

## 5.13 Traffic and Transportation

This AFC section assesses the potential impacts to the transportation system due to activities associated with the construction and operation of the BSEP. The section addresses applicable LORS; describes the existing transportation system (vehicular, rail, and air) and current traffic conditions; evaluates potential Project impacts; and identifies mitigation measures as needed.

### 5.13.1 LORS Compliance

The Project will comply with all applicable LORS pertaining to traffic and transportation. Table 5.13-1 and the following text sections summarize Federal, State, and local LORS that apply to traffic and transportation.

**Table 5.13-1 LORS Applicable to Traffic and Transportation**

LORS	Applicability	Where Discussed in AFC
<b>Federal:</b>		
Title 49, Code of Federal Regulations (CFR), Subtitle B, Parts 171-173, 177-178, 350-359, 397.9 and Appendices A-G	Addresses safety considerations for the transport of goods, materials, and substances. Governs the transportation of hazardous materials including types of materials and the marking of the transportation vehicles.	Sections 5.13.3 and 5.13.4
Title 14 CFR, Aeronautics and Space, Chapter I, FAA-DOT, Part 77	Establishes standards for determining obstructions in navigable air space and sets forth notification of FAA requirements when there is any change.	Section 5.13.3
Title 14, Part 77 CFR "Objects Affecting the Navigable Air Space"	Describes the criteria used to determine the need for a Federal Aviation Administration (FAA) "Notice of Proposed Construction or Alteration" in cases of potential obstruction hazards.	Section 5.13.3
FAA Advisory Circular No. 70/7460-1G, "Proposed Construction and/or Alteration of Objects that May Affect the Navigation Space"	Addresses the need to file the "Notice of Proposed Construction or Alteration" (Form 7460) with the FAA in cases of potential for an obstruction hazard.	Section 5.13.3
Title 47, CFR, Section 15.2524, Federal Communications Commission (FCC)	Prohibits operation of devices that can interfere with radio-frequency communication	Sections 5.13.3 and 5.14.3

LORS	Applicability	Where Discussed in AFC
<b>State:</b>		
California Vehicle Code Section 35780; California Streets and Highways Code, Sections 660-711; 21 CCR 1411.1-1411.6, Section 31300, 31303 <i>et seq.</i> , Section 32105	Requires permits for any load exceeding Caltrans weight, length, or width standards for public roadways.  Requires that the transportation of hazardous materials be on state or interstate highways that offer the shortest overall transit time possible.  Requires shippers of inhalation hazard or explosive materials must apply for a Hazardous Material Transportation License and obtain routes approved for material shipping.	Sections 5.13.3 and 5.13.4
California Streets and Highways Code, Sections 117-660-711	Requires permits from Caltrans for any roadway encroachment during truck transportation and delivery.	Sections 5.13.3 and 5.13.4
California Government Code Sections 65352, 65940, and 65944.	Requires evaluation of compatibility with military activities for any land use proposal located near a military installation or airspace.	Section 5.13.1
CEC staff, Radio Interference and Television Interference(RI-TVI) Criteria (Kern River Cogeneration) Project 82-AFC-2, Final Decision, Compliance Plan 13-7	Prescribes the CEC's RI-TVI mitigation requirements, developed and adopted by the CEC in past siting cases.	Sections 5.13.3 and 5.14
<b>Local:</b>		
Kern County General Plan Circulation Element	Specifies long-term planning goals and procedures for transportation infrastructure system quality; standards and procedures for air transportation; and transportation safety in Kern County	Sections 5.13.3 and 5.13.5

### 5.13.1.1 Federal LORS

Federal laws and regulations that could apply to this Project include the following:

Title 49 Code of Federal Regulations (CFR), Subtitle B, Chapter I, Part 172, Hazardous Materials Regulations, addresses the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles.

- Title 49 CFR, Subtitle B, Chapter I; Parts 171-173; and 177-178 contain national safety standards for the transport of goods, materials, and substances over public highways; require proper handling and storage of hazardous materials during transportation.

- Title 49 CFR, Subtitle B, Chapter III, Parts 350–399 Motor Carrier Safety Regulations address safety considerations for the transport of goods, materials, and substances over public highways.
- Hazardous Materials Transportation Act of 1974; Title 49 Code of Federal Regulations (CFR) Subtitle B, Chapter III, Part 397.9 directs the Federal Department of Transportation to establish criteria and regulation for the safe interstate transportation of hazardous materials.
- Title 14 CFR Regulations, Aeronautics and Space, Federal Aviation Administration, Department of Transportation, Chapter I, Part 77 establishes standards for determining obstructions in navigable air space and sets forth notification requirements to the FAA when there is a change in land use that would involve the development of any structures over 200 feet above ground level. Notification is also required if the obstruction is less than the specified height and is located within restricted air space in the approach to airports.

### 5.13.1.2 State LORS

State laws that could apply to the BSEP include the following:

- California Vehicle Code Division 1, Section 353 defines hazardous materials.
- California Vehicle Code Division 13, Chapter 5, Article 1 Hazardous Materials, Sections 31303 *et seq.* address the transportation of hazardous materials, the routes used, and restrictions thereon.
- California Vehicle Code Division 14, Transportation of Explosives, Sections 31600-31309 regulate the transportation of explosive materials.
- California Vehicle Code Division 14.1, Transportation of Hazardous Materials, Sections 32000-32053 regulate the licensing of carriers of hazardous materials including noticing requirements.
- California Vehicle Code Division 14.3, Sections 32100-32109 establish special requirements for the transportation of inhalation hazards and poisonous gases
- California Vehicle Code Division 14.7 Flammable and Combustible Liquids, Sections 34000 *et seq.* address the transportation of flammable and combustible liquids over public roads and highways.
- California Vehicle Code Division 14.8 Safety Regulations, Sections 34500, 34501, 34501.3, 34502-7, and 34510-11 address the safe operation of vehicles, including those that are used for the transportation of hazardous materials.
- California Vehicle Code Division 2 Administration, Chapter 2.5, Article 1, Sections 2500-2505 and 2531-2532 address the issuance of licenses by the Commissioner of the California Highway Patrol for the transportation of hazardous materials.
- California Vehicle Code Division 6 Driver's Licenses, Division 6, Chapter 1, Article 3 Sections 12804-12804.5; Chapter 2, Article 3, Section 13369; and Chapter 7 Article 6, Sections 15275-15278 address the licensing of drivers and the classification of licenses required for the operation of particular types of vehicles; also require certificates permitting operation of vehicles transporting hazardous materials.
- California Vehicle Code Division 15 Size, Weight, and Load, Chapter 5, Article 6 Section 35780 states that overload approvals from the State Department of Transportation (Caltrans) are required for transportation of oversized or excessive loads over State highways.

- California Streets and Highways Code Sections 117, 660-711 require an encroachment permit from Caltrans for facilities that require construction, maintenance, or repairs on or across State highways.
- California Streets and Highways Code Sections 660, 670, 1450, and 1460 *et seq.* regulate right-of-way encroachment and the granting of permits for encroachment on State and county roads.

### 5.13.1.3 Local LORS

Applicable local LORS include the following:

- Kern County General Plan Circulation Element Section 2.3.2 sets a County Policy objective of maintaining a Level of Service (LOS) D on county roads and a LOS C on State or Federal Highways.
- Kern County General Plan Circulation Element Section 2.3.3 Highway Plan establishes LOS D as the minimum acceptable standard on County roadways.
- The Kern County Circulation Element requires that section lines and mid-section lines in Valley and Desert Regions (that include the Project site) be protected as future roadway corridors. Section lines are to be protected as corridors for arterial roadways and mid-section lines are to be protected as future collector roads. Project implementation would require that these roadway corridors no longer be reserved. This elimination of roadway corridors on the BSEP plant site would require an amendment to the Circulation Element.

### 5.13.1.4 Agencies and Agency Contacts

Table 5.13-2 identifies agency contacts for traffic and transportation issues associated with the BSEP.

**Table 5.13-2 Agencies and Agency Contacts**

Agency Contact	Phone/E-mail	Permit/Issue
Ms. Patricia J. Ebel Transportation Devel. Engineer. Kern County Roads Department. 2700 M Street, Suite 400 Bakersfield, CA 93301	(661) 862-8827 pate@co.kern.ca.us	Encroachment Permit for work in the County Right of Way Permits for Oversize Loads on County Roadways
Ms. Susan Lent, Public Information Officer, CALTRANS, District 9 500 South Main Street Bishop, CA 95201	(619) 872-0603 susan.lent@dot.ca.gov	Encroachment Permit for work in Caltrans' Right of Way Permits for Oversize Loads on State Highways
California DMV 3120 F Street Bakersfield, CA 93301	(916) 657-6560	Licenses for Transport of Hazardous Materials and Wastes
CHP, Motor Carrier Division 4040 Buck Owens Blvd Bakersfield 93308-4930	(661) 395-2839	Approved Routes for Transport of Hazardous Materials and Wastes

### 5.13.1.5 Required Permits and Permitting Schedules

Table 5.13-3 identifies the required traffic and transportation permits and permit schedule.

**Table 5.13-3 Required and Permit Schedule**

Permit/Approval Required	Due Date
Kern County Encroachment Permit (for work in County Rights of way)	Submit plans showing work 30 days prior to construction work in public ROW
Kern County Oversize Load Permit	Apply at least 10 working days prior to oversize load on County roadways
Caltrans Encroachment Permit	Ongoing consultation; obtain permit prior to start of construction activities
Caltrans Oversize Load Permit	Apply at least 7 working days prior to oversize load on State highways

## 5.13.2 Affected Environment

### 5.13.2.1 Regional Setting

Regional access is provided to the BSEP site and the surrounding California City area by SR-14, and State Route 58 (SR-58), as indicated in Figure 5.13-1. SR-14 is a primary north/south regional arterial that extends northerly along the eastern side of the Sierra Nevada Mountain Range from the Los Angeles basin to U.S. 395 at Inyokern. It extends southerly to I-5 at Newhall and links the Project with the greater Los Angeles area. The Project site is located several hundred yards east of SR-14, approximately four miles north of the northern boundary of California City. The site is to be linked to SR-14 by a new access road extending easterly from a current at-grade intersection on SR-14 (see Figure 5.13-2). Access to SR-14 is controlled along the Project frontage and adjacent parcels by Caltrans freeway agreements, which restrict the number and location of cross streets or other access points. SR-58 is an east-west facility extending westerly to I-5 west of Bakersfield and easterly to I-15 in Barstow. SR-58 intersects SR-14 at Mojave approximately 15 miles south of the Project site.

SR-14 is improved to freeway status north of Newhall to SR-58 at Mojave. From there, it extends north with a variable width facility and at-grade intersections to U.S. 395. It is a two-lane undivided facility north of Mojave to California City Boulevard where it widens to four lanes with an approximately 90-foot wide median. The divided four-lane section continues north through the Red Rock Canyon area after which it narrows back to two undivided lanes to U.S. 395. The section of highway adjacent to the Project site includes two 12-foot lanes with a 10-foot paved shoulder in each direction separated by a 92-foot median. Access to the BSEP plant site is proposed via an existing median break in SR-14 that has intersecting dirt roadways connecting to parcels adjacent to the highway. The existing median break has a paved width of approximately 52 feet and a length of approximately 80 feet, which provides a median refuge area for approximately four vehicles waiting to enter the southbound traffic stream on SR-14. Northbound and southbound left turn lanes in the center median with a length of 400 feet are currently present at the median break.

SR-58 is improved to freeway status with two lanes in each direction between Bakersfield and the City of Boron near U.S. 395. It continues east as a two way facility with one lane in each direction and at-grade intersections towards Barstow. Between Boron and Barstow, it varies in width from two to four lanes.

### **5.13.2.2 Local Setting**

The BSEP site is located in a remote section of the Kern County, approximately four miles north of the northern boundary of California City. Regional access to the area is limited to State highways. Circulation in the surrounding area other than SR-14 has a very rural characteristic consisting of what are often unpaved local roadways extending east and west from SR-14. All vehicular traffic approaching the site will use SR-14.

### **5.13.2.3 Roadway Operating Characteristics**

Existing daily traffic volumes on roadways providing access to the site are summarized below. The volumes are from Caltrans and represent Year 2006 Average Annual Daily Traffic (AADT) volumes or the annual average of 24-hour volumes. SR-14 currently accommodates an AADT of approximately 6,600 vehicles north of California City Boulevard, and 19,000 south of SR-58. SR-58 currently accommodates an AADT of approximately 18,000 vehicles west of SR-14 and 17,000 east of SR-14.

Use of the roadways is subject to the California Vehicle Code and vehicles without special permits are required to be a maximum of 60 feet long with a gross vehicle weight limitation of 80,000 pounds. A semi truck (tractor and semi-trailer) can have a maximum length of 65 feet. A set of doubles (tractor and two trailers) can have a maximum length of 75 feet.

Existing and future roadway operations have been characterized using a peak hour Level of Service (LOS) analysis; LOS provides a standardized means of describing a roadway or an intersection's operation by relating traffic volumes to facility capacity. As shown in Table 5.13-4, LOS range from A to F with LOS A representing the best conditions (free flow) and LOS F representing the worst (most congested) conditions.

Peak hour traffic volumes on roadways for existing and for potentially accommodating Project-related traffic in Baseline Year 2011 are summarized in Table 5.13-5, with approximate capacities and LOS. The LOS presented is based on existing ratios of traffic volumes to vehicle capacity. The Baseline Year 2011 traffic volumes reflect continued growth in surrounding area commensurate with 2000 to 2006 levels. Year 2011 is when the BSEP is expected to generate peak amounts of construction related traffic and with associated worst-case traffic related impacts.

Table 5.13-5 shows that most roadways in the Project vicinity currently operate at LOS A (free flow). The table also shows that roadways are forecast to operate at similar, primarily free flowing conditions under Baseline Year 2011 conditions, which assume continued growth in traffic volumes consistent with growth rates experienced between 2000 and 2006 in the Project area.

**Table 5.13-4 Level of Service Description for Roadway Sections**

<b>Level of Service</b>	<b>Interpretation</b>	<b>Nominal Range Volume to Capacity Ratio</b>
A	Low Volumes; primarily free-flow operations. Density is low and vehicles can freely maneuver within the traffic stream. Drivers can maintain their desired speeds with little or no delay.	0.00-0.60
B	Stable flow with potential for some restriction of operating speeds due to traffic conditions. Maneuvering is only slightly restricted. The stopped delays are not bothersome, and drivers are not subject to appreciable tension.	0.61-0.70
C	Stable Operations; however, the ability to maneuver is more restricted by the increase in traffic volumes. Relatively satisfactory operating speeds prevail, but adverse signed coordination or longer queues cause delays.	0.71-0.80
D	Approaching unstable traffic flow, where small increases in volumes could cause substantial delays. Most drivers are restricted in their ability to maneuver and in their selection of travel speeds. Comfort and convenience are low but tolerable.	0.81-0.90
E	Operations characterized by significant approach delays and average travel speeds of one-half to one-third free-flow speed.	0.91-1.00
F	Forced flow operations with high approach delays at critical signalized intersections. Speeds are reduced substantially, and stoppages may occur for short or long periods of time because of downstream congestion.	Not Meaningful

Source: Transportation Research Board, 1985, 2000

**Table 5.13-5 Baseline Peak Hour Roadway Traffic Volumes, Design Capacities, and Levels of Service (Without the Project)**

<b>Roadway/ Segment</b>	<b>Existing Conditions<sup>1</sup></b>				<b>Year 2011 Conditions<sup>2</sup></b>			
	<b>Travel Lanes</b>	<b>Volume</b>	<b>Capacity<sup>3</sup></b>	<b>LOS</b>	<b>Travel Lanes</b>	<b>Volume</b>	<b>Capacity<sup>3</sup></b>	<b>LOS</b>
SR-14 North of Project Site	2	345 <sup>4</sup>	2,000	A	2	355	2,000	A
SR-14 At Project Site	4	345 <sup>4</sup>	6,800	A	4	355	6,800	A
SR-14 South of Project Site	2	345 <sup>4</sup>	2,000	A	2	355	2,000	A
SR-14 South of Mojave	4	2,050	6,800	A	4	2,345	6,800	A
SR-58 West of SR-14	4	1,900	6,800	A	4	2,255	6,800	A
SR-58 East of SR-14	4	1,850	6800	A	4	2,345	6,800	A

<sup>1</sup> Caltrans, 2007  
<sup>2</sup> Year 2006 traffic volumes expanded to Year 2011 (estimated construction completion) at historical rates Year 2000 to 2006 (1.28-3.76 percent/year depending on location).  
<sup>3</sup> Approximate two-way capacity in vehicles per hour  
<sup>4</sup> Wilson Engineering Field Count, February 2008

As described earlier, the roadway network serving the Project site is effectively limited to the State highway network. In the BSEP vicinity, Caltrans traffic counts on SR-14 show approximately 13 percent of the traffic stream consists of trucks. Similarly, approximately 35 percent of the traffic stream on SR-58 near SR-14 is trucks.

#### **5.13.2.4 Safety**

There are no roadway features that have been identified as potentially being a safety hazard in the Project vicinity. SR-14 is fully improved to expressway status with two lanes in each direction separated by a raised median. Access is controlled and typically limited to approximately one-mile intervals. However, the Project access road will be required to cross the Union Pacific's Lone Pine Branch as discussed below.

#### **5.13.2.5 Rail and Bus Transportation**

Regionally, the area has an extensive railroad network operated by Union Pacific and Burlington Northern and Santa Fe (BNSF), with major yards at Barstow and Colton. The Union Pacific mainline section extends northerly from Los Angeles County adjacent to SR-14 to Mojave where it intersects the BNSF mainline tracks extending westerly from Barstow. The mainline continues northerly and westerly over the Tehachapi Pass to Bakersfield and then turns north up the Central Valley. Union Pacific's Lone Pine Branch extends north from the mainline in Mojave just west of the Project site toward Trona and Lone Pine (Figure 5.13-1). The Lone Pine Branch is single tracked and accommodates approximately four trains per day.

The nearest siding for offloading materials or equipment is located in the Town of Mojave. It will be utilized during BSEP construction for the delivery of several pieces of major power generation equipment, which will then be transported by truck to the Project site.

Regional transit service in the area is provided by Kern Regional Transit with the Boron-Mojave Route, East Kern Express, and the Mojave-Ridgecrest Route.

- Boron-Mojave Route - Service is provided on Wednesdays only between the communities of Boron, North Edwards, and Mojave.
- East Kern Express - Service is provided Monday through Saturday between the communities of Bakersfield, Keene, Tehachapi, Mojave, Rosamond, and Lancaster.
- Mojave-Ridgecrest Route - Service is provided between Mojave and California City Monday through Monday through Saturday. Intercity service is provided between the communities of Ridgecrest, Inyokern, and Mojave on Monday, Wednesday, and Friday.

Dial-A-Ride service is also provided in the communities of Mojave, Tehachapi, and Rosamond. Service is typically available Monday through Saturday.

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### **5.13.2.6 Bicycle and Pedestrian Circulation**

Currently there are no bicycle or pedestrian facilities in the Project vicinity. Bicycle and pedestrian circulation is limited to shoulders of rural highway and county roads but is not allowed on freeways.

### **5.13.2.7 Airport Operations**

Four airport facilities are located in the general vicinity of the BSEP site: the California City Municipal Airport, the Mojave Air and Space Port, Edwards Air Force Base (AFB); and the Naval Aviation Weapons Station (NAWS) China Lake. The location and general characteristics of these aircraft facilities are described briefly below.

#### **California City Municipal Airport**

The California City Municipal Airport is located at 22636 Airport Way in California City, approximately six miles south of the Project site. The airport is open to the public and operations average 102 flights per day, of which 67 percent are transient general aviation and 33 percent are local general aviation. The airport has two runways which are 6,029 feet and 1,837 feet in length, respectively (California City, 2008).

#### **Mojave Air and Space Port**

The Mojave Air and Space Port (formerly Mojave Airport) is located at 1434 Flight Line in Mojave approximately 15 miles southwest of the Project site. The Mojave Air and Space Port serves as an aircraft storage facility as well as providing facilities for aerospace testing and commercial and civilian flight. Numerous large aircraft owned by major airlines are stored onsite. Some aircraft reach the end of their useful lifetime and are scrapped at Mojave, while others are refurbished and returned to active service. The Mojave Air and Space Port is served by three runways of length 3,943 feet, 7,050 feet, and 12,500 feet, respectively, and is the home of the National Test Pilot School (Mojave Air and Space Port, 2008).

#### **Edwards Air Force Base**

Edwards AFB is located on 301,000 acres in the Mojave Desert approximately 20 miles south of the Project site. Edwards AFB has 19 runways--three are paved and the other 16 are located on a dry lakebed within the base. The base is home to the Air Force Flight Test Center, the 412th Test Wing and the 95th Air Base Wing. A vast array of test and test support aircraft are currently assigned to Edwards AFB; these aircraft fly test missions that evaluate everything from airframe structures and propulsion to avionics and electronic warfare. The 412th Test Wing at Edwards AFB maintains and flies an average of 90 aircraft with upwards of 30 different aircraft designs and performs over 7,400 missions (over 1,900 test missions) on an annual basis (Edwards AFB, 2008).

#### **Naval Air Weapons Station China Lake**

NAWS China Lake, located near the city of Ridgecrest in the northeast Mojave Desert, approximately 40 miles northeast of the Project site, is an airborne weapons testing and training range operated by the United States Navy and its contractors. NAWS China Lake, situated on 1.1 million acres, has been in use since 1943. The main airfield, Armitage Field, has three runways of length 9,993 feet, 9,013 feet, and 7,702 feet, respectively (NAWS China Lake, 2008).

### **R-2508 Special Use Airspace Complex**

As was discussed in Section 5.7, Land Use, and shown in Figure 5.7-2, the R-2508 Complex encompasses 20,000 square miles within Inyo, Kern, San Bernardino, and Tulare counties. It includes all the airspace and associated land presently used and managed by the three principal military activities in the Upper Mojave Desert region:

- Air Force Flight Test Center (AFFTC), Edwards Air Force Base,
- National Training Center, Fort Irwin, and
- Naval Air Weapons Station China Lake.

The R-2508 Complex is composed of internal restricted areas, Military Operations Areas (MOAs), Air Traffic Control Assigned Airspace (ATCAAs) areas, and other special airspace. Use of these areas include bombing ranges, supersonic corridors, low altitude high speed maneuvers, radar intercept areas, and refueling areas.

The California Government Code, referred to as the State Planning and Zoning Law, includes the provisions of Senate Bill (SB) 1462, adopted in 2005, that require the military to be notified of any land use proposal located within 1,000 feet of a military installation, within special use airspace, or beneath a low level flight path. To aid in the implementation of SB 1462, the California Office of Planning and Research has drafted the R-2508 Joint Land Use Study (JLUS) to address land use issues for the R-2508 Complex.

According to the R-2508 JLUS, the BSEP site is located within a “special use airspace” designation and beneath a “low level flight path” area. These designations require that an evaluation of land use compatibility be conducted pursuant to sections 65352, 65940, and 65944 of the California Government Code, which include the provision for consultation among the project applicant, public agency(ies), and the affected military branch(es). Beacon Solar has consulted with the Office of Sustainability of the R-205S Complex. BSEP structures are within acceptable height limits and arrangements have been made for further consultation regarding avoiding potential electronic interference issues (see correspondence in Appendix L). Land use compatibility is discussed further in Section 5.7, Land Use. The effects of construction and operation of the Project with regard to restricted airspace, interference with aircraft communications, and potential solar array glare distractions to pilots are discussed below in Section 5.13.3.4, Potential Impacts on Aircraft Operations.

### **5.13.3 Environmental Impacts**

This section discusses the potential impacts of the Project on traffic and transportation.

#### **5.13.3.1 Evaluation Methodology and Significance Criteria**

For purposes of this evaluation, impacts are considered significant if the Project would:

- Cause an increase in vehicular traffic that is substantial in relation to the existing traffic load and capacity of the street system;

- Reduce a roadway segment or intersection level of service (LOS) below acceptable levels, as defined below:
  - Kern County's target for peak hour operations on County roads is LOS D or better and LOS C or better on State highways. The threshold of significance is that a significant project-related impact occurs if the addition of project-generated trips causes a County facility (roadway segment or intersection) operating at LOS D or better, to degrade to LOS E or worse or for a State facility operating at an LOS C or better, to de-grade to LOS D or worse.
  - The Kern County CMP (Congestion Management Program) indicates a significant impact occurs when: 1) a County facility currently operating at an LOS D or better degrades to LOS E or F.
- The Project adversely affects traffic circulation and parking conditions in neighboring areas because of inadequate onsite parking and/or inadequate onsite circulation.

### 5.13.3.2 Construction Phase Impacts

Construction of the BSEP would be completed over an approximately 25-month period. The Project construction work force will peak during Month 15 at approximately 836 workers per day and average approximately 440 workers over the course of construction. Construction of the transmission line is expected to require a limited crew with less than 25 workers during peak periods and construction of the gas pipeline is forecast to require upwards of 250 workers during peak periods. However, the transmission line and gas line construction schedule will not coincide with the peak of plant site construction employment. Further, the route of the gas line from California City to the site will follow Neuralia Road which is east of the plant site, and thus pipeline workers will largely avoid SR-14.

A worst-case scenario, where all workers commute in autos with only one occupant per vehicle, yields a peak trip generation of approximately 836 inbound trips during the morning peak period and another 836 outbound trips during the evening peak hour. There would be a peak of 1,672 one-way worker commute trips per day and an average of 880 one-way trips per day. Construction is also forecasted to generate an average of approximately 15 to 20 one-way, truck trips per day with a peak of approximately 50-75 truck trips per day; the peak truck travel would be during plant site foundation construction and would not coincide with the peak onsite worker commute time frame (Month 15).

A temporary parking area of approximately six acres would be required for construction personnel parking (assuming 350 square feet per vehicle) with additional area required for the staging/laydown of equipment, materials, and supplies. The Project will include onsite laydown and parking areas during construction which will be relocated around the site as construction progresses.

It is anticipated that the BSEP construction workforce will be drawn from the surrounding local and regional area, including a limited number from the greater Los Angeles Basin. As shown in Figure 5.13-3, Project construction traffic from the Los Angeles, Palmdale, and Lancaster areas is expected to follow SR-14 north to the site. Traffic approaching from either Tehachapi or Barstow will follow SR-58 east or west as appropriate and then SR-14 north to the site. A limited volume of construction related traffic is forecast to be oriented to and from the north on SR-14 from Inyokern and Ridgecrest. A small portion of the Project construction workforce is expected to come from or at least be temporarily housed in the local area (e.g., California City and Mojave).

Table 5.13-6 summarizes existing plus Project construction-related peak hour traffic volumes on roadways in the surrounding area. As shown in Table 5.13-6, particularly in comparison to existing conditions without the BSEP (Table 5.13-5), Project construction related increases in traffic will be limited; Project impacts would be dispersed over a number of routes such that they will not cause a degradation of existing peak hour LOS and thus would not have significant impacts on existing roadway operations. All roadways are forecast to continue operating at their existing without-Project LOS during peak construction when 836 workers are commuting to and from the site daily.

**Table 5.13-6 Peak Hour Roadway Traffic Volumes, Design Capacities, and Levels of Service (With Project Related Traffic)**

Roadway / Segment	Year 2011 Conditions with Project Construction Traffic <sup>1</sup>				Year 2011 Conditions with Project Operations Traffic <sup>2</sup>			
	Travel Lanes	Volume	Capacity <sup>3</sup>	LOS	Travel Lanes	Volume	Capacity <sup>3</sup>	LOS
SR-14 North of the Project Site	2	397	2,000	A	2	358	2,000	A
SR-14 At the Project Site	4	1,150	6,800	A	4	402	6,800	A
SR-14 South of the Project Site	2	1,150	2,000	A <sup>4</sup>	2	402	2,000	A
SR-14 South of Mojave	4	2,680	6,800	A	4	2,365	6,800	A
SR-58 West of SR-14	4	2,505	6,800	A	4	2,265	6,800	A
SR-58 East of SR-14	4	2,512	6,800	A	4	2,355	6,800	A

<sup>1</sup> Assumes Month 15 peak construction traffic levels with 836 workers

<sup>2</sup> Assumes normal future Project operations with total work force of 66 employees.

<sup>3</sup> Two-way capacity in vehicles per hour

<sup>4</sup> Based on Volume to Capacity Ratio, Project operations are LOS A. Based on the most recent Highway Capacity Manual methodology for rural two-lane highways, which determines LOS based on an estimated percentage of drivers having to follow another vehicle under worst case peak conditions, the two-lane segment of SR-14 at the BSEP site could be described as operating at LOS D.

Project construction will involve transport to the site of several pieces of equipment that exceed roadway load or size limits and will require special permits for on-road transport. Oversized equipment includes the steam turbine generator and main transformers. These items will likely be shipped by rail to the City of Mojave and then transported by truck to the BSEP plant site. The equipment would be transported via multi-axle trucks along SR-14 to the Project site. The maximum allowable load without a special permit is 80,000 pounds. Transport of this equipment will likely require the use of a truck and trailer with multiple axles, advance and trailing warning vehicles, and possibly police control in Mojave. The moving contractor will be required to file for and obtain a permit from Caltrans following the determination of the size of the truck and configuration of the axles.

BSEP site access will be provided via a new driveway/access road extending easterly from SR-14 in the northeastern area of the plant site. The highway currently has a median opening with breaks in the controlled access to adjacent parcels on both sides of the highway. Initial review with Caltrans staff (Erlwein, 2007) indicated that Caltrans considers this the appropriate location to provide access to the Project site. The access road extending east from the highway onto the site is currently a dirt road, but does include a grade crossing of the Union Pacific Lone Pine Extension railroad tracks. Use of this alignment will allow inbound traffic from the south on SR-14 (direction of approach of the majority of Project traffic) to simply turn right off the highway and travel directly east into the site. However, outbound traffic returning south in the evening will be required to cross the northbound traffic lanes to reach the center median where they will then wait for a break in the southbound traffic stream.

A majority of the construction workers are expected to be arriving from the south on SR-14. Peak crew levels are forecast to require upwards of 830 members. Using the worst-case assumption of only one person per vehicle for the entire work force, having over 830 vehicles arrive at the Project site in the morning and depart in the evening would exceed the capacity of the existing roadway configuration at the plant site access road intersection with SR-14. During the morning peak period, the arrival of upwards of 830 workers would be expected to cause significant queues to back down the highway. Conversely, during the evening peak hour, significant queues would develop back onto the site as departing workers attempt to turn south on to the highway.

A review of potential peak hour operational characteristics of the intersection during periods of peak construction activity using a Level of Service (LOS) analysis indicated that the evening outbound traffic would experience the worst delays; it potentially could take upwards of an hour for over 800 vehicles to leave the site. During the morning, significant queues would be expected to develop on northbound SR-14 as large numbers of vehicles arrive, but the intersection would operate considerably better than during the evening peak period.

The morning inbound queue could be mitigated to an acceptable level several ways. A northbound deceleration right turn lane long enough to accommodate peak queues could be constructed subject to the approval of Caltrans. This deceleration land might be temporary, and if so, it would have to be removed at the end of construction and the site returned to preexisting conditions (Erlwein, 2007).

The evening peak period, while being a source of significantly longer delays for workers departing the site compared to morning arrivals, potentially could also result in significant safety issues. A significant safety hazard might develop as some departing construction workers become frustrated with the long delays and begin turning right onto northbound SR-14 and then completing a U-turn at the first available median break.

The intersection of the BSEP plant site and SR-14 is expected to be highly congested during the evening commute period. Traffic engineering analysis predicts the outbound left turn lane onto SR-14 would operate at an LOS F during peak construction periods and it would take upwards of an hour for over 800 construction workers to depart.

Regardless of how the entrance to the site is configured, the median break point on SR-14, which currently includes north and southbound left turn lanes, will need to be improved with a southbound acceleration lane. The lane will be needed to accommodate the large volume of construction related traffic attempting to turn onto southbound SR-14 when departing the site in the evening. It should be

located in the center median and should include a storage area, acceleration area and merge taper with a total length of approximately 1,500 feet.

Construction of access related improvements in the Caltrans ROW, particularly a northbound deceleration lane and southbound acceleration lane at the Project entrance, will require a Caltrans' Encroachment Permit. Beacon Solar will meet with Caltrans staff to further review proposed access to the plant site. Construction documents for the improvements will then be prepared by Beacon Solar and submitted to Caltrans for review and approval. Caltrans, when approving the plans and granting the Encroachment Permit, will condition the construction, stipulating State requirements including construction methods and traffic control, and returning the area to preexisting conditions.

Preliminary evaluation of the access requirements has indicated a need for an approximately 1,500-foot southbound acceleration and a 1,600-foot deceleration lane. The acceleration lane assumes a design merge speed of 55 mph with an initial or starting speed of zero from the median break yields a parallel lane acceleration distance of 960 feet with a taper of 300 feet (Table 10-71, pg 847, *A Policy on Geometric Design of Highways and Streets*, AASHTO, 2004). Adding storage for at least one truck and six autos yields an approximate lane length of 1,200 feet plus a 300-foot taper. The 1,600-foot deceleration lane assumes a 55 mph vehicle speed slowing to 15 mph (315 feet), a lane change taper of 605 feet and storage for 27 vehicles (a two-minute period with arrivals occurring at a rate of 800 vehicles per hour).

The BSEP site access road will cross the Union Pacific rail line tracks at an existing crossing location. The crossing will have to be upgraded in conformance with Union Pacific requirements (gates, lights, bells, etc.)

Overall, transportation impacts associated with construction of the BSEP should not be significant for the following reasons:

- Construction workers commuting to and from the plant site have available to them a number of routes toward the site. The use of multiple routes will minimize impacts to any particular segment of roadway until the area of SR-14 in the immediate site vicinity. Because of the low current traffic volumes, all affected roadways are forecast to continue operating well, based on volume to capacity ratios forecast for Baseline Year 2011 conditions, even during the peak period of BSEP construction activity when the workforce exceeds 830 construction workers.
- Subject to a Caltrans Encroachment Permit, BSEP development is expected to include construction of acceleration and deceleration lanes at the site access road entrance from SR-14 to maximize traffic safety, particularly during construction. The improvements are expected to include a southbound center refuge/acceleration for vehicles turning left out of the site which is approximately 1,500 feet long including a 300-foot taper to help accommodate traffic departing the site (see discussion below). The improvements also are expected to include an approximately 1,600-foot long northbound deceleration lane to allow traffic entering the site in the morning a safe place out of the trough lanes to slow and turn into the site.
- The outbound left turn maneuver from the plant site to SR-14 is forecast to operate at an LOS F or jammed conditions with an extended queue and potential for safety hazards during the evening peak

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hour when construction activities peak. A number of measures are suggested for consideration to mitigate potential safety and capacity related impacts. These include:

- Construction of a southbound acceleration lane at the Project entrance to facilitate left turns from the site onto southbound SR-14 during the evening commute period (one of the improvements discussed immediately above), and
  - Staggered construction employee work schedules and encouraging contractor employee carpooling and/or busing to reduce the arrival and departure of workers.
- The requirements to obtain special permits to move oversize or overweight materials and equipment to and from the site would ensure use of proper vehicles, scheduling, routes, and escorts to minimize impacts.
  - No bike lanes are currently present in the Project area that could be impacted by construction traffic.
  - To the extent practicable, Project construction activities will be coordinated so as to minimize conflicts with train traffic on the Union Pacific tracks.
  - The Project access road crossing of the Union Pacific tracks will be upgraded as required to meet applicable safety standards.

### 5.13.3.3 Operations Impacts

BSEP operations will generate small amounts of vehicular traffic. The Project operations phase workforce is estimated at a total of 66 workers, who will cover operations on a 24 x 7 basis (i.e., peak hour weekday traffic will be less than 50 vehicles even if every employee commutes alone in their own vehicle). Existing-plus-Project operations traffic volumes and the resulting LOS on select roadways in the Project vicinity are summarized in Table 5.13-6. As shown, Project operations will not alter existing roadway LOS and will not have significant impacts on roadway operations.

BSEP operations will also involve truck traffic for the delivery of materials and supplies as well as for other purposes such as the offsite shipment of wastes. Approximately 38 truck trips per month are expected, with an average of between one and two truck trips per day including offsite shipments (e.g., solid waste) and deliveries of materials and supplies. These volumes would not affect LOS on roadways in the Project vicinity.

Project truck travel will include approximately 15 deliveries per month of hazardous materials. Section 5.7, Hazardous Materials Handling describes the types and estimated quantities of hazardous materials to be transported to or from the Project. It is expected that hazardous materials shipments will utilize SR-14, and possibly SR-58 to access the BSEP site from the south. Hazardous materials shipments will comply with applicable regulations in terms of route selection, operator training and qualifications, etc. (also see Section 5.7, Hazardous Materials Handling).

The elimination of roadway corridors on the Project site would preclude future development of north-south and east-west roadways along the section and mid-section lines during the life of the Project. The Circulation Element of the County General Plan requires that section lines are to be protected as 110 foot-wide corridors for future arterial roadways and mid-section lines are to be protected as 90-foot wide

corridors for collector roads. Project implementation would require eliminating these easements through an amendment to the Circulation Element. However, the future absence of these roadways would have minimal traffic circulation impacts.

As discussed in Section 5.7, Land Use, there is little potential for foreseeable future development in the Project vicinity for which roadway access across the plant site would be needed. To the southwest, south, and west of the BSEP plant site are lands covered by land use designations (Resource Management and Intensive Agriculture) that have minimal potential for future traffic generation. The Honda automotive test track occupies lands to the east and northeast. Land to the north of the Project site is designated for residential development, but development (and traffic generation) has been minimal due to factors such as the absence of necessary infrastructure and the large minimum lot size, and there is no indication that this situation will change in the foreseeable future. In any case, future development requiring access to the south of the plant site could be served by the existing Neuralia Road east of the BSEP plant site, and future development north of the Project site would have access to SR-14, which is the primary access route to destinations both north and south in the surrounding region.

Transportation impacts associated with operation of the BSEP would not be significant for the following reasons:

- The Project will generate a maximum of 132 one-way employee commute trips per day spread over a 24-hour period. As indicated in Tables 5.13-5 and 5.13-6, surrounding roadways are generally expected to operate well below capacity. The addition of this traffic volume to the existing roadway network will not alter existing or future roadway operating characteristics (LOS).
- Truck travel and other non-employee site visits will be very small and will typically occur during non-peak periods.
- Project design will not impact the ability to provide bike lanes in the future and BSEP traffic levels would not have significant adverse impacts on bike lanes that might be developed.

#### **5.13.3.4 Potential Impacts on Aircraft Operations**

This section addresses the potential impacts of BSEP operations on aircraft operations in the Project vicinity. Aircraft facilities in the Project vicinity include the California City Municipal Airport, the Mojave Air and Space Port, Edwards AFB; and the NAWS China Lake. BSEP operations potentially could cause concern with respect to aircraft flight operations in a number of ways, as listed immediately below and discussed individually further below:

- BSEP facility structures (e.g., transmission towers or cooling tower) conceivably could produce a hazard to low flying aircraft if the structures extending into restricted airspace;
- BSEP transmission lines or facility control systems' use of specific electronic frequencies potentially could cause concerns with respect to interference with aircraft communications or avionics; and
- The solar collector mirrors might be considered a potential source of glare, resulting in visual distraction to pilots.

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### **Structure Height and Potential Air Space Obstruction**

The maximum structure height for proposed BSEP facilities is approximately 110 feet (a small number of the transmission structures will be 110 feet, while most will be under 80 feet; the tallest solar plant structure will be the steam turbine generator at 55 feet). The Kern County Zoning Ordinance Section 19.08.160 and the figure titled "Military Review Requirements" in Section 19.08.160 (see Figure 5.7-3) indicate that military review is required for the Project where maximum structure height is more than 80 feet; Beacon Solar has consulted with the applicable Department of Defense (DOD) agencies and no significant impacts are expected. Potential impacts on military operations also are addressed in Section 5.7, Land Use, and are shown to have less-than-significant impacts. It should be noted that the existing Airport Land Use Compatibility Plans for the nearest airports do not impose limitations on structure height within the Project site. Existing towers for high-voltage electrical transmission lines located along the west side of SR-14 are in excess of 80 feet in height. Considering the remoteness of the Project site from the nearest civilian airport (six miles), the Project would not conflict with civilian aircraft operations. Nonetheless, Beacon Solar intends to submit a "Notice of Proposed Construction and Alteration (Form 7460) to the Federal Aviation Administration (FAA).

### **Transmission Line Interference Potential**

Transmission line interference affecting aircraft communications or avionics would be considered a hazard to aircraft operations. Transmission line-related radio-frequency interference (RFI) is one of the indirect effects of transmission line operation and is produced by the physical interactions of line electric fields. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as corona discharge and can occur within gaps between the conductor and insulators or metal fittings. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines.

The level of RFI that occurs usually depends on the magnitude of the electric fields involved and the distance from the line. The potential for such impacts is, therefore, minimized by reducing the line electric fields and locating the line away from inhabited areas. The Project transmission line would be built and maintained in keeping with standard practices that minimize surface irregularities and discontinuities. Moreover, the potential for such corona-related interference is usually of concern for lines of 345 kV and above, and not the BSEP 230 kV line. There is currently no available information to suggest that such issues have arisen from the operation of existing transmission lines in the general Project vicinity. Because only approximately 3.5 miles of new transmission line are needed for the BSEP under either of the two transmission options under consideration, it is reasonable to assume that no adverse effects would be generated by the Project.

Impacts on aviation safety would be less than significant. Beacon Solar will ensure that use of the electronic spectrum by the BSEP will not interfere with DOD activities. As discussed in Section 2.0, Project Description, Beacon Solar will provide information on planned use of the electronic spectrum at project facilities to the DOD, and as needed, Beacon Solar will modify the facility's planned frequency use based on the feedback provided by DOD.

### **Solar Array Visual Distraction Potential**

The BSEP will use solar thermal equipment comprised of arrays of parabolic trough mirrors. Each solar collector mirror is parabolic in shape and focuses the sun's energy on the glass-encased metal receiver tube containing the heat transfer fluid, thus limiting the potential for stray reflections. The receiver tube may glow as the reflected sun rays enter the collector. The reflections from the curved surface of the receiver tube are greatly diminished in intensity from those that would be associated with a reflection of the sun in a mirror. These reflections are similar to the reflections one would observe from a body of water with waves on it if the viewer is in the right spot. The glow could be observed by a pilot if the aircraft were positioned at the right angle above the array, but it would not be a bright source of glare.

The Solar Electric Generating Station (SEGS) power plants in the Mojave Desert at Harper Lake and Kramer Junction have been operating since the 1980's and thus provide a reference for the issue of potential glare impacts to pilots. In the nearly 20 years that the SEGS facilities have been in operation, glare has not been reported as a distraction to pilots (Frier, 2007). As an additional data point, on October 4, 2007, Caltrans Aeronautics and CEC staff flew over the Kramer Junction and Harper Lake solar thermal facilities during a sunny mid-morning at about 1,500 feet above ground level and no glare was observed, although from a distance of four miles the solar facility appeared to be a lake or pond and reflected some sunlight (CEC, 2007).

Given this history of aircraft operations in the vicinity of nearby existing solar thermal power plants and no recorded aviation safety issues, it is not expected that the BSEP solar array will cause adverse effects on aviation operations in the Project vicinity.

#### **5.13.3.5 Cumulative Impacts**

Table 5.13-5 includes Baseline Year 2011 peak hour traffic forecasts for major roadways in the BSEP vicinity; these forecasts assume continued development and growth in traffic volumes consistent with growth rates experienced on SR-14 in the Project vicinity between 2000 and 2006. Table 5.13-6 shows Baseline Year 2011 peak hour traffic forecasts plus traffic that would be generated by operation of the BSEP. A comparison of Table 5.13-6 to the without-BSEP Baseline Year 2011 conditions in Table 5.13-5 shows that the Project would not contribute significantly to potential cumulative impacts on roadways in the vicinity. Because of low current traffic volumes, significant cumulative traffic effects would not occur when also considering traffic volumes associated with construction or operation of the Pine Tree Wind Project and Barren Ridge-Castaic Transmission Project.

#### **5.13.4 Mitigation Measures**

Although no significant adverse traffic or transportation impacts are expected during Project construction or operation, the following measures are proposed to minimize potential adverse but non-significant impacts during Project construction. No mitigation measures are required or proposed during BSEP operations.

**TR-1** The project owner will develop and implement a construction phase Traffic Management Plan (TMP) in consultation with Caltrans and Kern County for the roadway network potentially affected by construction activities at the plant site and offsite linear facilities.

- TR-2** The project owner will conduct construction activities in accordance with Caltrans and other applicable limitations on vehicle sizes and weights, Construction Excavation Permits obtained from the Kern County, Encroachment Permits from Caltrans, as well as permits and licenses from the California Highway Patrol and Caltrans for the transport of hazardous substances.
- TR-3** The project owner will coordinate construction activities as necessary and practicable with Union Pacific train traffic to minimize potential conflict between project construction and rail activities.

### 5.13.5 References

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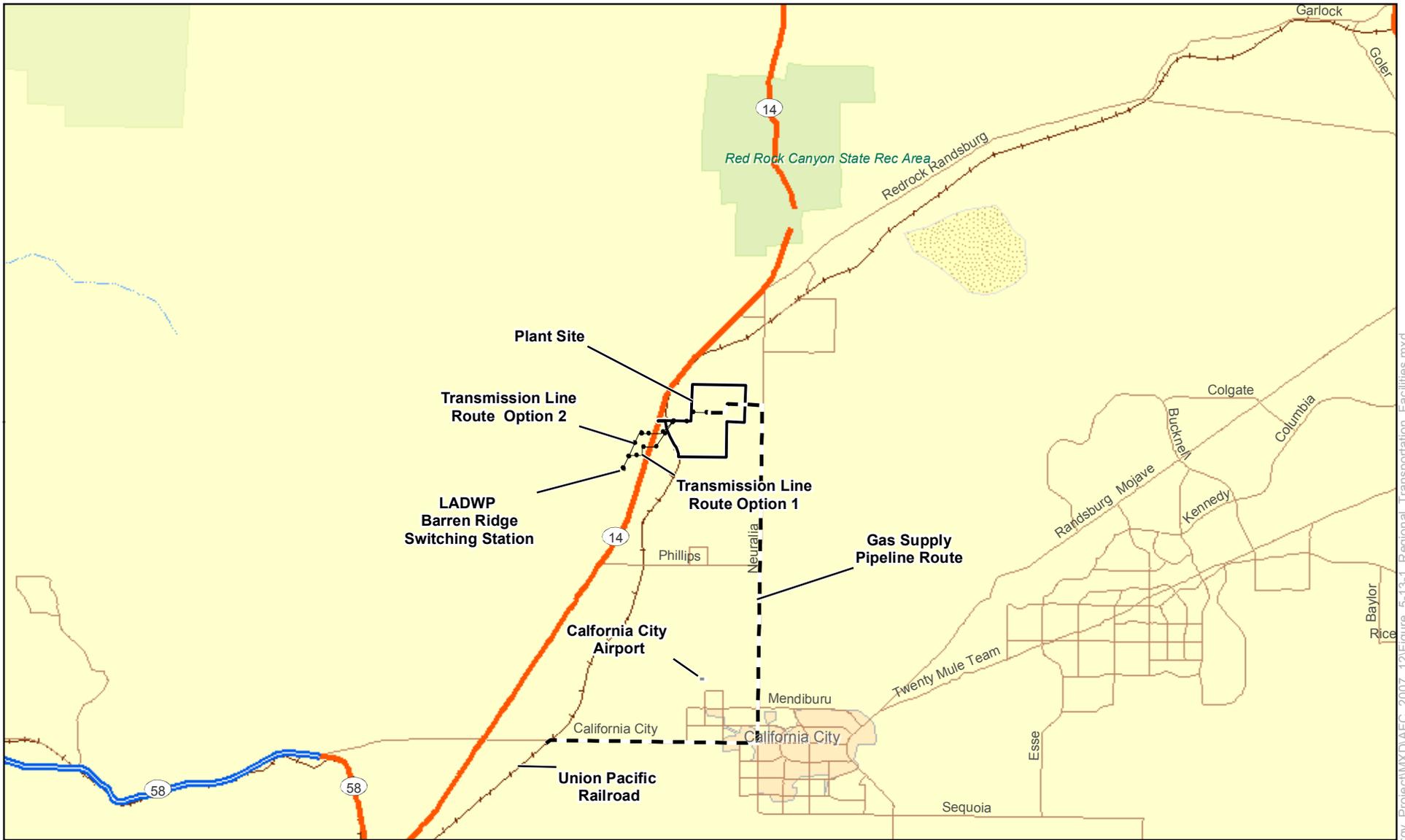
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- Legend**
- Plant Site Boundary
  - Gas Supply Pipeline Route
  - LADWP Barren Ridge Switching station
  - Railroads
  - Transmission Line Route



**Beacon Solar Energy Project**

**Figure 5.13-1**  
**Regional Transportation**  
**Facilities**

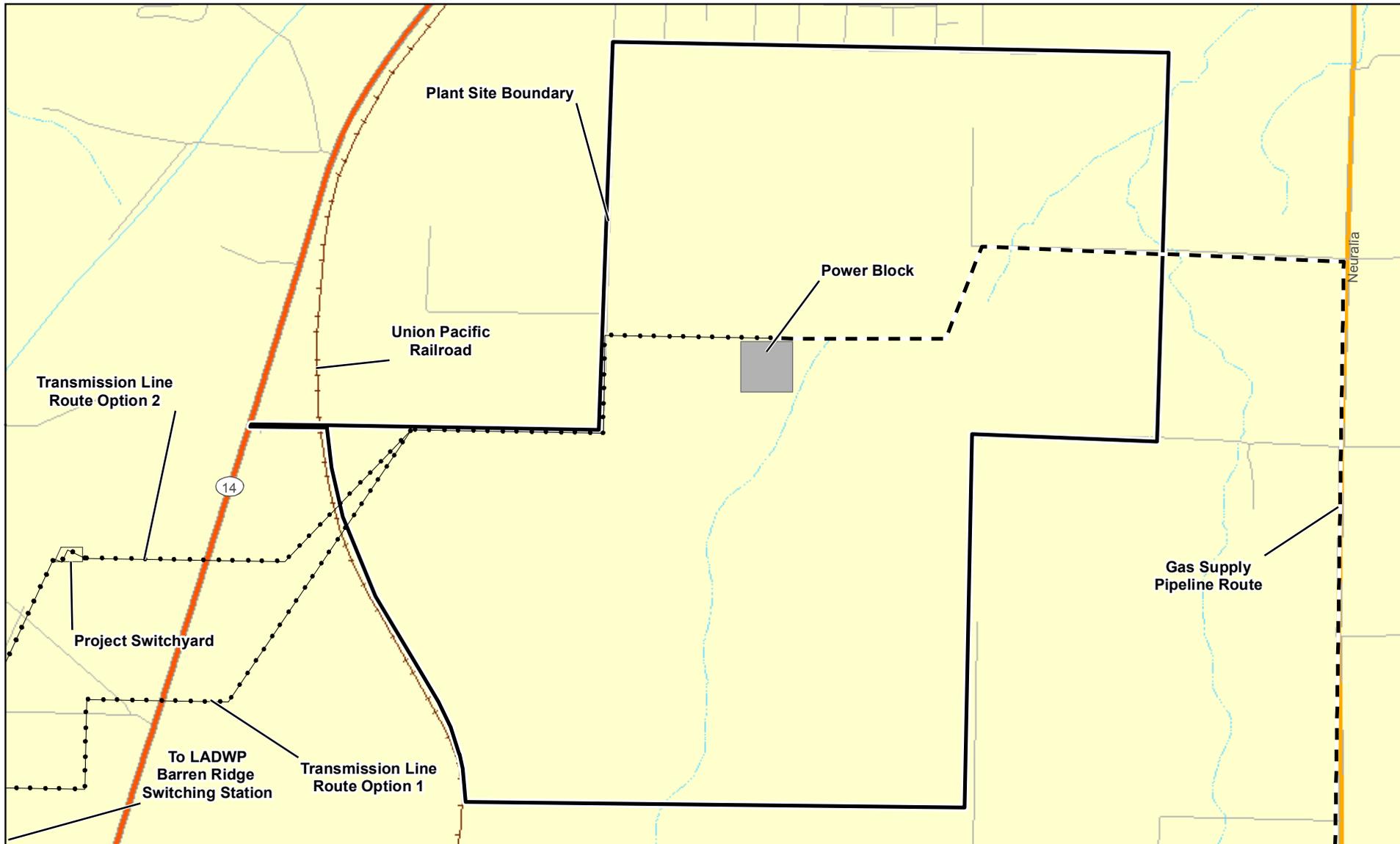
***Beacon Solar***

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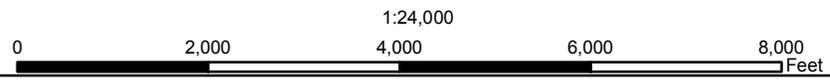
ENSR | AECOM

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Project: 10056-014  
Date: March 2008



- Legend**
- Plant Site Boundary
  - Power Block
  - Project Switchyard
  - Transmission Line Route Options
  - Gas Supply Pipeline Route



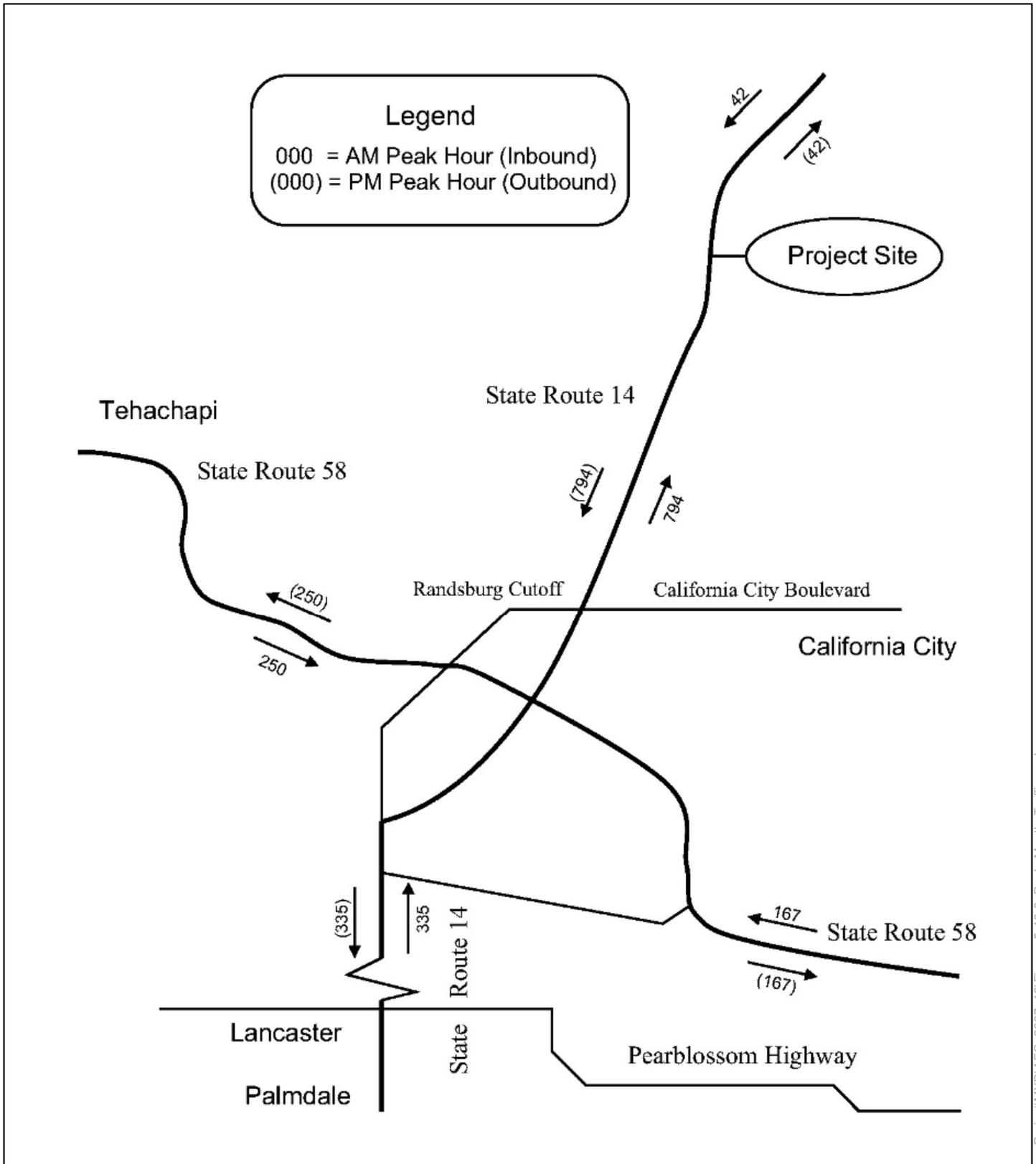
**Beacon Solar Energy Project**  
**Figure 5.13-2**  
**Local Transportation Facilities**

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Project: 10056-014  
 Date: March 2008

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**Beacon Solar Energy Project**

**Figure 5.13-3  
 Peak Month Project  
 Construction Traffic**

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Project: 10056-014  
 Date: March 2008

Not to Scale

Data: Wilson Engineering, 2008