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AIS 1

TECHNICAL MEMORANDUM

To:	Rugged Solar LLC
From:	Dudek
Subject:	Aesthetics Analysis – Energy Storage
Date:	September 25, 2014

1.0 INTRODUCTION

This memorandum provides information regarding a new, optional component of the Soitec Solar Development Project (Proposed Project) that was not analyzed in the Draft Program Environmental Impact Report (DPEIR) dated January 2014. Rugged Solar LLC (Rugged) proposes to include an optional energy storage system in the Rugged solar farm as part of the Proposed Project. This memorandum describes the energy storage system, analyzes its potential to have a significant environmental impact related to aesthetics, and concludes that the addition of the energy storage system on the Rugged solar farm would not affect the conclusions of the DPEIR prepared and circulated for the development of the Proposed Project.

2.0 PROJECT DESCRIPTION

The applicant proposes to include a component as part of the Rugged solar farm, to be located in southeastern San Diego County. This component consists of energy storage in the form of lithium ion (Li-ion) batteries (energy storage system), which would be located on the Rugged solar farm site in order to store energy produced by CPV trackers and to provide the ability to dispatch this energy upon request depending upon demand and other factors. The battery storage system would provide 160 Megawatt hours (MWh) of Li-ion battery storage in the form of 160 1 MWh containers each measuring 40 feet x 8.5 feet x 9.5 feet (LxWxH) on approximately 7 acres with appropriate fire access and approximately 20 feet of spacing on all four sides of each container.

2.1 Location

The energy storage system would be located on an approximate 7-acre portion of the Rugged solar farm site immediately south of the on-site substation (see Figures 1a and 1b, Energy

Storage System Location) in an area previously proposed to be developed with approximately 47 CPV trackers and associated inverters and step-up transformers. The proposed energy storage system would not change the developed footprint of the Rugged solar farm site.

2.2 Components

The Li-ion battery storage would be housed in standard 40' International Organization for Standardization (ISO) shipping containers. The containers are typically made from 12 to 14 gauge steel. The supplier's logo would be displayed on each container and containers can be painted to order (i.e., containers can be painted with any color stocked by the supplier). The containers would be oriented east/west in two rows of 80 containers each or in four rows of 60 containers each. An approximate 7-acre area would be required to accommodate two rows of 80 containers and an additional 0.5-acre area would be required to accommodate four rows of 60 containers. Approximately 20 feet of spacing would be provided on all four sides of each container measuring 40 feet x 8.5 feet x 9.5 feet (LxWxH); see Figure 2, Energy Storage Container Size and Spacing. It should be noted that inverters and step-up transformers would be located within the container spacing as described below and as depicted in Figure 3.

The Li-ion batteries (cells) would be arranged into modules, which in turn would be stored in battery racks. The racks would be entirely contained within the container. The container would have an access door at each end and overhead lighting on the interior roof. Each container would have an integrated heating, ventilation, and air conditioning (HVAC) unit located on the roof of the container. Each HVAC unit would measure approximately 7.5 feet in height. An inverter with a battery management system and container control system would be installed externally on a concrete pad next to each container. A step-up transformer would be associated with a set of two containers and would be installed alongside the container on a separate concrete pad. Thus, a total of 160 HVAC units, 160 inverters, and 80 step-up transformers would be associated with the energy storage system. Figure 3 provides an example illustration of the containers, step up transformers, and related infrastructure while Figure 4 provides an example of the typical container interior and battery pack configurations. Figure 5 presents the typical Li-ion battery pack components.

The proposed batteries and containers also include the following important monitoring and safety components:

- Modular battery racks designed for ease of maintenance. Every rack's battery monitoring system (BMS) continually monitors for unsafe voltage, current, and temperature, and has control of an automated switch (contactor) to disconnect the rack from the system if necessary.

- Integrated fire detection and suppression system
- Li-ion nanophosphate chemistry which is considered to be the most stable Li-ion technology and substantially reduces the possibility of thermal runaway and provides for reduced reaction from abuse (Sandia National Laboratories 2012) and A123 Systems (no date).

3.0 ANALYSIS

The energy storage system would introduce additional man-made features to the project site that could be visible from scenic vistas and public viewpoints. In addition, potentially reflective surfaces associated with the shipping container, HVAC systems and inverters and any outdoor lighting required for nighttime maintenance of energy storage system could affect night and daytime views in the area.

3.1 Scenic Vistas

The energy storage system would be located internally within the Rugged solar farm and would consist of 9.5-foot tall containers (approximately 18 feet tall when accounting for the height of HVAC units (7.5 feet tall) and associated perimeter screen walls (i.e., implementation of PDF-ES-N-1) that would be oriented east/west in two rows of 80 containers each or 4 rows of 40 containers each. Because the containers would be surrounded by project components exhibiting a larger vertical scale and form, aesthetic impacts would be minimal. With the exception of locations at which superior angle views of the Rugged solar farm are available (i.e., eastbound Interstate 8 at the Tecate Divide and Mt. Tule), visible project components from local area public roads would primarily consist of CPV trackers located along the site boundary. Further, because the height of the top of CPV trackers would range from 13 feet, 6 inches to 30 feet above grade during normal daily operations, CPV trackers would effectively screen the energy storage system during most hours of the day from view of motorists on most local area public roads near the solar farm.

On eastbound Interstate 8 at the Tecate Divide, views to the project site would be brief and due to distance, the form, line and texture of the energy storage system containers would not be overly distinguishable from CPV trackers. However, color contrasts between containers and surrounding CPV trackers may be perceptible from superior viewing locations. Therefore, containers would be painted a color that is consistent in hue and intensity with the CPV tracker panels to minimize visible color contrast (PDF-ES-AE-1). PDF-ES-AE-1 would also require that materials, coatings, or paints having little or no reflectivity be used whenever possible.

From Mt. Tule, the energy storage system would be viewed as an interior component of the larger Rugged solar farm. The installation of 160 containers, HVAC units and associated step-up transformers would interrupt the continuity and visual pattern of repetitive CPV tracker rows spread across the solar farm. When viewed from a superior viewing location, however, the energy storage system would display an altogether short, horizontal form. As such, containers would not obstruct long, westward-oriented scenic views available from Mt. Tule.

In addition, the application of an exterior color to the containers consistent in hue and intensity with the CPV tracker panels would minimize visible color contrast with the other solar farm components. Therefore, for the reasons discussed above, the inclusion of the energy storage system to the Rugged solar farm would not result in additional impacts to valued focal and/or panoramic vistas.

3.2 Visual Character and Quality of the Site and Surroundings

The DPEIR determined that the Rugged solar farm would produce strong visual contrast with existing vegetation and terrain and that the operation of numerous rows of tall CPV trackers in the McCain Valley would create visible contrast in form and color with existing vegetation and rural residential development. As such, the Rugged solar farm was determined to have significant and unmitigable impacts to existing visual character and quality (**AE-R-1**). Due to the height of CPV trackers, the energy storage system would be screened at most public viewing locations in the surrounding area. Further, public perception of the Rugged solar farm would typically be fashioned by the visibility of peripheral solar farm components and more specifically, by CPV trackers. Although the energy storage system would be screened from most public viewpoints by taller CPV tracker systems, the inclusion of the energy storage system to the Rugged solar farm would contribute to the previously identified significant and unmitigable impact, but is not anticipated to cause in increase in the severity of that impacts beyond that previously stated in the DPEIR.

3.3 Lighting and Glare

The installation of exterior lighting on individual containers, HVAC systems or step-up transformers is not anticipated to be necessary and therefore, no additional nighttime lighting sources would be added to the Rugged solar farm. As such, no new nighttime lighting impacts would occur due to the addition of the proposed energy storage system. As stated previously, containers would be painted a color to match the hue and intensity of CPV tracker panels to minimize potential color contrast within the solar farm. The application of paint to the exterior of containers would minimize the potential for glare generated by the energy storage system. PDF-ES-AE-1 would also require that materials, coatings, or paints having little or no reflectivity be used whenever possible. As stated in the DPEIR, CPV trackers would create glare that would be received by motorists and residences in the surrounding area (**AE-R-2** and **AE-R-3**). This source of glare was determined to be a significant and unmitigatable impacts of the Rugged solar farm. The addition of the energy storage system to the Rugged solar farm would not create a substantial source of additional glare that would increase the severity of anticipated glare impacts of the project described in the DPEIR.

4.0 DESIGN CONSIDERATIONS

In addition to the project design features (PDFs) listed in Table 1-10, Summary of Project Design Features, of the DPEIR, the applicant has incorporated the following additional PDF as part of this component of the Rugged solar farm. PDFs would be made conditions of approval for the Rugged solar farm to ensure these features are incorporated into the solar farm design. PDF-ES-AE-1 would be implemented at the Rugged solar farm to ensure that color contrast between energy storage containers and CPV trackers is minimized and that new sources of potential glare are reduced wherever possible.

PDF-ES-AE-1 Energy storage system containers shall be painted a color consistent in hue and intensity with CPV tracker. Materials, coatings, or paints having little or no reflectivity shall be used whenever possible.

5.0 CERTIFICATION

This addendum has been prepared by Mr. Josh Saunders and Mr. Michael Sweesy. Mr. Michael Sweesy is a County of San Diego approved CEQA Consultant for Visual Analysis.

Michael L. Sweesy
Registered Landscape Architect #3319
Principal/Habitat Restoration Specialist

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AIS 2

TECHNICAL MEMORANDUM

To:	Tierra del Sol Solar Farm LLC; Rugged Solar LLC
From:	David Deckman, Director of Air Quality Services
Subject:	Supplemental Air Quality and Greenhouse Gas Analysis – Energy Storage
Date:	October 29, 2014

1.0 INTRODUCTION

This memorandum provides information regarding a new, optional component of the Soitec Solar Development Project (Proposed Project) that was not analyzed in the Draft Program Environmental Impact Report (DPEIR) dated January 2014. Rugged Solar LLC (Rugged) proposes to include an optional energy storage system in the Rugged solar farm as part of the Proposed Project. This memorandum describes the energy storage system, analyzes its potential to have a significant environmental impact related to air quality, and concludes that the addition of the energy storage system on the Rugged solar farm would not affect the conclusions of the DPEIR prepared and circulated for the development of the Proposed Project.

2.0 PROJECT DESCRIPTION

The applicant proposes to include a component as part of the Rugged solar farm, to be located in southeastern San Diego County. This component consists of energy storage in the form of lithium ion (Li-ion) batteries (energy storage system), which would be located on the Rugged solar farm site in order to store energy produced by CPV trackers and to provide the ability to dispatch this energy upon request depending upon demand and other factors. The battery storage system would provide 160 Megawatt hours (MWh) of Li-ion battery storage in the form of 160 1 MWh containers each measuring 40 feet x 8.5 feet x 9.5 feet (LxWxH) on approximately 7 acres with appropriate fire access and approximately 20 feet of spacing on all four sides of each container.

2.1 Location

The energy storage system would be located on an approximate 7-acre portion of the Rugged solar farm site immediately south of the on-site substation (see Figures 1a and 1b, Energy

Storage System Location) in an area previously proposed to be developed with approximately 47 CPV trackers and associated inverters and step-up transformers. The proposed energy storage system would not change the developed footprint of the Rugged solar farm site.

2.2 Components

The Li-ion battery storage would be housed in standard 40' International Organization of Standardization (ISO) shipping containers. The containers are typically made from 12 to 14 gauge steel. The supplier's logo would be displayed on each container and containers can be painted to order (i.e., containers can be painted with any color stocked by the supplier). The containers would be oriented east/west in two rows of 80 containers each or in four rows of 60 containers each. An approximate 7-acre area would be required to accommodate two rows of 80 containers and an additional 0.5-acre area would be required to accommodate four rows of 60 containers. Approximately 20 feet of spacing would be provided on all four sides of each container measuring 40 feet x 8.5 feet x 9.5 feet (LxWxH); see Figure 2, Energy Storage Container Size and Spacing. It should be noted that inverters and step-up transformers would be located within the container spacing as described below and as depicted in Figure 3.

The Li-ion batteries (cells) would be arranged into modules, which in turn would be stored in battery racks. The racks would be entirely contained within the container. The container would have an access door at each end and overhead lighting on the interior roof. Each container would have an integrated heating, ventilation, and air conditioning (HVAC) unit located on the roof of the container. Each HVAC unit would measure approximately 7.5 feet in height. An inverter with a battery management system and container control system would be installed externally on a concrete pad next to each container. A step-up transformer would be associated with a set of two containers and would be installed alongside the container on a separate concrete pad. Thus, a total of 160 HVAC units, 160 inverters, and 80 step-up transformers would be associated with the energy storage system. Figure 3 provides an example illustration of the containers, step up transformers, and related infrastructure while Figure 4 provides an example of the typical container interior and battery pack configurations. Figure 5 presents the typical Li-ion battery pack components.

The proposed batteries and containers also include the following important monitoring and safety components:

- Modular battery racks designed for ease of maintenance. Every rack's battery monitoring system (BMS) continually monitors for unsafe voltage, current, and temperature, and has control of an automated switch (contactor) to disconnect the rack from the system if necessary.

- Integrated fire detection and suppression system.
- Li-ion nanophosphate chemistry which is considered to be the most stable Li-ion technology and substantially reduces the possibility of thermal runaway and provides for reduced reaction from abuse (Sandia National Laboratories 2012) and A123 Systems (no date).

3.0 ANALYSIS

Construction Impacts

Construction of the Li-ion energy storage system would consist of site preparation and grading, development of fire access roads, container arrangement, and assembly of accessory components, including transformers and inverters. Because the energy storage system would be located on an area previously proposed to be developed with CPV systems, site preparation and grading would be included with that originally anticipated in the DPEIR. No additional grading would be required. All existing vegetation would be cleared and grubbed from the area, as originally anticipated in the DPEIR. Fire access roads and pads for each container would be graded consistent with what is required for the entire project. The energy storage system would be connected to the grid by an underground direct buried connection to the project substation. Each container would be trucked to the site and arranged on a graded pad. Accessory components would be placed either adjacent to or mounted on each container. Following placement of the energy storage systems, fire access roads would be constructed to support the imposed loads of fire apparatus (not less than 50,000 pounds) as required by the County Fire Code. All other disturbed areas would be treated with a permeable nontoxic soil binding agent to reduce fugitive dust and erosion, which is consistent with fugitive dust control measures identified in the DPEIR.

Additionally, construction personnel, equipment, and hours of operation would be consistent with that discussed in the DPEIR; refer to Chapter 1.0, Project Description.

The transportation of the energy storage units to the Rugged solar farm site would require the use of heavy-duty trucks. Each of the 160 1-MWh units would be transported individually, resulting in 160 trucks or 320 one-way trips. The energy storage system would replace approximately 47 CPV tracker components previously proposed as part of the Rugged solar farm. Approximately 123 one-way trips for material deliveries associated with the 47 CPV components were analyzed in Appendix 9.0-5 of the Final PEIR. With the addition of the energy storage delivery trips, the net increase in delivery trips would result in 197 additional one-way trips. The delivery of energy storage systems would occur in the final two months of construction during the punch list, cleanup and commissioning phase. Daily deliveries and delivery trips during construction would not exceed more than 25 energy storage deliveries (50 one-way trips) any given day; see Attachment 1, which includes a list of the assumptions. Although it is anticipated that the amount of deliveries per day would be less, the maximum amount of trips (50 one way trips) were used in the analysis to represent a worse-case scenario. At this level, criteria air pollutants would remain below the County significance thresholds as shown in Table 1 (see AIS 2 Attachment 1 for details).

Table 1 shows the maximum daily Rugged construction emissions estimates as provided in Appendix 9.0-5 of the Final PEIR. The addition of delivery trips associated with energy storage would not occur during the construction period when maximum daily emissions would occur; therefore, the emissions estimates as provided in Appendix 9.0-5 would not change.

Table 1
Revised Estimated Maximum Daily Construction Emissions (pounds/day)
Rugged Solar Farm

	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
2014	17.54	239.82	125.20	0.44	96.76	26.14
2015	14.19	175.61	107.17	0.38	26.03	9.94
Maximum Daily Emissions (Revised)	***17.73***	***244.22***	***126.10***	***0.45***	***96.89***	***26.23***
Emission Threshold	*137*	*250*	*550*	*250*	*100*	*55*
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**

Source: See Appendix 9.0-5, Attachment 1 for details.

As previously discussed, additional delivery trips associated with energy storage would occur during the last two months of construction for the Rugged solar farm. Table 2 shows the maximum daily emissions during the last two months of construction as disclosed in Attachment 1 of Appendix 9.0-5 of the Final PEIR. Table 2 also shows the resulting maximum daily emissions with the addition of energy storage delivery trips.

Table 2
Revised Estimated Maximum Daily Construction Emissions (pounds/day)
Rugged Solar Farm – Energy Storage Delivery Period

	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
*Maximum Daily Emissions without Energy Storage Delivery Trips**	2.37	42.06	13.35	0.10	1.95	0.99
Maximum Daily Emissions with Energy Storage Delivery Trips	5.67	113.82	28.80	0.27	4.81	2.54
Emission Threshold	*137*	*250*	*550*	*250*	*100*	*55*
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**

Source: See Attachment 1 for complete results. *See Appendix 9.0-5, Attachment 1

It should be noted that Attachment 1 used the updated emissions for the Rugged solar farm that were provided in Appendix 9.0-5 Supplemental Air Quality Analysis – Project Changes. Therefore, because the additional truck trips associated with the transportation of energy storage units would not contribute to an exceedance of the County of San Diego thresholds for the purposes of analyzing air quality impacts, air quality impacts associated with the Rugged solar farm would remain less than significant as originally concluded in the DPEIR.

Table 3 shows the maximum daily emissions that would occur under the Proposed Project scenario during the last two months of the Rugged construction period as disclosed in Attachment 1 of Appendix 9.0-5 of the Final PEIR. Table 3 also shows resulting emissions with the addition of energy storage delivery trips during the energy storage delivery period under the Proposed Project scenario.

Table 3
Revised Estimated Maximum Daily Construction Emissions (pounds/day)
Proposed Project – Energy Storage Delivery Period

	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
TDS – Energy Storage Period	1.51	16.47	28.80	0.26	4.781	2.54
Rugged – Energy Storage Period	5.67	113.82	10.80	0.04	1.08	0.72
Proposed Project Emissions – Energy Storage Period	***7.19***	***130.29***	***39.60***	***0.30***	***5.88***	***3.26***
Emission Threshold	*137*	*250*	*550*	*250*	*100*	*55*
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**

Source: See Attachment 1 for complete results.

As shown in Table 3, because the additional truck trips associated with the transportation of energy storage units would not contribute to an exceedance of the County of San Diego thresholds for the purposes of analyzing air quality impacts, air quality impacts associated with the Proposed Project would remain less than significant as originally concluded in the DPEIR.

Operational Impacts

During operation, containers would be inspected, monthly, quarterly, and annually with physical maintenance (equipment testing, continuous remote monitoring, repair, routine procedures to ensure service continuity, and standard preventative maintenance) occurring annually. All inspections would occur during daylight hours and would be performed by the employees operating the Rugged solar farm. No additional employees would be required for the operation of the energy storage system.

Electricity required to power the HVAC systems associated with each individual unit would be directly generated by the project on site and would not require an additional external source of electricity. Each individual unit would be designed as an integrated energy storage system, and the HVAC system associated with each individual unit would be directly connected to the energy storage system's output and would not require additional electrical input. As such, greenhouse gas emissions associated with electrical use would not increase.

4.0 CONCLUSIONS

Only a minor increase in daily truck trips would be required to accommodate the transportation of the energy storage units to the project site, and no additional electricity would be required to operate the energy storage units. As a result, daily criteria pollutant emissions and annual greenhouse gas emissions would remain below the thresholds and impacts would be less than significant as previously concluded in the DPEIR.

5.0 CERTIFICATION

This addendum has been prepared by Ms. Jennifer Longabaugh and Mr. David Deckman. Mr. David Deckman is a County of San Diego approved CEQA Consultant for Air Quality.

David Deckman
Director of Air Quality Services

ATTACHMENT 1

Revised Air Quality Emission Estimates

Rugged Solar Farm Project
Emissions Summary - Revised 9.29.14

CONSTRUCTION

ROG

Activity	2014 Emissions (lbs/day)						2015 Emissions (lbs/day)					
	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Offroad Emissions												
Mobilization and Clean-Up	0.35											
Site Clearing/Grubbing/Grinding	1.94	1.94	1.94									
Grading/Road Construction			4.70									
Underground Electric/Communications Cable Installation				2.42	2.42	2.42	2.40					
Tracker Installation		4.64	4.64	4.64	4.64	4.64	4.58	4.58	4.58	4.58		
Substation Construction	0.91	0.91										
O&M Building Construction					0.81	0.81	0.79	0.79				
OFFROAD MONTHLY TOTAL (max daily)	**2.85**	**6.57**	**9.34**	**7.06**	**7.87**	**7.87**	**7.76**	**5.37**	**4.58**	**4.58**		
Onroad Emissions	**4.50**	**6.49**	**6.60**	**5.33**	**5.33**	**5.33**	**4.83**	**4.83**	**4.83**	**5.29**	**3.76**	**0.46**
Concrete Batch Plant	**1.60**	**1.60**	**1.60**	**1.60**	**1.60**	**1.60**	**1.60**	**1.60**	**1.60**	**1.60**		
MAX DAILY EMISSIONS	**8.95**	**14.67**	**17.54**	**13.99**	**14.80**	**14.80**	**14.19**	**11.80**	**11.00**	**11.47**	**3.76**	**0.46**

CO

Activity	2014 Emissions (lbs/day)						2015 Emissions (lbs/day)					
	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Offroad Emissions												
Mobilization and Clean-Up	3.75											
Site Clearing/Grubbing/Grinding	17.67	17.67	17.67									
Grading/Road Construction			34.06									
Underground Electric/Communications Cable Installation				21.12	21.12	21.12	20.84					
Tracker Installation		40.27	40.27	40.27	40.27	40.27	39.90	39.90	39.90	39.90		
Substation Construction	8.34	8.34										
O&M Building Construction					5.31	5.31	5.18	5.18				
OFFROAD MONTHLY TOTAL (max daily)	**26.01**	**57.94**	**74.33**	**61.40**	**66.71**	**66.71**	**65.92**	**45.08**	**39.90**	**39.90**		
Onroad Emissions	**24.88**	**41.98**	**43.03**	**37.08**	**37.08**	**37.08**	**33.42**	**33.42**	**33.42**	**37.84**	**19.84**	**4.39**
Concrete Batch Plant	**7.84**	**7.84**	**7.84**	**7.84**	**7.84**	**7.84**	**7.84**	**7.84**	**7.84**	**7.84**		
MAX DAILY EMISSIONS	**58.73**	**107.76**	**125.20**	**106.31**	**111.62**	**111.62**	**107.17**	**86.33**	**81.15**	**85.57**	**19.84**	**4.39**

Rugged Solar Farm Project
Emissions Summary - Revised 9.29.14

NOx

	2014 Emissions (lbs/day)						2015 Emissions (lbs/day)					
Activity	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
Offroad Emissions												
Mobilization and Clean-Up	4.22											
Site Clearing/Grubbing/Grinding	28.18	28.18	28.18									
Grading/Road Construction			68.47									
Underground Electric/Communications Cable Installation				34.59	34.59	34.59	33.74					
Tracker Installation		63.60	63.60	63.60	63.60	63.60	61.57	61.57	61.57	61.57		
Substation Construction	12.33	12.33										
O&M Building Construction					10.55	10.55	10.29	10.29				
OFFROAD MONTHLY TOTAL (max daily)	**40.51**	**91.78**	**132.07**	**98.19**	**108.74**	**108.74**	**105.59**	**71.85**	**61.57**	**61.57**		
Onroad Emissions	**85.29**	**96.23**	**96.33**	**67.27**	**67.27**	**67.27**	**58.60**	**58.60**	**58.60**	**59.04**	**72.20**	**0.44**
Concrete Batch Plant	**11.42**	**11.42**	**11.42**	**11.42**	**11.42**	**11.42**	**11.42**	**11.42**	**11.42**	**11.42**		
MAX DAILY EMISSIONS	**137.22**	**199.43**	**239.82**	**176.88**	**187.43**	**187.43**	**175.61**	**141.87**	**131.58**	**132.03**	**72.20**	**0.44**

SOx

	2014 Emissions (lbs/day)						2015 Emissions (lbs/day)					
Activity	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
Offroad Emissions												
Mobilization and Clean-Up	0.01											
Site Clearing/Grubbing/Grinding	0.04	0.04	0.04									
Grading/Road Construction			0.08									
Underground Electric/Communications Cable Installation				0.06	0.06	0.06	0.06					
Tracker Installation		0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12		
Substation Construction	0.02	0.02										
O&M Building Construction					0.02	0.02	0.02	0.02				
OFFROAD MONTHLY TOTAL (max daily)	**0.06**	**0.16**	**0.20**	**0.18**	**0.19**	**0.19**	**0.19**	**0.14**	**0.12**	**0.12**		
Onroad Emissions	**0.18**	**0.22**	**0.23**	**0.17**	**0.17**	**0.17**	**0.17**	**0.17**	**0.17**	**0.18**	**0.17**	**0.01**
Concrete Batch Plant	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**		
MAX DAILY EMISSIONS	**0.26**	**0.40**	**0.44**	**0.36**	**0.38**	**0.38**	**0.38**	**0.32**	**0.30**	**0.31**	**0.17**	**0.01**

Rugged Solar Farm Project
Emissions Summary - Revised 9.29.14

PM10

	2014 Emissions (lbs/day)						2015 Emissions (lbs/day)					
Activity	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
Offroad Emissions												
Mobilization and Clean-Up	0.29											
Site Clearing/Grubbing/Grinding	1.32	1.32	1.32									
Grading/Road Construction			3.24									
Underground Electric/Communications Cable Installation				1.70	1.70	1.70	1.70					
Tracker Installation		3.34	3.34	3.34	3.34	3.34	3.25	3.25	3.25	3.25		
Substation Construction	0.63	0.63										
O&M Building Construction					0.56	0.56	0.55	0.55				
OFFROAD MONTHLY TOTAL (max daily)	**1.95**	**4.66**	**6.58**	**5.04**	**5.61**	**5.61**	**5.50**	**3.80**	**3.25**	**3.25**		
Onroad Emissions	**3.38**	**4.68**	**4.74**	**3.91**	**3.91**	**3.91**	**3.62**	**3.62**	**3.62**	**3.92**	**3.15**	**0.30**
Fugitive Dust	**65.52**	**65.52**	**68.53**									
Concrete Batch Plant	**16.91**	**16.91**	**16.91**	**16.91**	**16.91**	**16.91**	**16.91**	**16.91**	**16.91**	**16.91**		
MAX DAILY EMISSIONS	**87.76**	**91.77**	**96.76**	**25.86**	**26.43**	**26.43**	**26.03**	**24.33**	**23.78**	**24.08**	**3.15**	**0.30**

PM2.5

	2014 Emissions (lbs/day)						2015 Emissions (lbs/day)					
Activity	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
Offroad Emissions												
Mobilization and Clean-Up	0.26											
Site Clearing/Grubbing/Grinding	1.21	1.21	1.21									
Grading/Road Construction			2.98									
Underground Electric/Communications Cable Installation				1.56	1.56	1.56	1.53					
Tracker Installation		3.07	3.07	3.07	3.07	3.07	2.99	2.99	2.99	2.99		
Substation Construction	0.58	0.58										
O&M Building Construction					0.52	0.52	0.51	0.51				
OFFROAD MONTHLY TOTAL (max daily)	**1.79**	**4.29**	**6.05**	**4.64**	**5.16**	**5.16**	**5.02**	**3.50**	**2.99**	**2.99**		
Onroad Emissions	**1.99**	**2.49**	**2.51**	**1.92**	**1.92**	**1.92**	**1.65**	**1.65**	**1.65**	**1.75**	**1.64**	**0.09**
Fugitive Dust	**13.68**	**13.68**	**14.31**									
Concrete Batch Plant	**3.26**	**3.26**	**3.26**	**3.26**	**3.26**	**3.26**	**3.26**	**3.26**	**3.26**	**3.26**		
MAX DAILY EMISSIONS	**20.73**	**23.72**	**26.14**	**9.82**	**10.34**	**10.34**	**9.94**	**8.41**	**7.91**	**8.00**	**1.64**	**0.09**

Rugged Solar Farm Project
Emissions Summary - Revised 9.29.14

CO2

Activity	2014 Emissions (tons/yr)		2015 Emissions (tons/yr)
Offroad Emissions			
Mobilization and Clean Up	2.35		—
Site Clearing/Grubbing/Grinding	112.02		—
Grading/Road Construction	34.41		—
Underground Electric/Communications Cable Installation	200.12		56.44
Tracker Installation	613.99		512.59
Substation Construction	35.70		—
O&M Building Construction	20.79		22.23
OFFROAD ANNUAL TOTAL	**1,019.37**		**591.26**
Onroad Emissions	**1,422.09**		**1,390.33**
Concrete Batch Plant	**69.37**		**104.34**
ANNUAL EMISSIONS	**2,510.83**		**2,085.93**

OPERATION

Vehicle Type	ROG	CO	NOx	SOx	PM10	PM2.5
Solar Farm						
Employee Vehicles	0.66	6.27	0.63	0.01	0.43	0.13
Personnel Transport Vehicles	0.01	0.09	0.01	0.00	0.01	0.00
Washing Vehicles	0.01	0.04	0.17	0.00	0.01	0.00
Satellite Washing Vehicles	0.01	0.09	0.01	0.00	0.01	0.00
Service Trucks	0.00	0.05	0.01	0.00	0.00	0.00
Emergency Generators	1.02	19.30	11.01	0.02	0.63	0.62
Maximum Daily Emissions	**1.71**	**25.84**	**11.83**	**0.03**	**1.08**	**0.76**

Notes:
1. Emissions per month reflect worst-case daily emissions accounting for construction phases occurring concurrently.

Rugged Solar Farm Project
On-Road Motor Vehicle Emissions - Revised

2014 EMISSIONS

Vehicle Type	Trips/Day	No. of Units	Distance (mi)	Duration (days)	Category	2014 Emissions (lb/day)							2014 Emissions (lbs/month)						
						ROG	CO	NOx	SOx	PM10	PM2.5	CO2	ROG	CO	NOx	SOx	PM10	PM2.5	CO2
July																			
Worker Vehicles[1]	43		35	18	On-Road	0.79	7.58	0.76	0.01	0.46	0.14	1,357.64	14.24	136.48	13.65	0.25	8.36	2.57	24,437.44
Delivery Trucks[2]	29		85	18	On-Road	2.12	9.91	48.40	0.09	1.88	1.11	9,915.66	38.21	178.32	871.19	1.70	33.90	19.97	178,481.85
Water Trucks (on-site)[3]		2	120	18	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	3.72	17.36	84.82	0.17	2.43	1.73	17,377.54
Water Trucks (off-site)[4]	20		54	18	On-Road	0.93	4.34	21.21	0.04	0.61	0.43	4,344.39	16.74	78.13	381.70	0.75	10.95	7.79	78,198.94
Water Trucks (off-site)[4]	28		10	18	On-Road	0.24	1.13	5.50	0.01	0.16	0.11	1,126.32							
Dump Trucks[5]		4	60	18	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	3.72	17.36	84.82	0.17	2.43	1.73	17,377.54
August																			
Worker Vehicles[1]	130	4	35	26	On-Road	2.37	22.75	2.28	0.04	1.39	0.43	4,072.91	61.71	591.43	59.15	1.07	36.21	11.14	105,895.59
Delivery Trucks[2]	29		85	26	On-Road	2.12	9.91	48.40	0.09	1.88	1.11	9,915.66	55.20	257.58	1258.39	2.46	48.97	28.85	257,807.12
Water Trucks (on-site)[3]		2	120	26	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	5.37	25.08	122.52	0.24	3.51	2.50	25,100.90
Water Trucks (off-site)[4]	20		54	26	On-Road	0.93	4.34	21.21	0.04	0.61	0.43	4,344.39	24.18	112.85	551.34	1.08	15.82	11.25	112,954.03
Water Trucks (off-site)[4]	28		10	26	On-Road	0.24	1.13	5.50	0.01	0.16	0.11	1,126.32							
Concrete Material Trucks[6]	8		55	26	On-Road	0.38	1.77	8.64	0.02	0.34	0.20	1,769.93	9.85	45.98	224.62	0.44	8.74	5.15	46,018.31
Concrete Trucks[7]	8		5	26	On-Road	0.03	0.16	0.79	0.00	0.03	0.02	160.90	0.90	4.18	20.42	0.04	0.79	0.47	4,183.48
Dump Trucks[5]		4	60	26	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	5.37	25.08	122.52	0.24	3.51	2.50	25,100.90
September																			
Worker Vehicles[1]	130	4	35	26	On-Road	2.37	22.75	2.28	0.04	1.39	0.43	4,072.91	61.71	591.43	59.15	1.07	36.21	11.14	105,895.59
Delivery Trucks[2]	29		85	26	On-Road	2.12	9.91	48.40	0.09	1.88	1.11	9,915.66	55.20	257.58	1258.39	2.46	48.97	28.85	257,807.12
Commissioning Trips[8]	6		35	26	On-Road	0.11	1.05	0.10	0.00	0.06	0.02	187.69	2.84	27.25	2.73	0.05	1.67	0.51	4,879.98
Water Trucks (on-site)[3]		2	120	26	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	5.37	25.08	122.52	0.24	3.51	2.50	25,100.90
Water Trucks (off-site)[4]	20		54	26	On-Road	0.93	4.34	21.21	0.04	0.61	0.43	4,344.39	24.18	112.85	551.34	1.08	15.82	11.25	112,954.03
Water Trucks (off-site)[4]	28		10	26	On-Road	0.24	1.13	5.50	0.01	0.16	0.11	1,126.32							
Concrete Material Trucks[6]	8		55	26	On-Road	0.38	1.77	8.64	0.02	0.34	0.20	1,769.93	9.85	45.98	224.62	0.44	8.74	5.15	46,018.31
Concrete Trucks[7]	8		5	26	On-Road	0.03	0.16	0.79	0.00	0.03	0.02	160.90	0.90	4.18	20.42	0.04	0.79	0.47	4,183.48
Dump Trucks[5]		4	60	26	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	5.37	25.08	122.52	0.24	3.51	2.50	25,100.90
October																			
Worker Vehicles[1]	130	4	35	26	On-Road	2.37	22.75	2.28	0.04	1.39	0.43	4,072.91	61.71	591.43	59.15	1.07	36.21	11.14	105,895.59
Delivery Trucks[2]	29		85	26	On-Road	2.12	9.91	48.40	0.09	1.88	1.11	9,915.66	55.20	257.58	1258.39	2.46	48.97	28.85	257,807.12
Commissioning Trips[8]	6		35	26	On-Road	0.11	1.05	0.10	0.00	0.06	0.02	187.69	2.84	27.25	2.73	0.05	1.67	0.51	4,879.98
Water Trucks (on-site)[3]		2	60	26	On-Road	0.10	0.48	2.36	0.00	0.07	0.05	482.71	2.69	12.54	61.26	0.12	1.76	1.25	12,550.45
Concrete Material Trucks[6]	8		55	26	On-Road	0.38	1.77	8.64	0.02	0.34	0.20	1,769.93	9.85	45.98	224.62	0.44	8.74	5.15	46,018.31
Concrete Trucks[7]	8		5	26	On-Road	0.03	0.16	0.79	0.00	0.03	0.02	160.90	0.90	4.18	20.42	0.04	0.79	0.47	4,183.48
Dump Trucks[5]		4	60	26	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	5.37	25.08	122.52	0.24	3.51	2.50	25,100.90
November																			
Worker Vehicles[1]	130	4	35	26	On-Road	2.37	22.75	2.28	0.04	1.39	0.43	4,072.91	61.71	591.43	59.15	1.07	36.21	11.14	105,895.59
Delivery Trucks[2]	29		85	26	On-Road	2.12	9.91	48.40	0.09	1.88	1.11	9,915.66	55.20	257.58	1258.39	2.46	48.97	28.85	257,807.12
Commissioning Trips[8]	6		35	26	On-Road	0.11	1.05	0.10	0.00	0.06	0.02	187.69	2.84	27.25	2.73	0.05	1.67	0.51	4,879.98
Water Trucks (on-site)[3]		2	60	26	On-Road	0.10	0.48	2.36	0.00	0.07	0.05	482.71	2.69	12.54	61.26	0.12	1.76	1.25	12,550.45
Concrete Material Trucks[6]	8		55	26	On-Road	0.38	1.77	8.64	0.02	0.34	0.20	1,769.93	9.85	45.98	224.62	0.44	8.74	5.15	46,018.31
Concrete Trucks[7]	8		5	26	On-Road	0.03	0.16	0.79	0.00	0.03	0.02	160.90	0.90	4.18	20.42	0.04	0.79	0.47	4,183.48
Dump Trucks[5]		4	60	26	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	5.37	25.08	122.52	0.24	3.51	2.50	25,100.90
December																			
Worker Vehicles[1]	130	4	35	26	On-Road	2.37	22.75	2.28	0.04	1.39	0.43	4,072.91	61.71	591.43	59.15	1.07	36.21	11.14	105,895.59
Delivery Trucks[2]	29		85	26	On-Road	2.12	9.91	48.40	0.09	1.88	1.11	9,915.66	55.20	257.58	1258.39	2.46	48.97	28.85	257,807.12
Commissioning Trips[8]	6		35	26	On-Road	0.11	1.05	0.10	0.00	0.06	0.02	187.69	2.84	27.25	2.73	0.05	1.67	0.51	4,879.98
Water Trucks (on-site)[3]		2	60	26	On-Road	0.10	0.48	2.36	0.00	0.07	0.05	482.71	2.69	12.54	61.26	0.12	1.76	1.25	12,550.45
Concrete Material Trucks[6]	8		55	26	On-Road	0.38	1.77	8.64	0.02	0.34	0.20	1,769.93	9.85	45.98	224.62	0.44	8.74	5.15	46,018.31
Concrete Trucks[7]	8		5	26	On-Road	0.03	0.16	0.79	0.00	0.03	0.02	160.90	0.90	4.18	20.42	0.04	0.79	0.47	4,183.48
Dump Trucks[5]		4	60	26	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	5.37	25.08	122.52	0.24	3.51	2.50	25,100.90
												TOTAL 2014	**820.31**	**5471.38**	**11404.11**	**27.44**	**599.83**	**307.62**	**2,844,181.45**

Rugged Solar Farm Project
On-Road Motor Vehicle Emissions - Revised

2015 EMISSIONS

Vehicle Type	Trips/Day	No. of Units	Distance (mi)	Duration (days)	Category	2015 Emissions (lb/day)							2015 Emissions (lbs/month)						
						ROG	CO	NOx	SOx	PM10	PM2.5	CO2	ROG	CO	NOx	SOx	PM10	PM2.5	CO2
January																			
Worker Vehicles[1]	130		35.0	26	On-Road	2.14	20.37	2.04	0.04	1.39	0.43	4,066.21	55.75	529.65	53.09	1.06	36.10	11.08	105,721.51
Delivery Trucks[2]	29		85.0	26	On-Road	1.91	8.96	41.62	0.09	1.65	0.90	9,907.60	49.72	232.99	1082.13	2.46	43.01	23.36	257,597.63
Commissioning Trips[8]	6		35.0	26	On-Road	0.10	0.94	0.09	0.00	0.06	0.02	187.67	2.57	24.45	2.45	0.05	1.67	0.51	4,879.45
Water Trucks (on-site)[3]		2	60.0	26	On-Road	0.09	0.44	2.03	0.00	0.06	0.04	482.32	2.42	11.34	52.68	0.12	1.47	0.98	12,540.25
Concrete Material Trucks[6]	8		55.0	26	On-Road	0.34	1.60	7.43	0.02	0.30	0.16	1,768.50	8.88	41.59	193.16	0.44	7.68	4.17	45,980.92
Concrete Trucks[7]	8		5.0	26	On-Road	0.03	0.15	0.68	0.00	0.03	0.01	160.77	0.81	3.78	17.56	0.04	0.70	0.38	4,180.08
Dump Trucks[5]		4	60.0	26	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	4.84	22.68	105.36	0.24	2.93	1.97	25,080.50
February																			
Worker Vehicles[1]	130		35.0	26	On-Road	2.14	20.37	2.04	0.04	1.39	0.43	4,066.21	55.75	529.65	53.09	1.06	36.10	11.08	105,721.51
Delivery Trucks[2]	29		85.0	26	On-Road	1.91	8.96	41.62	0.09	1.65	0.90	9,907.60	49.72	232.99	1082.13	2.46	43.01	23.36	257,597.63
Commissioning Trips[8]	6		35.0	26	On-Road	0.10	0.94	0.09	0.00	0.06	0.02	187.67	2.57	24.45	2.45	0.05	1.67	0.51	4,879.45
Water Trucks (on-site)[3]		2	60.0	26	On-Road	0.09	0.44	2.03	0.00	0.06	0.04	482.32	2.42	11.34	52.68	0.12	1.47	0.98	12,540.25
Concrete Material Trucks[6]	8		55.0	26	On-Road	0.34	1.60	7.43	0.02	0.30	0.16	1,768.50	8.88	41.59	193.16	0.44	7.68	4.17	45,980.92
Concrete Trucks[7]	8		5.0	26	On-Road	0.03	0.15	0.68	0.00	0.03	0.01	160.77	0.81	3.78	17.56	0.04	0.70	0.38	4,180.08
Dump Trucks[5]		4	60.0	26	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	4.84	22.68	105.36	0.24	2.93	1.97	25,080.50
March																			
Worker Vehicles[1]	130		35.0	26	On-Road	2.14	20.37	2.04	0.04	1.39	0.43	4,066.21	55.75	529.65	53.09	1.06	36.10	11.08	105,721.51
Delivery Trucks[2]	29		85.0	26	On-Road	1.91	8.96	41.62	0.09	1.65	0.90	9,907.60	49.72	232.99	1082.13	2.46	43.01	23.36	257,597.63
Commissioning Trips[8]	6		35.0	26	On-Road	0.10	0.94	0.09	0.00	0.06	0.02	187.67	2.57	24.45	2.45	0.05	1.67	0.51	4,879.45
Water Trucks (on-site)[3]		2	60.0	26	On-Road	0.09	0.44	2.03	0.00	0.06	0.04	482.32	2.42	11.34	52.68	0.12	1.47	0.98	12,540.25
Concrete Material Trucks[6]	8		55.0	26	On-Road	0.34	1.60	7.43	0.02	0.30	0.16	1,768.50	8.88	41.59	193.16	0.44	7.68	4.17	45,980.92
Concrete Trucks[7]	8		5.0	26	On-Road	0.03	0.15	0.68	0.00	0.03	0.01	160.77	0.81	3.78	17.56	0.04	0.70	0.38	4,180.08
Dump Trucks[5]		4	60.0	26	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	4.84	22.68	105.36	0.24	2.93	1.97	25,080.50
April																			
Worker Vehicles[1]	158		35.0	26	On-Road	2.61	24.79	2.49	0.05	1.69	0.52	4,948.27	67.85	644.54	64.61	1.30	43.93	13.48	128,654.94
Delivery Trucks[2]	29		85.0	26	On-Road	1.91	8.96	41.62	0.09	1.65	0.90	9,907.60	49.72	232.99	1082.13	2.46	43.01	23.36	257,597.63
Commissioning Trips[8]	6		35.0	26	On-Road	0.10	0.94	0.09	0.00	0.06	0.02	187.67	2.57	24.45	2.45	0.05	1.67	0.51	4,879.45
Water Trucks (on-site)[3]		2	60.0	26	On-Road	0.09	0.44	2.03	0.00	0.06	0.04	482.32	2.42	11.34	52.68	0.12	1.47	0.98	12,540.25
Concrete Material Trucks[6]	8		55.0	26	On-Road	0.34	1.60	7.43	0.02	0.30	0.16	1,768.50	8.88	41.59	193.16	0.44	7.68	4.17	45,980.92
Concrete Trucks[7]	8		5.0	26	On-Road	0.03	0.15	0.68	0.00	0.03	0.01	160.77	0.81	3.78	17.56	0.04	0.70	0.38	4,180.08
Dump Trucks[5]		4	60.0	26	On-Road	0.21	0.96	4.71	0.01	0.14	0.10	965.42	4.84	22.68	105.36	0.24	2.93	1.97	25,080.50
May																			
Worker Vehicles[1]	28		35.0	26	On-Road	0.46	4.39	0.44	0.01	0.30	0.09	875.80	12.01	114.08	11.44	0.23	7.78	2.39	22,770.79
Delivery Trucks[9]	50		85.0	26	On-Road	3.30	15.45	71.76	0.16	2.85	1.55	17,082.07	85.73	401.70	1865.74	4.24	74.15	40.28	444,133.85
June																			
Worker Vehicles[1]	28		35.0	26	On-Road	0.46	4.39	0.44	0.01	0.30	0.09	875.80	12.01	114.08	11.44	0.23	7.78	2.39	22,770.79
Delivery Trucks[9]	50		85.0	26	On-Road	3.30	15.45	71.76	0.16	2.85	1.55	17,082.07	85.73	401.70	1865.74	4.24	74.15	40.28	444,133.85
												TOTAL 2015	**707.54**	**4,612.33**	**9,791.58**	**26.80**	**545.89**	**257.55**	**2,780,664.07**

1. Trips per day - assumes 30% decrease in worker trips due to carpooling
   Employee commute distance of 35 miles is assumed based on local workforce from Alpine and Boulevard
2. Materials delivery coming from Rancho Bernardo, San Diego. Includes tracker deliveries and other delivery trips associated with grading, substation construction, and O&M building construction.
3. Assumes on-site water trucks will be operating at 15 mph for 8 hours per day during site preparation (120 mi/day), and 4 hours per day following site preparation activities (60 mi/day)
4. Assumes 65,170 gallons per day of water is imported from Padre Dam Municipal Water District (approx. 54 miles) during October, November and December for site preparation (clear and grub)
   Assumes 92,324 gallons/day of water is imported from Jacumba Community Services District (approx. 10 miles) during October, November, and December for site preparation (clear and grub)
   An original distance of 58 miles was arbitrarily assigned for truck trips travelling to and from Padre Dam. A more accurate 54-mile distance was assigned based on actual miles traveled to and from PDMWD.
5. Assumes dump trucks will be operating at 15 mph for 4 hours per day = 60 mi/day
6. Assumes concrete material (sand, cement, etc) trucks will be travelling 55 miles
7. Assumes concrete trucks will be travelling 5 miles
8. Employee commute/commissioning distance of 35 miles is assumed based on local workforce from Alpine and Boulevard
9. Assumes 50 one way trips per day from Rancho Bernardo, CA for energy storage deliveries

Water for site prep. 12 ac-ft imported from Padre Dam Municipal Water District

Rugged Solar Farm Project
On-Road Motor Vehicle Emissions - Revised

	56,670	gal//day
	54	miles driving distance one-way
	17	ac-ft imported from Jacumba Community Service District
	80,282	gal/day
	10	miles driving distance one-way
Energy Storage	50	one way trips per day from Rancho Bernardo, CA for energy storage deliveries

Source: Dudek Water Estimation Sheet
Construction Traffic Estimates: Dudek "Rugged Traffic Estimates" worksheet

AIS 3

ADDENDUM
ACOUSTICAL ASSESSMENT REPORT
Rugged Solar LLC Project
Environmental Review Project Number 3910-120005
Major Use Permit 3300-12-007
Boulevard, San Diego County, California

Lead Agency:

County of San Diego
Planning & Development Services
5510 Overland Avenue, Suite 310
San Diego, California 92123
Contact: Robert Hingtgen

Project Proponent:

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ADDENDUM
Acoustical Assessment Report
Rugged Solar LLC Project

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EXECUTIVE SUMMARY

Dudek has prepared this addendum noise analysis report for the Rugged Solar Farm, evaluating operational noise impacts associated with outdoor mechanical equipment, to include the proposed optional addition of an energy storage system component. Operational noise impacts associated with the energy storage systems include heating, ventilation and air conditioning units (HVAC), power inverters, and step up transformers. The applicant proposes to implement one of two project design feature options, both of which are analyzed in this report. The options are based on two different types of HVAC units. Option 1 would be implemented if the energy storage container units are equipped with the standard HVAC unit (NACO Model 30RB120 or sound equivalent). Each HVAC unit would be surrounded by a solid perimeter (screen) wall with elevation one foot higher than the top elevation of the HVAC unit. In addition, each step-up transformer and related pair (2) of power inverters would be enclosed with an 8-foot high solid perimeter wall.

Option 2 would be implemented if a quieter HVAC unit (Daikin McQuay 025D, or sound equivalent) is used. With this option, each would be surrounded by a solid perimeter (screen) wall with elevation one foot higher than the top elevation of the chiller unit. No energy storage transformer or power inverter screen walls are proposed or necessary if the Daikin McQuay 025D, or sound-equivalent HVAC model is used.

This addendum analyzes both project design feature options, and incorporates the following applicable mitigation measure for the Rugged solar farm from the original report and Draft Program Environmental Impact Report (DPEIR) Section 2.6, Noise:

M-N-R-1 Enclose Inverters in Noise Attenuating Structures: To ensure noise from inverters would comply with the County Noise Ordinance, the following would be implemented:

- Locate non-enclosed inverters a minimum of 800 feet or greater from the nearest property line, or enclose inverters within 800 feet of property lines in cement blocks or other type of structure capable of achieving a minimum 10 dB attenuation.
- Direct all switch station doorways and exterior ventilation ducts away from adjacent property lines.
- Prior to the approval of building plans, a noise analysis shall be prepared that demonstrates that the inverters comply with the County Noise Ordinance.
- The O&M building at the Rugged solar farm shall be located no closer than 1,250 feet from the property line.

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ADDENDUM
Acoustical Assessment Report
Rugged Solar LLC Project

1.0 INTRODUCTION

This addendum to the Dudek Acoustical Assessment Report for the Rugged Solar LLC Project (October 2013) provides information regarding a new, optional component of the Soitec Solar Development Project (Proposed Project) that was not analyzed in the Draft Program Environmental Impact Report (DPEIR) dated January 2014. Rugged Solar LLC (Rugged) proposes to include an optional energy storage system in the Rugged solar farm as part of the Proposed Project. This addendum describes the energy storage system, analyzes its potential to have a significant environmental impact related to noise, and concludes that the addition of the energy storage system on the Rugged solar farm would not affect the conclusions of the DPEIR prepared and circulated for the development of the Proposed Project.

2.0 PROJECT DESCRIPTION

The applicant proposes to include a component as part of the Rugged solar farm, to be located in southeastern San Diego County. This component consists of energy storage in the form of lithium ion (Li-ion) batteries (energy storage system), which would be located on the Rugged solar farm site in order to store energy produced by CPV trackers and to provide the ability to dispatch this energy upon request depending upon demand and other factors. The battery storage system would provide 160 Megawatt hours (MWh) of Li-ion battery storage in the form of 160 1 MWh containers each measuring 40 feet x 8.5 feet x 9.5 feet (LxWxH) on approximately 7 acres with appropriate fire access and approximately 20 feet of spacing on all four sides of each container.

2.1 Location

The energy storage system would be located on an approximate 7-acre portion of the Rugged solar farm site immediately south of the on-site substation (see Figures 1a and 1b, Energy Storage System Location) in an area previously proposed to be developed with approximately 47 CPV trackers and associated inverters and step-up transformers. The proposed energy storage system would not change the developed footprint of the Rugged solar farm site.

2.2 Components

The Li-ion battery storage would be housed in standard 40’ International Organization of Standardization (ISO) shipping containers. The containers are typically made from 12 to 14 gauge steel. The supplier’s logo would be displayed on each container and containers can be painted to order (i.e., containers can be painted with any color stocked by the supplier). The containers would be oriented east/west in two rows of 80 containers each or in four rows of 40 containers each. An approximate 7-acre area would be required to accommodate two rows of 80 containers and an additional 0.5-acre area would be required to accommodate four rows of 60 containers.. Approximately 20 feet of spacing would be provided on all four sides of each container measuring 40 feet x 8.5 feet x 9.5 feet (LxWxH); see Figure 2, Energy Storage Container Size and Spacing. It should be noted that inverters and step-up transformers would be located within the container spacing as described below and as depicted in Figure 3.

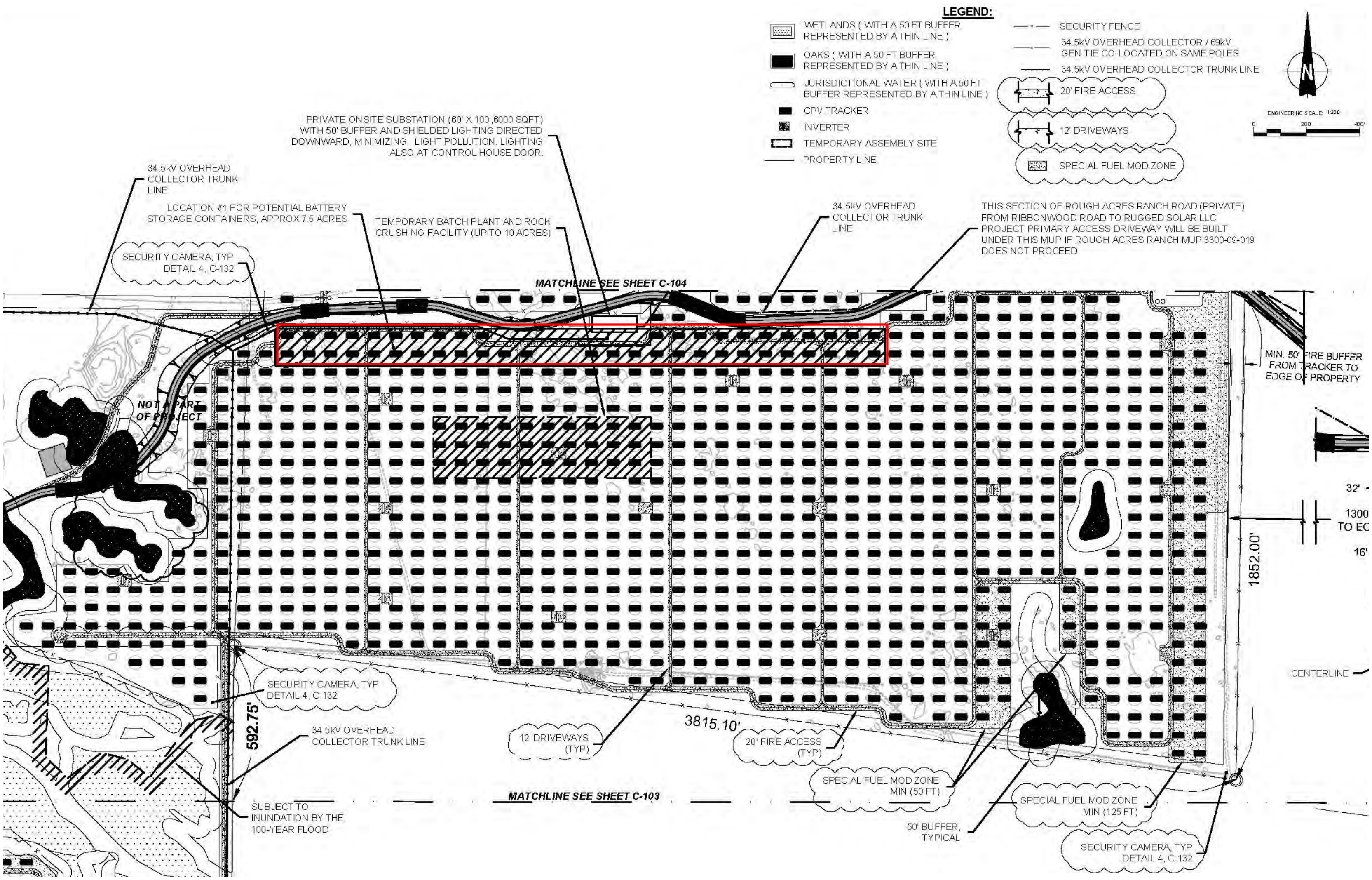
The Li-ion batteries (cells) would be arranged into modules, which in turn would be stored in battery racks. The racks would be entirely contained within the container. The container would have an access door at each end and overhead lighting on the interior roof. Each container would have an integrated heating, ventilation, and air conditioning (HVAC) unit located on the roof of the container. Each HVAC unit would measure approximately 7.5 feet in height. An inverter with a battery management system and container control system would be installed externally on a concrete pad next to each container. A step-up transformer would be associated with a set of two containers and would be installed alongside the container on a separate concrete pad. Thus, a total of 160 HVAC units, 160 inverters, and 80 step-up transformers would be associated with the energy storage system. Figure 3 provides an example illustration of the containers, step up transformers, and related infrastructure while Figure 4 provides an example of the typical container interior and battery pack configurations. Figure 5 presents the typical Li-ion battery pack components.

The proposed batteries and containers also include the following important monitoring and safety components:

- Modular battery racks designed for ease of maintenance. Every rack's battery monitoring system (BMS) continually monitors for unsafe voltage, current, and temperature, and has control of an automated switch (contactor) to disconnect the rack from the system if necessary.
- Integrated fire detection and suppression system
- Li-ion nanophosphate chemistry which is considered to be the most stable Li-ion technology and substantially reduces the possibility of thermal runaway and provides for reduced reaction from abuse (Sandia National Laboratories 2012) and A123 Systems (no date).

Figure 1a

Example Location for Battery Storage Containers



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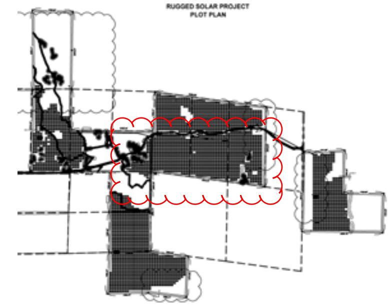
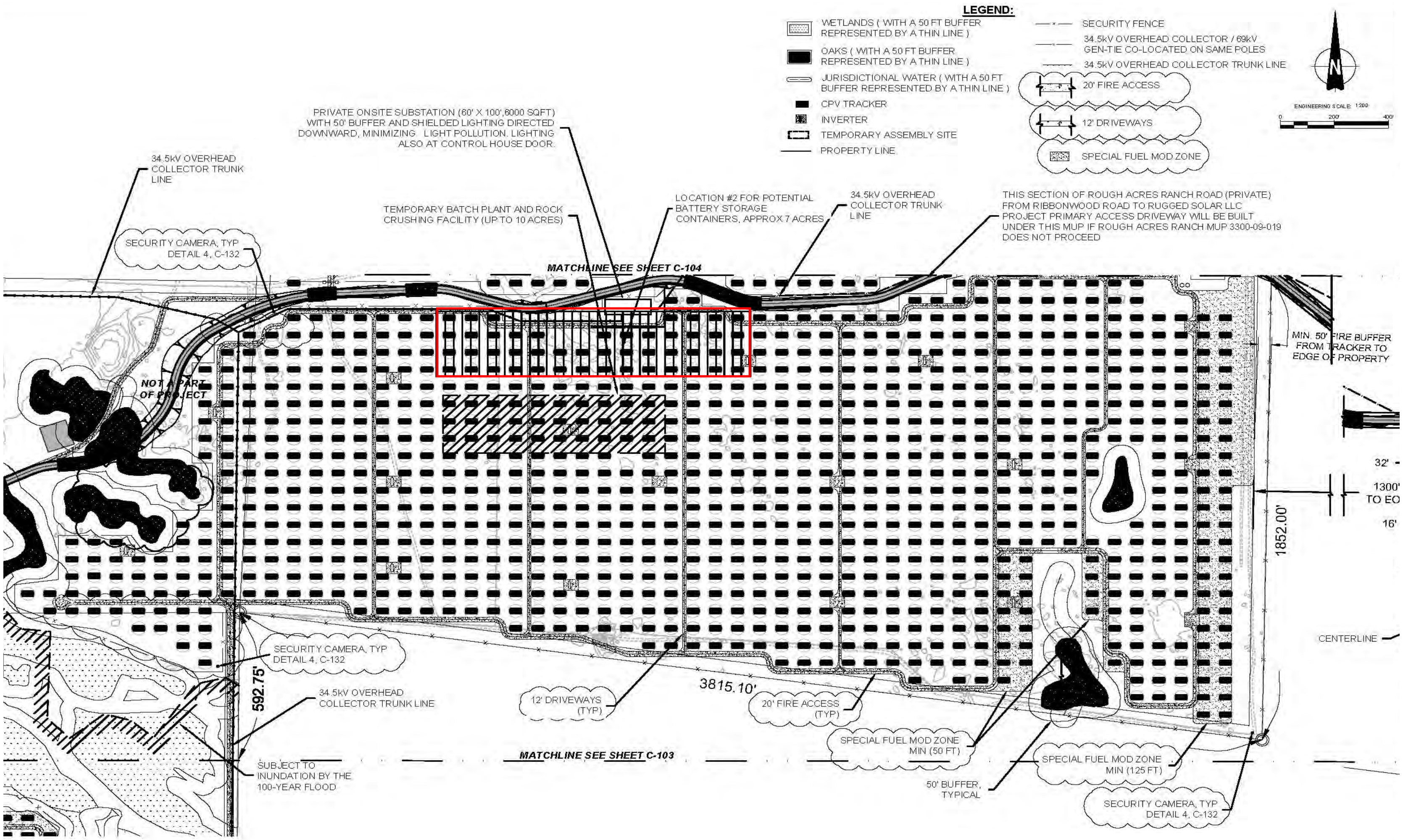


Figure 1b

Example Location for Battery Storage Containers



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3.0 ANALYSIS

3.1 Solar Farm Operation Noise Sources

On-site stationary noise sources associated with the Rugged solar farm and evaluated in the Dudek Acoustical Assessment Report for Rugged Solar LLC (October 2013) would include pad-mounted inverters and transformers, substation transformers, tracker array motors and dryers/blowers. The noise from operation of the energy storage system container HVAC systems and step-up transformers must be added to the previously assessed stationary noise sources in order to determine composite noise levels from all project components. We briefly summarize each of the operational components previously evaluated, in addition to the new energy storage component, before presenting the results of the assessment of operations noise.

3.1.1 Building Block Inverters and Transformers

The Rugged solar farm includes a total installation of 3,588 CPV Trackers. The CPV Trackers would be arranged into a building block that consists of Soitec Concentrix CX-S530 dual-axis trackers that would feed into an inverter station. The proposed Xantrex Inverter, or equivalent, has a noise level rating of 77 dB at 6 feet (Schneider Electric 2011). The proposed transformer has a sound rating of 60 dB at 5 feet based on National Electric Manufactures Association (NEMA) ratings for the size of transformer anticipated to be used with inverters (NEMA 2000).

The inverter/transformer equipment represents the most substantial noise source in the panel array areas, compared to tracker and blower noise. The distance spacing between inverters/transformers is such that a given point on the project perimeter may be exposed to noise from more than a single inverter station. For this reason, property line noise exposure was evaluated from the combined noise from the three closest inverter stations.

3.1.2 Substation Transformer

The Rugged solar farm requires the use of a private on-site collector substation 60feet by 100 feet that would be located on a 2.0-acre site within the central portion of the site (refer to *Figure 1*). The purpose of the substation is to collect the energy received from the overhead and underground collector system and increase the voltage from 34.5–138 kV. Once the voltage is stepped up to 138kV, the power would be conveyed through a 35-foot high deadened structure that terminates the gen-tie within the on-site collector substation. The power would then be conveyed through the gen-tie line to the Boulevard Substation.

The transformer at the on-site substation would be either a 50 MVA or 70 MVA step up transformer. A transformer with 50 MVA or 70 MVA capacity has a noise level rating of 72 dB at 5 feet (Delta Star 2012). See *Figure 1* for the proposed location of the substation, which Dudek used for evaluation of noise levels at the project property boundaries.

3.1.3 Operations and Maintenance

An operations and maintenance (O&M) area is also proposed in the central subarea of the site, east of Ribbonwood Road and west of McCain Valley Road on APN 611-100-07-00 and would contain parking, a 7,500-sf building, and other maintenance material and equipment. The O&M operations yard would potentially generate noise levels during daytime hours on the order of 70 dBA Leq at 50 feet (AECOM 2012).

3.1.4 Tracker Motors and Dryers/Blowers

Individual tracker dimensions are approximately 48 feet across by 25 feet tall. Each CPV Tracker unit would be mounted on a steel pole. Noise associated with the trackers would be from the motors and dryers/blowers. Field noise measurements of the tracker indicates the tracker motor generates a noise level of 37 dB at 50 feet and the dryers/blowers generate a noise level of 43 dB at 50 feet (AECOM 2012).

3.1.5 Energy Storage Container HVAC / Inverters / Step-Up Transformers

With respect to potential long-term operational noise associated with the energy storage component, the HVAC unit for each storage container would be a primary source of noise generation. Standard literature for one mass energy storage vendor indicates a typical installation of one step up transformer for each pair of containers. Thus, a total of 160 HVAC units, 160 power inverters, and 80 transformers would be associated with the storage containers.

Information from the vendor indicates the HVAC unit which is supplied as standard equipment for the storage containers produces 68 dBA at a distance of 50 feet during full operation (NACO Model 30RB120). An alternate HVAC unit with the same capacity is available from another vendor, which has a much lower sound rating of 60 dBA at a distance of 30 feet during full operation (Daikin McQuay 025D). The anticipated step-up transformer has a sound rating of 60 dB at 5 feet based on National Electric Manufactures Association (NEMA) ratings for the size of transformer anticipated to be used with storage battery systems (NEMA 2000). The anticipated power inverter is a Xantrex model, or equivalent, which has a noise level rating of 77 dB at 6 feet (Schneider Electric 2011). However, it should be noted that the anticipated power inverter would be bi-drectional whereas the Xantrex model is not. A total of 160 energy storage containers would be provided to house the energy storage systems, in two rows of 80 containers apiece (or in four rows of 40 containers apiece), oriented east/west. Each container would be equipped with an individual HVAC system and between each pair of containers, a step-up transformer and inverter would be provided (80 total). Noise contribution from the energy storage complex was modelled using the acoustic center of the dedicated energy storage system yard.

3.2 Equipment Noise Levels at Property Lines

Figure 5 of the Dudek Acoustical Assessment Report for Rugged Solar LLC (DPEIR Appendix 2.6-2, October 2013) illustrates the noise modeling locations selected to determine the worst-case cumulative noise levels at the property lines, resulting from the building block inverters and transformers, substation transformer, operations and maintenance yard, tracker motors and dryers/blowers. *Figure 6* depicts the property lines accounted for in the cumulative noise level analysis. A cumulative noise level analysis from the Rugged solar farm with addition of the energy storage component was completed, which included assessment at the same locations as previously identified in the Dudek Acoustical Assessment Report. Since the applicant proposes one of two project design feature options based on the type of HVAC equipment that will be used, the following analyzes both options.

3.2.1 Option 1

If the energy storage container units are equipped with the standard HVAC unit (NACO Model 30RB120, or sound equivalent), each HVAC unit would be surrounded by a solid perimeter screen wall with elevation one foot higher than the top elevation of the HVAC unit. In addition, each step-up transformer and related pair (2) of power inverters would be enclosed with an 8-foot high solid perimeter wall.

The results of the cumulative noise levels for Option 1 are included in *Table 1* (refer to *Attachment 1* for calculation worksheets). Each cumulative noise level includes contribution from the substation transformer, operations yard, tracker and blower motors, solar panel inverters and the energy storage system HVAC units, inverters, and step-up transformers. As indicated above, the analysis assumes adherence to Mitigation M-N-R-1 from the DPEIR (i.e., inverters setback 800 feet or more to adjacent residential property lines and operations and maintenance yard located not closer than 1,250 feet from adjacent residential property lines). As illustrated in *Table 1,* the resulting noise level from combined project noise sources would comply with the County's noise ordinance criteria at all project property boundaries; thus, operational noise under Option 1 would not result in a significant noise impact.

Table 1
Summary of Project Noise Levels at Property Lines
OPTION 1

Property Line	Project Noise Level (dBA Leq)	Exceed County daytime noise limit (50 dBA Leq)	Exceed County nighttime noise limit (45 dBA Leq)
#1	44	No	No
#2	42	No	No
#3	42	No	No
#4	45	No	No
#5	45	No	No
#6	44	No	No
#7	41	No	No
#8	42	No	No
#9	42	No	No
#10	44	No	No
#11	42	No	No
#12	43	No	No
#13	44	No	No
#14	43	No	No
#15	43	No	No
#16	45	No	No

3.2.2 Option 2

Option 2 is use of a quieter HVAC unit (Daikin McQuay 025D, or equivalent) with each HVAC unit surrounded by a solid perimeter (screen) wall with elevation one foot higher than the top elevation of the chiller unit. No transformer or inverter screen walls are proposed or necessary if the Daikin McQuay 025D, or sound-equivalent HVAC model is used.

The results of the cumulative noise levels for Option 2 are included in *Table 2* (refer to *Attachment 1* for calculation worksheets). Each cumulative noise level includes contribution from the substation transformer, operations yard, tracker and blower motors, solar panel inverters and the energy storage system HVAC units, inverters, and step-up transformers. Again, the analysis assumes adherence to Mitigation M-N-R-1 from the DPEIR. As illustrated in *Table 2,* the resulting noise level from combined project noise sources would comply with the County's noise ordinance criteria at all project property boundaries; thus, operational noise under Option 2 would also not result in a significant noise impact.

Table 2
Summary of Mitigated Project Noise Levels at Property Lines
OPTION 2

Property Line	Project Noise Level (dBA Leq)	Exceed County daytime noise limit (50 dBA Leq)	Exceed County nighttime noise limit (45 dBA Leq)
#1	44	No	No
#2	41	No	No
#3	42	No	No
#4	44	No	No
#5	44	No	No
#6	44	No	No
#7	41	No	No
#8	42	No	No
#9	42	No	No
#10	44	No	No
#11	42	No	No
#12	43	No	No
#13	44	No	No
#14	43	No	No
#15	43	No	No
#16	44	No	No

3.3 Short Term Construction Noise

Because no additional grading would be required and construction equipment and duration would remain the same as evaluated in the DPEIR, the on-site construction noise would not be appreciably altered with substitution of the energy storage units for approximately 47 CPV components. Installation of the energy storage systems would also result in a short-term increase in traffic on the local area's roadway network; approximately 160 truck trips (320 one-way trips) would be required for energy storage unit deliveries. However, approximately 123 one-way trips for material deliveries associated with the 47 CPV components were originally analyzed in the DPEIR, and therefore the storage unit substitution for 47 CPV components would result in a net trip increase of 197 overall trips over an eight-month period.

Energy storage container deliveries could reach up to 25 truck trips per day (or 50 one-way trips per day). At this level, the peak construction truck traffic for the Rugged solar farm would increase to 197 one-way trips per day. This increase would not be sufficient to increase traffic noise levels a substantial amount. Typically, traffic volumes must double to create an increase in perceptible (3 dBA) traffic noise (Caltrans 2009). The addition of 197 construction-related trips to the roadway network would not double existing traffic levels and, therefore, would not increase traffic noise by 3 dBA.

4.0 DESIGN CONSIDERATIONS

Implementation of applicant proposed design feature PDF-ES-N-1 (i.e., Option 1 or Option 2 as discussed above in Section 3.2.1 and 3.2.2) would maintain project noise impacts at a level below significance, including compliance with the County's daytime and nighttime hourly Leq standards. No further design considerations would be necessary in order to address potentially significant noise impacts.

PDF-ES-N-1 To ensure noise from energy storage system HVAC units, transformers and inverters will comply with the County Noise Ordinance, one of the following measures shall be implemented:

1) If the battery storage container units are equipped with the standard HVAC unit (NACO Model 30RB120, or sound equivalent), each HVAC unit shall be surrounded by a solid perimeter screen wall with elevation one foot higher than the top elevation of the HVAC unit. In addition, each step-up transformer and related pair (2) of power inverters shall be enclosed with an 8-foot high solid perimeter wall.
2) If the battery storage container units are equipped with a quieter HVAC unit (Daikin McQuay 025D, or sound equivalent), each HVAC unit shall be surrounded by a solid perimeter screen wall with elevation one foot higher than the top elevation of the chiller unit. No transformer or inverter screen walls are necessary if the Daikin McQuay 025D, or sound-equivalent HVAC model is used.

5.0 CERTIFICATION

This addendum has been prepared by Mr. Jonathan V. Leech and Mr. Mike Greene. Mike Greene is a County of San Diego approved CEQA Consultant for Acoustics.

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Environmental Specialist/Acoustician

ATTACHMENT 1

Operating Noise Levels at Adjacent Property Boundaries

Scenario: NACO Model 30RB120 Chiller with 8.5 foot screen; 8 ft transformer screen — Property Line 1

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	240	32.0	39.7
Transformer (pad mounted)	60	5	1	240	33.6	26.4
Inverter	67	6	3	425	37.0	34.8
Transformer (pad mounted)	60	5	1	425	38.6	21.4
Inverter	67	6	3	805	42.6	29.2
Transformer (pad mounted)	60	5	1	805	44.1	15.9
Substation Transformer	72	5	1	7250	63.2	8.8
O&M Yard	70	50	1	5500	40.8	29.2
Tracker Motor	37	50	1	80	4.1	32.9
Tracker dryer/blower	43	50	1	80	4.1	38.9
Storage Transformers	15	50	80	7250	43.2	1.0
Storage HVAC	50	50	160	7250	43.2	28.8
Storage Inverters	30	50	160	7250	43.2	8.8
					Cumulative	44.0

Scenario: NACO Model 30RB120 Chiller with 8.5 foot screen; 8 ft transformer screen — Property Line 2

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	380	36.0	35.7
Transformer (pad mounted)	60	5	1	380	37.6	22.4
Inverter	67	6	3	665	40.9	30.9
Transformer (pad mounted)	60	5	1	665	42.5	17.5
Inverter	67	6	3	950	44.0	27.8
Transformer (pad mounted)	60	5	1	950	45.6	14.4
Substation Transformer	72	5	1	6810	62.7	9.3
O&M Yard	70	50	1	4375	38.8	31.2
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	15	50	80	7010	42.9	1.0
Storage HVAC	50	50	160	7010	42.9	29.1
Storage Inverters	30	50	160	7010	42.9	9.1
					Cumulative	41.5

Scenario: NACO Model 30RB120 Chiller with 8.5 foot screen; 8 ft transformer screen — Property Line 3

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	285	33.5	38.2
Transformer (pad mounted)	60	5	1	285	35.1	24.9
Inverter	67	6	3	805	42.6	29.2
Transformer (pad mounted)	60	5	1	805	44.1	15.9
Inverter	67	6	3	1470	47.8	24.0
Transformer (pad mounted)	60	5	1	1470	49.4	10.6
Substation Transformer	72	5	1	5625	61.0	11.0
O&M Yard	70	50	1	4250	38.6	31.4
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	15	50	80	5825	41.3	1.0
Storage HVAC	50	50	160	5825	41.3	30.7
Storage Inverters	30	50	160	5825	41.3	10.7
					Cumulative	42.3

Scenario: NACO Model 30RB120 Chiller with 8.5 foot screen; 8 ft transformer screen — Property Line 4

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	380	36.0	35.7
Transformer (pad mounted)	60	5	1	380	37.6	22.4
Inverter	67	6	3	330	34.8	37.0
Transformer (pad mounted)	60	5	1	330	36.4	23.6
Inverter	67	6	3	855	43.1	28.7
Transformer (pad mounted)	60	5	1	855	44.7	15.3
Substation Transformer	72	5	1	3065	55.7	16.3
O&M Yard	70	50	1	1625	30.2	39.8
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	15	50	80	3365	36.6	1.0
Storage HVAC	50	50	160	3365	36.6	35.5
Storage Inverters	30	50	160	3365	36.6	15.5
					Cumulative	44.7

Scenario: NACO Model 30RB120 Chiller with 8.5 foot screen; 8 ft transformer screen — Property Line 5

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	285	33.5	38.2
Transformer (pad mounted)	60	5	1	285	35.1	24.9
Inverter	67	6	3	570	39.6	32.2
Transformer (pad mounted)	60	5	1	570	41.1	18.9
Inverter	67	6	3	1140	45.6	26.2
Transformer (pad mounted)	60	5	1	1140	47.2	12.8
Substation Transformer	72	5	1	1750	50.9	21.1
O&M Yard	70	50	1	2250	33.1	36.9
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	15	50	80	1900	31.6	1.0
Storage HVAC	50	50	160	1900	31.6	40.4
Storage Inverters	30	50	160	1900	31.6	20.4
					Cumulative	45.0

Scenario: NACO Model 30RB120 Chiller with 8.5 foot screen; 8 ft transformer screen — Property Line 6

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	400	36.5	35.3
Transformer (pad mounted)	60	5	1	400	38.1	21.9
Inverter	67	6	3	520	38.8	33.0
Transformer (pad mounted)	60	5	1	520	40.3	19.7
Inverter	67	6	3	665	40.9	30.9
Transformer (pad mounted)	60	5	1	665	42.5	17.5
Substation Transformer	72	5	1	2000	52.0	20.0
O&M Yard	70	50	1	4625	39.3	30.7
Tracker Motor	37	50	1	80	4.1	32.9
Tracker dryer/blower	43	50	1	80	4.1	38.9
Storage Transformers	15	50	80	1800	31.1	1.0
Storage HVAC	50	30	160	1800	35.6	36.5
Storage Inverters	30	50	160	1800	31.1	20.9
					Cumulative	43.5

Scenario: NACO Model 30RB120 Chiller with 8.5 foot screen; 8 ft transformer screen — Property Line 7

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	475	38.0	33.8
Transformer (pad mounted)	60	5	1	475	39.6	20.4
Inverter	67	6	3	665	40.9	30.9
Transformer (pad mounted)	60	5	1	665	42.5	17.5
Inverter	67	6	3	805	42.6	29.2
Transformer (pad mounted)	60	5	1	805	44.1	15.9
Substation Transformer	72	5	1	5125	60.2	11.8
O&M Yard	70	50	1	8000	44.1	25.9
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	15	50	80	4925	39.9	1.0
Storage HVAC	50	50	160	4925	39.9	32.2
Storage Inverters	30	50	160	4925	39.9	12.2
					Cumulative	41.1

Scenario: NACO Model 30RB120 Chiller with 8.5 foot screen; 8 ft transformer screen — Property Line 8

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	285	33.5	38.2
Transformer (pad mounted)	60	5	1	285	35.1	24.9
Inverter	67	6	3	615	40.2	31.6
Transformer (pad mounted)	60	5	1	615	41.8	18.2
Inverter	67	6	3	710	41.5	30.3
Transformer (pad mounted)	60	5	1	710	43.0	17.0
Substation Transformer	72	5	1	5625	61.0	11.0
O&M Yard	70	50	1	8375	44.5	25.5
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	15	50	80	5525	40.9	1.0
Storage HVAC	50	50	160	5525	40.9	31.2
Storage Inverters	30	50	160	5525	40.9	11.2
					Cumulative	42.4

Scenario: NACO Model 30RB120 Chiller with 8.5 foot screen; 8 ft transformer screen — Property Line 9

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	380	36.0	35.7
Transformer (pad mounted)	60	5	1	380	37.6	22.4
Inverter	67	6	3	805	42.6	29.2
Transformer (pad mounted)	60	5	1	805	44.1	15.9
Inverter	67	6	3	950	44.0	27.8
Transformer (pad mounted)	60	5	1	950	45.6	14.4
Substation Transformer	72	5	1	7250	63.2	8.8
O&M Yard	70	50	1	10000	46.0	24.0
Tracker Motor	37	50	1	80	4.1	32.9
Tracker dryer/blower	43	50	1	80	4.1	38.9
Storage Transformers	15	50	80	6250	41.9	1.0
Storage HVAC	50	50	160	6250	41.9	30.1
Storage Inverters	30	50	160	6250	41.9	10.1
					Cumulative	42.2

Scenario: NACO Model 30RB120 Chiller with 8.5 foot screen; 8 ft transformer screen — Property Line 10

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	240	32.0	39.7
Transformer (pad mounted)	60	5	1	240	33.6	26.4
Inverter	67	6	3	665	40.9	30.9
Transformer (pad mounted)	60	5	1	665	42.5	17.5
Inverter	67	6	3	950	44.0	27.8
Transformer (pad mounted)	60	5	1	950	45.6	14.4
Substation Transformer	72	5	1	6250	61.9	10.1
O&M Yard	70	50	1	9315	45.4	24.6
Tracker Motor	37	50	1	80	4.1	32.9
Tracker dryer/blower	43	50	1	80	4.1	38.9
Storage Transformers	15	50	80	6050	41.7	1.0
Storage HVAC	50	50	160	6050	41.7	30.4
Storage Inverters	30	50	160	6050	41.7	10.4
					Cumulative	43.6

Scenario: NACO Model 30RB120 Chiller with 8.5 foot screen; 8 ft transformer screen — Property Line 11

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	330	34.8	37.0
Transformer (pad mounted)	60	5	1	330	36.4	23.6
Inverter	67	6	3	570	39.6	32.2
Transformer (pad mounted)	60	5	1	570	41.1	18.9
Inverter	67	6	3	665	40.9	30.9
Transformer (pad mounted)	60	5	1	665	42.5	17.5
Substation Transformer	72	5	1	5500	60.8	11.2
O&M Yard	70	50	1	7750	43.8	26.2
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	15	50	80	5350	40.6	1.0
Storage HVAC	50	50	160	5350	40.6	31.5
Storage Inverters	30	50	160	5350	40.6	11.5
					Cumulative	42.1

Scenario: NACO Model 30RB120 Chiller with 8.5 foot screen; 8 ft transformer screen — Property Line 12

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	330	34.8	37.0
Transformer (pad mounted)	60	5	1	330	36.4	23.6
Inverter	67	6	3	710	41.5	30.3
Transformer (pad mounted)	60	5	1	710	43.0	17.0
Inverter	67	6	3	805	42.6	29.2
Transformer (pad mounted)	60	5	1	805	44.1	15.9
Substation Transformer	72	5	1	7625	63.7	8.3
O&M Yard	70	50	1	9125	45.2	24.8
Tracker Motor	37	50	1	80	4.1	32.9
Tracker dryer/blower	43	50	1	80	4.1	38.9
Storage Transformers	15	50	80	7475	43.5	1.0
Storage HVAC	50	50	160	7475	43.5	28.5
Storage Inverters	30	50	160	7475	43.5	8.5
					Cumulative	42.5

Scenario: NACO Model 30RB120 Chiller with 8.5 foot screen; 8 ft transformer screen — Property Line 13

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	190	30.0	41.8
Transformer (pad mounted)	60	5	1	190	31.6	28.4
Inverter	67	6	3	760	42.1	29.7
Transformer (pad mounted)	60	5	1	760	43.6	16.4
Inverter	67	6	3	665	40.9	30.9
Transformer (pad mounted)	60	5	1	665	42.5	17.5
Substation Transformer	72	5	1	6310	62.0	10.0
O&M Yard	70	50	1	7060	43.0	27.0
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	15	50	80	6210	41.9	1.0
Storage HVAC	50	50	160	6210	41.9	30.2
Storage Inverters	30	50	160	6210	41.9	10.2
					Cumulative	44.1

Scenario: NACO Model 30RB120 Chiller with 8.5 foot screen; 8 ft transformer screen — Property Line 14

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	425	37.0	34.8
Transformer (pad mounted)	60	5	1	425	38.6	21.4
Inverter	67	6	3	665	40.9	30.9
Transformer (pad mounted)	60	5	1	665	42.5	17.5
Inverter	67	6	3	520	38.8	33.0
Transformer (pad mounted)	60	5	1	520	40.3	19.7
Substation Transformer	72	5	1	5375	60.6	11.4
O&M Yard	70	50	1	6750	42.6	27.4
Tracker Motor	37	50	1	80	4.1	32.9
Tracker dryer/blower	43	50	1	80	4.1	38.9
Storage Transformers	15	50	80	5175	40.3	1.0
Storage HVAC	50	50	160	5175	40.3	31.7
Storage Inverters	30	50	160	5175	40.3	11.7
					Cumulative	42.6

Scenario: NACO Model 30RB120 Chiller with 8.5 foot screen; 8 ft transformer screen | Property Line 15

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	240	32.0	39.7
Transformer (pad mounted)	60	5	1	240	33.6	26.4
Inverter	67	6	3	570	39.6	32.2
Transformer (pad mounted)	60	5	1	570	41.1	18.9
Inverter	67	6	3	665	40.9	30.9
Transformer (pad mounted)	60	5	1	665	42.5	17.5
Substation Transformer	72	5	1	4375	58.8	13.2
O&M Yard	70	50	1	6250	41.9	28.1
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	15	50	80	4275	38.6	1.0
Storage HVAC	50	50	160	4275	38.6	33.4
Storage Inverters	30	50	160	4275	38.6	13.4
					Cumulative	43.4

Scenario: NACO Model 30RB120 Chiller with 8.5 foot screen; 8 ft transformer screen | Property Line 16

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	285	33.5	38.2
Transformer (pad mounted)	60	5	1	285	35.1	24.9
Inverter	67	6	3	640	40.6	31.2
Transformer (pad mounted)	60	5	1	640	42.1	17.9
Inverter	67	6	3	760	42.1	29.7
Transformer (pad mounted)	60	5	1	760	43.6	16.4
Substation Transformer	72	5	1	1940	51.8	20.2
O&M Yard	70	50	1	3375	36.6	33.4
Tracker Motor	37	50	1	80	4.1	32.9
Tracker dryer/blower	43	50	1	80	4.1	38.9
Storage Transformers	15	50	80	1840	31.3	1.0
Storage HVAC	50	50	160	1840	31.3	40.7
Storage Inverters	30	50	160	1840	31.3	20.7
					Cumulative	45.2

Scenario: Daikin McQuay Chiller & 8.5 foot screen/parapet — Property Line 1

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	240	32.0	39.7
Transformer (pad mounted)	60	5	1	240	33.6	26.4
Inverter	67	6	3	425	37.0	34.8
Transformer (pad mounted)	60	5	1	425	38.6	21.4
Inverter	67	6	3	805	42.6	29.2
Transformer (pad mounted)	60	5	1	805	44.1	15.9
Substation Transformer	72	5	1	7250	63.2	8.8
O&M Yard	70	50	1	6250	41.9	28.1
Tracker Motor	37	50	1	80	4.1	32.9
Tracker dryer/blower	43	50	1	80	4.1	38.9
Storage Transformers	60	5	80	7250	63.2	15.8
Storage HVAC	35	50	160	7250	43.2	13.8
Storage Inverters	67	5	160	7250	63.2	25.8
					Cumulative	43.9

Scenario: Daikin McQuay Chiller & 8.5 foot screen/parapet — Property Line 2

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	380	36.0	35.7
Transformer (pad mounted)	60	5	1	380	37.6	22.4
Inverter	67	6	3	665	40.9	30.9
Transformer (pad mounted)	60	5	1	665	42.5	17.5
Inverter	67	6	3	950	44.0	27.8
Transformer (pad mounted)	60	5	1	950	45.6	14.4
Substation Transformer	72	5	1	6810	62.7	9.3
O&M Yard	70	50	1	5500	40.8	29.2
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	60	5	80	7010	62.9	16.1
Storage HVAC	35	50	160	7010	42.9	14.1
Storage Inverters	67	5	160	7010	62.9	26.1
					Cumulative	41.3

Scenario: Daikin McQuay Chiller & 8.5 foot screen/parapet — Property Line 3

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	285	33.5	38.2
Transformer (pad mounted)	60	5	1	285	35.1	24.9
Inverter	67	6	3	805	42.6	29.2
Transformer (pad mounted)	60	5	1	805	44.1	15.9
Inverter	67	6	3	1470	47.8	24.0
Transformer (pad mounted)	60	5	1	1470	49.4	10.6
Substation Transformer	72	5	1	5625	61.0	11.0
O&M Yard	70	50	1	4250	38.6	31.4
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	60	5	80	5825	61.3	17.7
Storage HVAC	35	50	160	5825	41.3	15.7
Storage Inverters	67	5	160	5825	61.3	27.7
					Cumulative	42.2

Scenario: Daikin McQuay Chiller & 8.5 foot screen/parapet — Property Line 4

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	380	36.0	35.7
Transformer (pad mounted)	60	5	1	380	37.6	22.4
Inverter	67	6	3	330	34.8	37.0
Transformer (pad mounted)	60	5	1	330	36.4	23.6
Inverter	67	6	3	855	43.1	28.7
Transformer (pad mounted)	60	5	1	855	44.7	15.3
Substation Transformer	72	5	1	3065	55.7	16.3
O&M Yard	70	50	1	1625	30.2	39.8
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	60	5	80	3365	56.6	22.5
Storage HVAC	35	30	160	3365	41.0	16.0
Storage Inverters	67	5	160	3365	56.6	32.5
					Cumulative	44.4

Scenario: Daikin McQuay Chiller & 8.5 foot screen/parapet — Property Line 5

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	285	33.5	38.2
Transformer (pad mounted)	60	5	1	285	35.1	24.9
Inverter	67	6	3	570	39.6	32.2
Transformer (pad mounted)	60	5	1	570	41.1	18.9
Inverter	67	6	3	1140	45.6	26.2
Transformer (pad mounted)	60	5	1	1140	47.2	12.8
Substation Transformer	72	5	1	1750	50.9	21.1
O&M Yard	70	50	1	2250	33.1	36.9
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	60	5	80	1900	51.6	27.4
Storage HVAC	35	30	160	1900	36.0	21.0
Storage Inverters	67	5	160	1900	51.6	37.4
					Cumulative	44.3

Scenario: Daikin McQuay Chiller & 8.5 foot screen/parapet — Property Line 6

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	400	36.5	35.3
Transformer (pad mounted)	60	5	1	400	38.1	21.9
Inverter	67	6	3	520	38.8	33.0
Transformer (pad mounted)	60	5	1	520	40.3	19.7
Inverter	67	6	3	665	40.9	30.9
Transformer (pad mounted)	60	5	1	665	42.5	17.5
Substation Transformer	72	5	1	2000	52.0	20.0
O&M Yard	70	50	1	4625	39.3	30.7
Tracker Motor	37	50	1	80	4.1	32.9
Tracker dryer/blower	43	50	1	80	4.1	38.9
Storage Transformers	60	5	80	1800	51.1	27.9
Storage HVAC	35	30	160	1800	35.6	21.5
Storage Inverters	67	5	160	1800	51.1	37.9
					Cumulative	44.0

Scenario: Daikin McQuay Chiller & 8.5 foot screen/parapet — Property Line 7

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	475	38.0	33.8
Transformer (pad mounted)	60	5	1	475	39.6	20.4
Inverter	67	6	3	665	40.9	30.9
Transformer (pad mounted)	60	5	1	665	42.5	17.5
Inverter	67	6	3	805	42.6	29.2
Transformer (pad mounted)	60	5	1	805	44.1	15.9
Substation Transformer	72	5	1	5125	60.2	11.8
O&M Yard	70	50	1	8000	44.1	25.9
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	60	5	80	4925	59.9	19.2
Storage HVAC	35	50	160	4925	39.9	17.2
Storage Inverters	67	5	160	4925	59.9	29.2
					Cumulative	40.9

Scenario: Daikin McQuay Chiller & 8.5 foot screen/parapet — Property Line 8

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	285	33.5	38.2
Transformer (pad mounted)	60	5	1	285	35.1	24.9
Inverter	67	6	3	615	40.2	31.6
Transformer (pad mounted)	60	5	1	615	41.8	18.2
Inverter	67	6	3	710	41.5	30.3
Transformer (pad mounted)	60	5	1	710	43.0	17.0
Substation Transformer	72	5	1	5625	61.0	11.0
O&M Yard	70	50	1	8375	44.5	25.5
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	60	5	80	5525	60.9	18.2
Storage HVAC	35	50	160	5525	40.9	16.2
Storage Inverters	67	5	160	5525	60.9	28.2
					Cumulative	42.3

Scenario: Daikin McQuay Chiller & 8.5 foot screen/parapet — Property Line 9

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	380	36.0	35.7
Transformer (pad mounted)	60	5	1	380	37.6	22.4
Inverter	67	6	3	805	42.6	29.2
Transformer (pad mounted)	60	5	1	805	44.1	15.9
Inverter	67	6	3	950	44.0	27.8
Transformer (pad mounted)	60	5	1	950	45.6	14.4
Substation Transformer	72	5	1	7250	63.2	8.8
O&M Yard	70	50	1	10000	46.0	24.0
Tracker Motor	37	50	1	80	4.1	32.9
Tracker dryer/blower	43	50	1	80	4.1	38.9
Storage Transformers	60	5	80	6250	61.9	17.1
Storage HVAC	35	50	160	6250	41.9	15.1
Storage Inverters	67	5	160	6250	61.9	27.1
					Cumulative	42.0

Scenario: Daikin McQuay Chiller & 8.5 foot screen/parapet — Property Line 10

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	240	32.0	39.7
Transformer (pad mounted)	60	5	1	240	33.6	26.4
Inverter	67	6	3	665	40.9	30.9
Transformer (pad mounted)	60	5	1	665	42.5	17.5
Inverter	67	6	3	950	44.0	27.8
Transformer (pad mounted)	60	5	1	950	45.6	14.4
Substation Transformer	72	5	1	6250	61.9	10.1
O&M Yard	70	50	1	9315	45.4	24.6
Tracker Motor	37	50	1	80	4.1	32.9
Tracker dryer/blower	43	50	1	80	4.1	38.9
Storage Transformers	60	5	80	6050	61.7	17.4
Storage HVAC	35	50	160	6050	41.7	15.4
Storage Inverters	67	5	160	6050	61.7	27.4
					Cumulative	43.5

Scenario: Daikin McQuay Chiller & 8.5 foot screen/parapet Property Line 11

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	330	34.8	37.0
Transformer (pad mounted)	60	5	1	330	36.4	23.6
Inverter	67	6	3	570	39.6	32.2
Transformer (pad mounted)	60	5	1	570	41.1	18.9
Inverter	67	6	3	665	40.9	30.9
Transformer (pad mounted)	60	5	1	665	42.5	17.5
Substation Transformer	72	5	1	5500	60.8	11.2
O&M Yard	70	50	1	7750	43.8	26.2
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	60	5	80	5350	60.6	18.4
Storage HVAC	35	50	160	5350	40.6	16.5
Storage Inverters	67	5	160	5350	60.6	28.5
					Cumulative	42.0

Scenario: Daikin McQuay Chiller & 8.5 foot screen/parapet Property Line 12

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	330	34.8	37.0
Transformer (pad mounted)	60	5	1	330	36.4	23.6
Inverter	67	6	3	710	41.5	30.3
Transformer (pad mounted)	60	5	1	710	43.0	17.0
Inverter	67	6	3	805	42.6	29.2
Transformer (pad mounted)	60	5	1	805	44.1	15.9
Substation Transformer	72	5	1	7625	63.7	8.3
O&M Yard	70	50	1	9125	45.2	24.8
Tracker Motor	37	50	1	80	4.1	32.9
Tracker dryer/blower	43	50	1	80	4.1	38.9
Storage Transformers	60	5	80	7475	63.5	15.5
Storage HVAC	35	50	160	7475	43.5	13.5
Storage Inverters	67	5	160	7475	63.5	25.5
					Cumulative	42.5

Scenario: Daikin McQuay Chiller & 8.5 foot screen/parapet — Property Line 13

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	190	30.0	41.8
Transformer (pad mounted)	60	5	1	190	31.6	28.4
Inverter	67	6	3	760	42.1	29.7
Transformer (pad mounted)	60	5	1	760	43.6	16.4
Inverter	67	6	3	665	40.9	30.9
Transformer (pad mounted)	60	5	1	665	42.5	17.5
Substation Transformer	72	5	1	6310	62.0	10.0
O&M Yard	70	50	1	7060	43.0	27.0
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	60	5	80	6210	61.9	17.1
Storage HVAC	35	50	160	6210	41.9	15.2
Storage Inverters	67	5	160	6210	61.9	27.2
					Cumulative	44.0

Scenario: Daikin McQuay Chiller & 8.5 foot screen/parapet — Property Line 14

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	425	37.0	34.8
Transformer (pad mounted)	60	5	1	425	38.6	21.4
Inverter	67	6	3	665	40.9	30.9
Transformer (pad mounted)	60	5	1	665	42.5	17.5
Inverter	67	6	3	520	38.8	33.0
Transformer (pad mounted)	60	5	1	520	40.3	19.7
Substation Transformer	72	5	1	5375	60.6	11.4
O&M Yard	70	50	1	6750	42.6	27.4
Tracker Motor	37	50	1	80	4.1	32.9
Tracker dryer/blower	43	50	1	80	4.1	38.9
Storage Transformers	60	5	80	5175	60.3	18.7
Storage HVAC	35	50	160	5175	40.3	16.7
Storage Inverters	67	5	160	5175	60.3	28.7
					Cumulative	42.5

Scenario: Daikin McQuay Chiller & 8.5 foot screen/parapet — Property Line 15

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	240	32.0	39.7
Transformer (pad mounted)	60	5	1	240	33.6	26.4
Inverter	67	6	3	570	39.6	32.2
Transformer (pad mounted)	60	5	1	570	41.1	18.9
Inverter	67	6	3	665	40.9	30.9
Transformer (pad mounted)	60	5	1	665	42.5	17.5
Substation Transformer	72	5	1	4375	58.8	13.2
O&M Yard	70	50	1	6250	41.9	28.1
Tracker Motor	37	50	1	100	6.0	31.0
Tracker dryer/blower	43	50	1	100	6.0	37.0
Storage Transformers	60	5	80	4275	58.6	20.4
Storage HVAC	35	50	160	4275	38.6	18.4
Storage Inverters	67	5	160	4275	58.6	30.4
					Cumulative	43.2

Scenario: Daikin McQuay Chiller & 8.5 foot screen/parapet — Property Line 16

Source	Source Noise Level	Source Reference Distance	Number of Representative Units	Distance to Nearest Property Line	Distance Attenuation	Noise Level at Property Line
Inverter	67	6	3	285	33.5	38.2
Transformer (pad mounted)	60	5	1	285	35.1	24.9
Inverter	67	6	3	640	40.6	31.2
Transformer (pad mounted)	60	5	1	640	42.1	17.9
Inverter	67	6	3	760	42.1	29.7
Transformer (pad mounted)	60	5	1	760	43.6	16.4
Substation Transformer	72	5	1	1940	51.8	20.2
O&M Yard	70	50	1	3375	36.6	33.4
Tracker Motor	37	50	1	80	4.1	32.9
Tracker dryer/blower	43	50	1	80	4.1	38.9
Storage Transformers	60	5	80	1840	51.3	27.7
Storage HVAC	35	30	160	1840	35.8	21.3
Storage Inverters	67	5	160	1840	51.3	37.7
					Cumulative	44.5