2), would locate a majority of the transmission line on federal land within the federal corridor identified in the West-Wide Corridor
PEIS, but would avoid the unincorporated community of Green Valley by exiting the corridor and creating a new pathway through the ANF for four miles before re-joining the federal corridor. The Alternative 2a transmission line would not parallel an existing transmission line or the proposed reconductoring activities for those four miles, resulting in construction, operation, and maintenance impacts in additional areas of the ANF. Importantly, Alternative 2a would result in significant and unavoidable impacts to firefighting abilities within the ANF, by creating an indefensible Transmission Line Bounded Island of forest land between the existing BR-RIN and proposed transmission lines, where firefighting activities would be severely limited. Such an indefensible island would permanently put the unincorporated community of Green Valley, as well as the unincorporated communities of Lake Hughes and Elizabeth Lake, at higher risk from wildfires.

Alternative 3 would minimize the Project footprint on the ANF, but would impact the rural residential communities through which the proposed transmission line would traverse. It is the only Alternative that would require the acquisition of private residences. Seven residences would need to be acquired for the construction of the proposed 230 kV double-circuit transmission line associated with Alternative 3. It is also the only Alternative that would impact Mountains Recreation Conservation Authority land.