

October 7, 2013

Mr. Beau Cooper, Entitlement Manager  
United Engineering Group  
3595 Inland Empire Boulevard, Suite 2200  
Ontario, California 91764

Subject: Lucerne Valley Desert View Ranch Generating Facilities: Construction Trip Generation  
(LSA Project No. UNE1301)

Dear Mr. Cooper:

This letter summarizes the analysis prepared by LSA Associates, Inc. (LSA) of the potential vehicle trip generation during construction and operation of the Lucerne Valley Desert View Generating Facilities (project) in San Bernardino County. This estimate has been prepared using the project description information provided to LSA by United Engineering Group. The project is planned to generate 20 megawatts (MW) of renewable power on an approximately 198-acre site using solar photovoltaic (PV) technology. The project would be constructed in two phases, which are expected to last approximately nine months. The two phases of construction are described below.

## CONSTRUCTION PHASES

- **Phase 1 (Site Preparation):** The site preparation phase would include paving of Desert View Road from the project site to Milpas Drive, and initial clearing and grading, as required, of the staging areas to provide construction offices, a first aid station, worker parking, truck loading and unloading facilities, and an area for assembling. On-site roadways would be constructed to bring equipment, materials, and workers to the construction areas. During Phase 1, approximately 45 employees would be on site. Phase 1 is expected to take approximately two months and would utilize two water trucks, two back hoes, and two scrapers (graders).
- **Phase 2 (PV System Installation, Testing and Startup):** This phase will include earthwork, grading, and erosion control, as well as construction of the plant substation and erection of the PV modules, supports, and associated electrical equipment. During Phase 2, approximately 150 employees would be on site. Phase 2 is expected to take approximately seven months and would utilize three pile drivers, two back hoes, two lifts, and one small crane. During Phase 2, there would be approximately 5 truck deliveries per day.

## CONSTRUCTION VEHICLE AND PCE TRIP GENERATION

Construction activities will generally occur during daylight hours, Monday through Friday. Work on weekends and during non-daylight hours may occur if necessary to make up schedule deficiencies, or

to complete critical construction activities. All construction activities will be conducted according to applicable San Bernardino County regulations concerning hours of construction.

The trip generation for each construction phase is based on the number of workers and the types of equipment used. In order to present the worst-case trip generation, no carpooling is assumed for construction workers and all are assumed to arrive during the a.m. peak hour and leave during the p.m. peak hour each day. Construction trips would occur throughout the day, but because the project does not require intense grading/off-site hauling, the majority of the trips would be associated with construction workers traveling to and from the site during the peak hours. Construction equipment would be brought on site at the beginning of the phase and removed at the end. However, to present the worst-case scenario, construction equipment was assumed to be brought to the site each day. Typical trip generation is provided in the attached table, which shows that the highest trip generation would occur during Phase 2, PV System Installation, with 177 peak hour trips. Trip generation during Phase 1 would be lower with 63 peak hour trips.

Large trucks utilize more roadway capacity than passenger vehicles due to their larger size, slower start-up times, and reduced maneuverability. In order to account for the increase in roadway capacity utilized by construction vehicles, passenger car equivalent (PCE) factors are used. These factors are applied to the vehicle trip generation to account for the difference in operational characteristics of heavy vehicles. To determine the PCE for the various types of trucks that could be used during construction of the project, LSA consulted the *Highway Capacity Manual (HCM)* adjustments for heavy vehicles, the *San Bernardino/Riverside County Warehouse/Distribution Center Vehicle Trip Generation Study* (NAIOP, January 2005), and photographs of the type of construction equipment to be used for this project.

As shown in the attached table, the highest PCE trip generation would occur during Phase 2, PV System Installation, with 204 peak hour trips. PCE Trip generation during Phase 1 would be lower with 81 peak hour trips.

## **DAILY OPERATIONS AND CONCLUSIONS**

Upon completion of the construction, the project will enter the operational phase. The project will be operated on an unstaffed basis and monitored remotely, with regular on-site personnel visitations for security, maintenance, and system monitoring. There will be no on-site personnel during operation. Fewer than five employees would visit the site regularly for security, maintenance, and system monitoring purposes and would, therefore, generate a nominal number of trips on a regular basis.

The panels would be washed up to four times per year. Approximately 235,350 gallons of water per year will need to be trucked to the site for panel washing. Assuming the use of a 4,000-gallon water truck, this would require a total of 59 inbound and 59 outbound truck trips (118 inbound and 118 outbound PCE trips) per year. If the panels are washed four times per year, this would require 30 inbound and 30 outbound PCE trips, plus fewer than 10 worker trips each time. The estimated trips due to construction activities would be significantly higher and for a longer duration than the trips generated by periodic visits for inspection, security, maintenance, system monitoring, and panel-washing purposes.

If you have any questions regarding this analysis, please feel free to call me at (951) 781-9310.

Sincerely,

**LSA ASSOCIATES, INC.**

A handwritten signature in black ink that reads "Meghan Macias". The signature is written in a cursive, flowing style.

Meghan Macias  
Principal

Attachment: Trip Generation Table

### Lucerne Valley Desert View Ranch Generating Facilities Construction Trip Generation

Construction Vehicles					Vehicle Trip Generation						PCE Trip Generation								
					AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour					
Description	Quantity	Roundtrips	Type	PCE	ADT	in	out	total	in	out	total	ADT	in	out	total	in	out	total	
<b>Phase 1: Site Preparation</b>																			
Workers	45	1	Passenger	1	90	45	0	45	0	45	45	90	45	0	45	0	45	45	
Water Truck	2	7	Large Truck	2	28	14	0	14	0	14	14	56	28	0	28	0	28	28	
Back Hoe	2	1	Large Truck	2	4	2	0	2	0	2	2	8	4	0	4	0	4	4	
Scraper (Grader)	2	1	Large Truck	2	4	2	0	2	0	2	2	8	4	0	4	0	4	4	
<b>Total Phase 1</b>					<b>126</b>	<b>63</b>	<b>0</b>	<b>63</b>	<b>0</b>	<b>63</b>	<b>63</b>	<b>162</b>	<b>81</b>	<b>0</b>	<b>81</b>	<b>0</b>	<b>81</b>	<b>81</b>	
<b>Phase 2: PV System Installation</b>																			
Workers	150	1	Passenger	1	300	150	0	150	0	150	150	300	150	0	150	0	150	150	
Pile Drivers	3	1	Large Truck	2	6	3	0	3	0	3	3	12	6	0	6	0	6	6	
Back Hoe	2	1	Large Truck	2	4	2	0	2	0	2	2	8	4	0	4	0	4	4	
Lift	2	1	Large Truck	2	4	2	0	2	0	2	2	8	4	0	4	0	4	4	
Crane	1	1	Large Truck	2	2	1	0	1	0	1	1	4	2	0	2	0	2	2	
Water Truck	2	7	Large Truck	2	28	14	0	14	0	14	14	56	28	0	28	0	28	28	
Equipment Deliveries	1	5	Large Truck	2	10	5	0	5	0	5	5	20	10	0	10	0	10	10	
<b>Total Phase 2</b>					<b>354</b>	<b>177</b>	<b>0</b>	<b>177</b>	<b>0</b>	<b>177</b>	<b>177</b>	<b>408</b>	<b>204</b>	<b>0</b>	<b>204</b>	<b>0</b>	<b>204</b>	<b>204</b>	

**Notes:**

PCE = passenger car equivalent. A large truck has a PCE of 2. All other vehicles have a PCE of 1.

ADT = average daily traffic