2141 W. Orangewood Avenue, Orange, CA 92868
T: 714.573.0317 | F: 714.573.9534 | www.koacorp.com
MONTEREY PARK ORANGE ONTARIO SAN DIEGO

TECHNICAL MEMORANDUM

Date: August 7, 2018

To: Ralph Laks, Project Engineer

From: Ryan Calad, P.E., Senior Engineer – KOA Corporation

Subject: Trip Generation Report for Solar Renewable Facilities in Daggett in the County of San Bernardino

---

KOA Corporation (KOA) is pleased to submit this technical memorandum for the two proposed Solar Renewable facilities in the unincorporated community of Daggett in the County of San Bernardino (County).

INTRODUCTION

The project is for two Solar Renewable Energy Facilities located between National Trails Highway (Route 66) and Interstate 40, east of the City of Barstow. The first site being Daggett Solar 33, located on Assessor's Parcel Number (APN) 0416-041-52 in the community of Daggett in the County of San Bernardino (Township 9 North, Range 1 East Section 25, USGS Minneola, California Quadrangle 2015). The second site is Daggett Solar 66, located on APN 0516-011-04 and 0516-012-02 in the community of Daggett in the County of San Bernardino (Township 9 North, Range 1 East Section 18, USGS Daggett California Quadrangle, 1956). The County requires these projects to complete a Trip Generation Report per the Building Requirements and Standards Summary (BRASS) report.

As outlined in the BRASS report, both projects require a *"Trip Generation Report/Letter....-estimating traffic generation for Construction, Operational, Decommissioning Phases of the Project [Completed by a Traffic Engineer]"*. Trip generation is a measure or forecast of the number of trips that will be made to or from the project and is generally equal to the traffic volume expected at the project entrances. For this project, KOA has created trip generation estimates for the projects' construction and decommissioning phases based on reported worker staffing and types of vehicles for each of the phases. For the operations phase, KOA conducted counts at a similar facility located near the project in order to estimate the trip generation for the two project sites.

PROPOSED PROJECT

The proposed facility Solar 66 consists of two development stages, with the first, Stage I, which has an area of development of 15.24 acres with a total of 8.72 acres of buildable area for approximately 8,333 solar panels. Stage II has an area of development of 19.11 acres, with a total buildable area of 11.21 acres for approximately 11,111 solar panels. Solar 33 has an area of development of 35 acres, with a total of 25 acres of buildable area for approximately 13,888 solar panels. The proposed Solar 66 facility would generate a total of 7 mega-watts (MW AC) of electricity after the completion of Stage II construction. The proposed Solar 33 would produce a total of 5 MW AC after construction.

During both the construction phase(s) and decommissioning phase the projects would include construction activities operating Monday through Friday from 8:00 AM to 5:00 PM. Construction Phase I has an anticipated maximum of 12 employees per day, Construction Phase II has an anticipated maximum of 30 employees per day, and for the

decommissioning phase a maximum of 10 employees per day. During Phase I, the construction activities would include site preparation (grading, dump trucks, etc.) with Phase II construction consisting of system installation (delivery trucks, assembling, etc.), and the decommission phase activities would include site demolition (grading, dump trucks, etc.). With these phases the project would include a nominal amount of truck traffic during the week that is not expected to exceed 2 to 6 trucks per day, per facility based on various activities for each phase. Though Solar 66, with Stage I and II, and Solar 33 are different sizes, their trip generations during the construction and decommissioning phases are expected to use the same size work force, but with different lengths of phases. For the Solar 33 site, it is expected to take 7 months until the completion of Construction Phase II. For the Solar 66 site, it is expected to take 6 months until the completion of Construction Phase II for both Stage I and II.

TRIP GENERATION REPORT

Using the approximate values for the number of employee trips and truck related construction activities previously discussed, KOA provided anticipated trip generations for the various project phases. During all Construction and Decommissioning phase(s) we have included a passenger car equivalent (PCE) conversion factor of 2.5 for the large truck trips. Table 1 shows the anticipated trip generation for the solar facilities during Construction Phase I for Solar 33, Solar 66 Stage I, and Solar 66 Stage II.

Table 1 – Project Trip Generation (Construction Phase I)

	Daily Trip	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Weekday Trip Generation							
Dump Truck	4	1	0	1	0	1	1
Passenger Vehicles (Employees)	38	12	0	12	0	12	12
Total	**42**	**13**	**0**	**13**	**0**	**13**	**13**
Weekday Trip Generation with PCE=2.5*							
Dump Truck with PCE	10	3	0	3	0	3	3
Passenger Vehicles (Employees)	38	12	0	12	0	12	12
Total	**48**	**15**	**0**	**15**	**0**	**15**	**15**

*PCE=Passenger Car Equivalent

The forecasted project trips using the passenger vehicles and truck trips for the solar projects Construction Phase I are 42 daily trips with a total of 13 peak hour trips for both the AM and PM peak hours. After adjusting large trucks only, and including passenger cars, the final trip generation is 48 daily trips, 15 AM peak hour trips, and 15 PM peak hour trips.

Using the approximate values for the number of employee trips and truck related construction activities previously discussed, Table 2 shows the anticipated trip generation for the solar facilities during Construction Phase II for Solar 33, Solar 66 Stage I, and Solar 66 Stage II.

Table 2 – Project Trip Generation (Construction Phase II)

	Daily Trip	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Weekday Trip Generation							
Total Trucks	16	4	0	4	0	4	4
Freight Truck	4	1	0	1	0	1	1
Flatbed Truck	4	1	0	1	0	1	1
Water Truck	8	2	0	2	0	2	2
Passenger Vehicles (Employees)	90	30	0	30	0	30	30
Total	**106**	**34**	**0**	**34**	**0**	**34**	**34**
Weekday Trip Generation with PCE=2.5*							
Total Trucks with PCE	40	11	0	11	0	11	11
Freight Truck with PCE	10	3	0	3	0	3	3
Flatbed Truck with PCE	10	3	0	3	0	3	3
Water Truck with PCE	20	5	0	5	0	5	5
Passenger Vehicles (Employees)	90	30	0	30	0	30	30
Total	**130**	**41**	**0**	**41**	**0**	**41**	**41**

*PCE=Passenger Car Equivalent

The forecasted project trips using the passenger vehicles and truck trips for Construction Phase II are 106 daily trips with a total of 34 peak hour trips for both the AM and PM peak hours. After adjusting large trucks only, and including passenger cars, the final trip generation is 130 daily trips, 41 AM peak hour trips, and 41 PM peak hour trips.

Trip Generation for the operational phase(s) of the facilities was determined by collecting data from a similar facility to use for our analysis. KOA studied Sunray Energy Inc. (Sunray) which is an existing 33.8 MW AC solar energy facility located at 35100 Santa Fe St, Daggett, CA. KOA collected daily traffic count data for a total of five days from Thursday July 26th, 2018 to Monday July 30th, 2018, covering typical weekday and weekend travel patterns. The counts conducted for the Sunray facility had a maximum of 4 AM peak hour trips (8:00 AM- 9:00 AM), 7 PM peak hour trips (5:00 PM – 6:00 PM), and ADT of 32 trips. For the creation of the project site trip generation we used these maximum observed total trip values previously stated for a conservative assumption. We then adjusted the ingress and egress for these maximum observed total trips based on the typical travel patterns observed over the five days to create trip generation rates for a solar facility on a per MW AC basis. Shown in Table 3 is the proposed trip generation study for the proposed Solar 33, Solar 66 Stage I, and Solar 66 Stage II.

Table 3 – Project Trip Generation (Operations Phase)

	Size	Unit	Daily Trip	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Weekday Trip Generation Rate									
Sunray Energy Inc.	33.8	MW AC	32	3	1	4	1	6	7
Trip Rates	Per MW AC	MW AC	.947	.09	.03	.12	.03	.18	.21
Weekday Trip Generation									
Solar 33	5	MW AC	5	1	0	1	0	1	1
Solar 66 Stage I	3	MW AC	3	1	0	1	0	1	1
Solar 66 Stage II	7	MW AC	7	1	0	1	0	2	2

As shown in Table 3, the anticipated trip generation for Solar 33 is 5 ADT, with only one trip during both the AM and PM peak hours. For Solar 66, after Stage II, the anticipated trip generation is 7 ADT, with only 1 trip during the AM peak hour and 2 for the PM peak hour.

Using the approximate values for the number of employee trips and truck related decommissioning activities previously discussed, Table 4 shows the anticipated trip generation for the solar facilities Decommissioning Phase.

Table 4 – Project Trip Generation (Decommissioning Phase)

	Daily Trip	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Weekday Trip Generation							
Dump Truck	8	2	0	2	0	2	2
Passenger Vehicles (Employees)	30	10	0	10	0	10	10
Total	**38**	**12**	**0**	**12**	**0**	**12**	**12**
Weekday Trip Generation with PCE=2.5*							
Dump Truck with PCE	20	5	0	5	0	5	5
Passenger Vehicles (Employees)	30	10	0	10	0	10	10
Total	**50**	**15**	**0**	**15**	**0**	**15**	**15**

*PCE=Passenger Car Equivalent

The forecasted project trips using the passenger vehicles and truck trips for Construction the decommissioning phase are 38 daily trips with a total of 12 peak hour trips for both the AM and PM peak hours. After adjusting large trucks only, and including passenger cars, the final trip generation is 50 daily trips, 15 AM peak hour trips, and 15 PM peak hour trips.

CONCLUSION

For this technical memorandum, KOA conducted an analysis of the trip generation for the proposed Solar 66, and Solar 33, in the unincorporated community of Daggett with each site's Trip Generation summarized in the following tables.

Table 5 – Solar 33 Total Trip Generation Per Phase

Phase	Unit	Daily Trip	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Weekday Trip Generation								
Construction Phase I*	Total	48	15	0	15	0	15	15
Construction Phase II*	Total	130	41	0	41	0	41	41
Operations (5 MW AC)	Total	5	1	0	1	0	1	1
Decommissioning Phase*	Total	50	15	0	15	0	15	15

*Passenger Car Equivalent Mix shown for Phase Trip Generation Totals

Table 6 – Solar 66 Total Trip Generation Per Phase

Phase	Unit	Daily Trip	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Weekday Trip Generation								
Construction Phase I*	Total	48	15	0	15	0	15	15
Construction Phase II*	Total	130	41	0	41	0	41	41
Operations Stage I (3 MW AC)	Total	3	1	0	1	0	1	1
Operations Stage II (7 MW AC)	Total	7	1	0	1	0	2	2
Decommissioning Phase*	Total	50	15	0	15	0	15	15

*Passenger Car Equivalent Mix shown for Phase Trip Generation Totals

If you have any questions and comments regarding this study, please contact us at (714) 573-0317.

Sincerely,

Ryan Calad, P.E.
Senior Engineer