SECTION 4.8

NOISE

This section defines technical terminology used in the analysis of noise; identifies federal, state and local regulations applicable to noise; and describes the environmental setting with regard to existing ambient noise levels. This section also analyzes potential noise impacts associated with construction, operation and decommissioning of the proposed Project. The information in this section is based on the *Noise Impact Analysis, Wistaria Ranch Solar Energy Center Project, Imperial County, California* prepared by AECOM (AECOM 2014c). This document is provided on the attached CD of Technical Appendices as **Appendix F** of this EIR.

Noise is analyzed with regard to potential impacts resulting from implementation of the Full Build-out Scenario or the Phased CUP Scenario, as applicable. The discussion focuses on the proposed Project noise impacts during daytime construction over an 8-hour period at the nearest sensitive receptor (i.e. the nearest occupied farmhouse) because this approach represents the most conservative (i.e. worst-case) analysis for the proposed Project.

DEFINITIONS AND TERMINOLOGY

The following discussion includes a variety of acronyms used to describe noise. To facilitate understanding of this section, the following glossary of terms is provided as an introduction to the environmental setting for noise. While some of the terms are technical in nature, these acronyms and abbreviations are essential to describe and characterize noise.

Noise is defined as unwanted or annoying sound which interferes with or disrupts normal activities. Exposure to high noise levels has been demonstrated to cause hearing loss. The individual human response to environmental noise is based on the sensitivity of that individual, the type of noise that occurs and when the noise occurs.

Measurements

Decibel (dB). The decibel (dB) is the standard unit of noise measurement. The decibel measurement is logarithmic which means that an increase of one decibel equates to a tenfold increase in the noise level. A noise level of zero (0) dB is barely audible and is considered the threshold of human hearing while noise levels in excess of 120 dB approach the pain threshold (e.g. jet engine noise). In between these extremes a quiet rural area with would have sound levels of approximately 20 dB and normal speech has a sound level of approximately 60 dB.

The smallest change in sound level detectable by the human ear is approximately 3 dB. The average person perceives a change in sound level of 10 dB as a doubling (or halving) of the level of loudness.

A-weighting (dBA). Because the human ear is unable to differentiate differences in sound levels at all frequencies, environmental sound is usually measured in what is referred to as "A-weighted decibels" (dBA). On this scale, the normal range of human hearing extends from about 10 dBA to about 140 dBA. A-weighting compensates for the variability in perceived noise levels by weighing some sound frequencies more than others.

Equivalent Sound Level (Leq). The equivalent sound level, or Leq, represents a steady sound level containing the same total acoustical energy as the actual fluctuating sound level over a given time interval. Leq refers to the true equivalent sound level averaged over a sample length of time. The sound levels are measured by maximum (Lmax) and the minimum (Lmin) with statistical indicators L10, L50, L90.

Community Noise Equivalent Level (CNEL). The Community Noise Equivalent Level (CNEL) is the 24-hour A-weighted average for sound, with corrections for evening and nighttime hours. The corrections require an addition of 5 dB to sound levels in the evening hours between 7 p.m. and 10 p.m. and an

addition of 10 dB to sound levels at nighttime hours between 10 p.m. and 7 a.m. These additions are made to account for the increased sensitivity during the evening and nighttime hours when sound is perceived as louder.

For example, noise samples taken between the hours of 7 p.m. and 10 p.m. are boosted by 5 dB to reflect increased sensitivity to noise in evening hours. Similarly, noise samples taken during the overnight and early morning hours between 10 p.m. and 7 a.m. are weighted by 10 dB to reflect even greater sensitivity to noise during the hours when most people would be sleeping. The CNEL scale is used by Imperial County for land use/noise compatibility assessment.

Day/night average sound level (Ldn). The day/night average sound level (Ldn) is the same as the CNEL, except the evening period is included in the daytime period.

Table 4.8-1 provides typical noise levels associated with common activities.

TABLE 4.8-1
TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Noise Common Indoor Activities
-	110	Rock Band
Jet Fly-over at 1,000 feet	100	-
Gas Lawn Mower at 3 feet	90	-
Diesel Truck at a distance of 50 feet at 50 mpg	80	Food Blender at 3 feet Garbage Disposal at 3 feet
Noisy Urban Area, Daytime Gas Lawn Mower, 100 feet	70	Vacuum Cleaner at 10 feet
Commercial Area Heavy Traffic at 300 feet)	60	Normal Speech at 3 feet
Quiet Urban Daytime	50	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	30	Library
Quiet Rural Nighttime	20	Bedroom at Night, Concert Hall (Background)
-	10	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Source: AECOM 2014c, p. 14.
Notes: m=meters ft=feet km/hr=kilometers per hour mph=miles per hour

Noise Attenuation

Noise attenuation refers to the decline in noise level that occurs in association with increased distance from the receptor. Sounds generated from a point source typically attenuate or decrease at a rate of 6 dBA for each doubling of distance. For example, a noise level of 87 dBA measured at a distance of 50 feet from the noise source would be reduced to 81 dBA at 100 feet from the source and be further reduced to 75 dBA at 200 feet from the source. When the noise source is a continuous line (e.g., vehicle traffic on a highway), the noise levels radiate in an almost oblique fashion from the source and drop off at a rate of 3 dBA for each doubling of distance under hard site conditions (e.g. concrete, asphalt and hard pack dirt) and at a rate of 4.5 dBA for soft site conditions (e.g. areas having slight grade changes, landscaped areas and vegetation). Barriers, obstructions, and weather conditions can all affect how noise travels.

Sensitive Receptors

Some land uses are considered more sensitive to noise than others due to the types of persons or activities involved. The Imperial County General Plan Noise Element, Existing Conditions and Trends, number 4) "Other Sources", item "C" defines sensitive noise receptors, in general, as areas of habitation where the intrusion of noise has the potential to adversely impact the occupancy, use, or enjoyment of the environment (Imperial County 1993c, p. 15). Noise sensitive receptors include, but are not limited to, residences, schools, hospitals, parks, and office buildings. Noise sensitive receptors may also be non-human species; many riparian bird species are sensitive to excessive noise. The United States Fish and Wildlife Service establishes a noise level of 60 dBA Leq, above which nesting protected bird species would be disturbed and, therefore, impacted.

Human perception of noise has no simple correlation with acoustical energy. The perception of noise is not linear in terms of dBA or in terms of acoustical energy. Two noise sources do not sound twice as loud as one source. It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA (increase or decrease); that a change of 5 dBA is readily perceptible; and that an increase (or decrease) of 10 dBA sounds twice (or half) as loud (AECOM 2014c, p. 18).

From the source to the receiver, noise changes both in level and frequency spectrum. The most obvious change is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on the following important factors: ground absorption, atmospheric effects and refraction, shielding by natural and man-made features, noise barriers, diffraction, and reflection. For a point or stationary noise source, such as construction equipment, the attenuation or drop-off in noise level would be at least -6 dBA for each doubling of unobstructed distance between source and the receiver and could attenuate to -7.5 dBA depending on the acoustic characteristics of the intervening ground. For a linear noise source, such as vehicles traveling on a roadway, the attenuation or drop-off in noise level would be approximately -3 dBA for each doubling of unobstructed distance between source and the receiver and could attenuate to -4.5 dBA depending on the acoustic characteristics of the intervening ground.

Localized Noise

Sound from a small localized source (a "point" source) radiates uniformly outward as it travels away from the source. The sound level attenuates or drops-off at a rate of 6 dBA for each doubling of distance.

Mobile Noise

Because mobile/traffic noise levels are calculated on a logarithmic scale, a doubling of the traffic noise or acoustical energy results in a noise level increase of 3 dBA. Therefore the doubling of the traffic volume, without changing the vehicle speeds or mix ratio, results in a noise increase of 3 dBA. Mobile noise levels radiate in an almost oblique fashion from the source and decrease at a rate of 3 dBA for each doubling of distance under hard site conditions and at a rate of 4.5 dBA for soft site conditions. In contrast, fixed or point sources radiate outward uniformly as it travels away from the source. Point source sound levels attenuate or decrease at a rate of 6 dBA for each doubling of distance.

Construction Noise

Construction noise varies depending on construction activities and duration, type of equipment involved, proximity to sensitive receptors, and the duration of the construction activities. Construction equipment used on the site may be mobile (e.g., loaders, graders, dozers) or stationary (e.g., air compressor, generator, concrete saw). Heavy construction equipment typically operates for short periods at full power followed by extended periods of operation at lower power, idling, or powered-off conditions. Site

preparation involves demolition, grading, compacting, and excavating and would include backhoes, bulldozers, loaders, excavation equipment (e.g., graders and scrapers), pile drivers, and compaction equipment. Finishing activities may include the use of pneumatic hand tools, scrapers, concrete trucks, vibrators, and haul trucks. **Table 4.8-2** summarizes typical noise sources and noise levels associated with construction activities.

TABLE 4.8-2
TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVELS

Type of Equipment	Range of Maximum Sound Levels Measured (dBA at a distance of 50	Suggested Maximum Sound Levels for Analysis (dBA at a distance of 50
Rock Drills	83-99	96
Jack Hammers	75-85	82
Pneumatic Tools	78-88	85
Pumps	74-84	80
Dozers	77-90	85
Scrapers	83-91	87
Haul Trucks	83-94	88
Cranes	79-86	82
Portable Generators	71-87	80
Rollers	75-82	80
Tractors	77-82	80
Front-End Loaders	77-90	86
Hydraulic Backhoe	81-90	86
Hydraulic Excavators	81-90	86
Graders	79-89	86
Air Compressors	76-89	86
Trucks	81-87	86
Pile Driver (Vermeer PD10)[1]	-	84

Source: AECOM 2014c, p. 15.

[1] Based on a 105.8 dBA at the operator's ear, as specified by Vermeer (2012). According to Mr. Dale Siever of Vermeer Sales Southwest, the operator's ear is approximately 4 feet from the part of the pile driver where noise is emitted. Therefore, based on the standard noise attenuation rate of -6 dBA per doubling of distance for point sources, noise from the pile driver would attenuate to approximately 84 dBA at a distance of 50 feet (AECOM 2014c, p. 15).

Corona Noise

When a transmission or sub-transmission line is in operation, an electric field is generated in the air surrounding the conductors forming a "corona." Corona results from the partial breakdown of the electrical insulating properties of the air surrounding the conductors. When the intensity of the electric field at the surface of the conductor exceeds the insulating strength of the surrounding air, a corona discharge occurs at the conductor surface, representing a small dissipation of heat and energy. Some of the energy may dissipate in the form of small local pressure changes that result in audible noise or in radio or television interference. Audible noise generated by corona discharge is characterized as a hissing or crackling sound that may be accompanied by a 120-Hz hum.

Slight irregularities or water droplets on the conductor and/or insulator surface accentuate the electric field strength near the conductor surface, thereby making corona discharge and the associated audible noise more likely. Under weather conditions such as rain and high wind, ambient noise levels would

generally be higher than those generated by the transmission line operation, and would mask the corona noise levels. Therefore, audible noise from transmission lines is generally a wet weather (wet conductor) phenomenon. However, during dry weather, insects and dust on the conductors can also serve as sources of corona discharge, and the associated audible noise more likely. Under weather conditions such as rain and high wind, ambient noise levels would generally be higher than those generated by the transmission line operation, and would mask the corona noise levels. Therefore, audible noise from transmission lines is generally a foul weather (wet conductor) phenomenon. However, during fair weather, insects and dust on the conductors can also serve as sources of corona discharge.

The Electric Power Research Institute (EPRI) has conducted several studies of corona effects. **Table 4.8-3** summarizes typical noise levels for transmission lines with wet conductors.

TABLE 4.8-3
TRANSMISSION LINE VOLTAGE AND AUDIBLE NOISE LEVELS

Line Voltage (kV)	Audible Noise Level Directly Below the Conductor (dBA)
138	33.5
240	40.4
356	51.0

Sources: AECOM 2014c, p. 16.
Notes: kV = kilovolt

As shown in **Table 4.8-3**, corona noise lev4.8-2els decrease with lower voltage. Beyond 100 feet of the transmission line, the corona noise level attenuates at a rate of approximately 3 dB for each doubling of the distance.

Ground-borne Noise and Vibration

In addition to noise, construction activities generate vibration, which can be interpreted as energy transmitted in waves through the soil mass. These energy waves generally dissipate with distance from the vibration source, due to spreading of the energy and frictional losses. The energy transmitted through the ground as vibration, if great enough, can result in structural damage.

Typical outdoor sources of perceptible ground-borne vibration are construction equipment and traffic on rough (i.e., unpaved or uneven) roads. Construction activity can also result in varying degrees of ground-borne vibration, depending on the type of equipment, methods employed, distance between source and receptor, duration, number of perceived vibration events, and local geology.

Ground-borne vibrations from typical construction activities do not often reach levels that can damage structures in proximity to construction, but their effects may manifest and be noticeable in buildings that are within 25 feet of construction activities. One major concern with regard to construction vibration is potential building damage, which is assessed in terms of peak particle velocity (ppv), typically in units of inches per second (in/sec). In addition to structural damage, the vibration of room surfaces affects people as human annoyance.

Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. **Table 4.8-4** presents various vibration magnitudes and the related effect on humans and structures.

TABLE 4.8-4
EFFECTS ON PEOPLE AND STRUCTURES AT VARIOUS VIBRATION LEVELS

Vibration Level (in/sec ppv)	Effects on People	Effects on Structures
0.006 - 0.019	Threshold of perception; possibility of intrusion	Unlikely to cause damage of any type
0.08	Vibrations readily perceptible	Recommended upper level for ruins and ancient monuments
0.1	Threshold of annoyance	Virtually no risk of damage
0.2	Annoying to people in buildings	Threshold of risk of architectural damage to normal dwelling with plastered walls and ceilings
0.4 - 0.6	Considered unpleasant	Architectural damage and possibly minor structural damage

Source: AECOM 2014c, p. 17.
Note: Caltrans considers most construction vibrations, with the exception of pile driving and blasting, to be continuous.

As shown in **Table 4.8-4**, a vibration level of 0.1 in/sec ppv is the threshold of human annoyance, and a vibration level of 0.2 ppv is the threshold of risk of structural damage.

Construction operations generally include a wide range of activities that can generate various levels of ground-borne vibration. In general, blasting and demolition of structures generate the highest vibrations. Heavy truck transport can also generate ground-borne vibrations, which vary depending on vehicle type, weight, and pavement conditions. **Table 4.8-5** summarizes typical, ground-borne vibration levels associated with typical construction equipment.

TABLE 4.8-5
TYPICAL CONSTRUCTION EQUIPMENT VIBRATION EMISSIONS

Equipment	Peak Particle Velocity (inches per second)		
	At 25 feet	At a distance of 50 feet	At 100 feet
Clam Shovel Drop (slurry wall)	**0.202**	0.071	0.025
Vibratory Roller	**0.210**	0.074	0.026
Hoe Ram	**0.089**	0.031	0.011
Large Bulldozer	**0.089**	0.031	0.011
Caisson Drilling	**0.089**	0.031	0.011
Loaded Trucks	0.076	0.027	0.010
Jackhammer	0.035	0.012	0.004
Small Bulldozer	0.003	0.001	0.0004

Source: AECOM 2014c, p. 18.
Note: Bold values are considered an annoyance to people.

As shown in **Table 4.8-5**, at 25 feet, two pieces of construction equipment (clam shovel drop and vibratory roller) generate vibration at levels exceeding the threshold of human annoyance (0.1 in/sec ppv), and at levels exceeding the threshold of risk of structural damage (0.2 in/sec ppv). In contrast, at a distance of 50 feet or 100 feet, this equipment is below the thresholds of human annoyance (0.1 in/sec ppv) and structural damage (0.2 in/sec ppv).

Noise Reduction Methods

The most effective noise reduction methods consist of controlling the noise at the source, blocking the noise transmission with barriers or relocating the receiver. Any or all of these methods could be required to reduce noise levels to an acceptable level.

4.8.1 REGULATORY FRAMEWORK

A. FEDERAL

The Noise Control Act of 1972 (P.L. 92-574)

The Noise Control Act and several other federal laws require the federal government to set and enforce uniform noise standards for aircraft and airports, interstate motor carriers and railroads, workplace activities, medium and heavy-duty trucks. Most federal noise standards focus on preventing hearing loss by limiting exposure to sounds of 90 dBA and higher. However, some are stricter and focus on limiting exposure to quieter levels that are annoying to most individuals and can diminish one's quality of life.

Occupational Safety and Health Act of 1970

The Federal Occupational Safety and Health Administration (OSHA) regulates onsite noise levels and protects workers from occupational noise exposure. To protect hearing, worker noise exposure is limited to 90 dBA over an 8-hour work shift (29 Code of Regulations [CFR] § 1910.95). Employers are required to develop a hearing conservation program when employees are exposed to noise levels exceeding 85 dBA. These programs include provision of hearing protection devices testing employees for hearing loss on a periodic basis.

B. STATE

California State Government Code

California does not promulgate statewide standards for environmental noise, but the California State Government Code section 65302 (f) requires each local jurisdiction to draft a Noise Element for its General Plan to establish acceptable noise limits for various land uses. The proposed Project is located within unincorporated Imperial County; the applicable construction noise regulations of the County are provided below.

California Code of Regulations Title 24 (California Building Code)

The California Code of Regulations also establishes noise insulation standards and a maximum interior noise level, with windows closed, of 45 dB CNEL, due to exterior sources (Title 24, §§ 3501 *et seq.*). This requirement is applicable to new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings.

California Department of Transportation

The California Department of Transportation (Caltrans) provides vibration level thresholds for architectural and structural damage and human perception thresholds. Caltrans vibrations are provided in **Table 4.8-4**, above, for reference. To assess the potential for structural damage associated with vibration from construction activities, the vibratory ground motion in the vicinity of an affected structure is measured in terms of ppv, typically in units of inches per second (in/sec). As shown in **Table 4.8-4**, damage to structures occurs when vibration levels range from 2 to 6 inches per second (in/sec) ppv. One half this minimum threshold, or 1 inch per second ppv, is considered a safe criterion that would protect against structural damage. Caltrans uses a vibration criterion of 0.2 in/sec ppv for its construction projects, except for pile driving and blasting.

C. LOCAL

County of Imperial General Plan

The Noise Element of the Imperial County General Plan identifies and defines existing and future environmental noise levels from sources of noise within or adjacent to the County; establishes goals and objectives to address these impacts, and provides implementation programs to implement these goals and objectives. **Table 4.8-6** summarizes the Project's consistency with the applicable General Plan noise policies. While this EIR analyzes the Project's consistency with the General Plan pursuant to State CEQA Guidelines section 15125(d), the Imperial County Board of Supervisors ultimately determines consistency with the General Plan.

TABLE 4.8-6
IMPERIAL COUNTY GENERAL PLAN CONSISTENCY ANALYSIS

General Plan Policies	Consistent with General Plan?	Analysis
NOISE ELEMENT		
Noise Environment		
Goal 1 Provide an acceptable noise environment for existing and future residents in Imperial County.	Yes	A Noise Impact Analysis (AECOM 2014c) was prepared for the proposed Project which examined noise generated in association with Project construction, operation and decommissioning. Impacts associated with noise increases (Impact 4.8.1), Noise Level Increases to Sensitive Receptors (Impact 4.8.2), Groundborne Vibration or Groundborne Noise Level Impacts (Impact 4.8.3) were identified. The Project includes Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) that would reduce Project-related construction, operation and decommissioning noise levels below a level of significance. Therefore, the proposed Project is consistent with this goal.
Objective 1.3 Control noise levels at the source where feasible.	Yes	The proposed Project includes Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) (refer to Table 2.0-9 in Chapter 2.0, Project Description) that focus on reducing noise and vibration during construction, operation and decommissioning. Therefore, the proposed Project is consistent with this objective.
Project/Land Use Planning		
Goal 2 Review proposed Projects for noise impacts and require design which will provide acceptable indoor and outdoor noise environments.	Yes	As noted under the analysis of Goal 1, above, a Noise Impact Analysis (AECOM 2014c) was prepared for the proposed Project. The analysis included the Applicant-proposed

TABLE 4.8-6
IMPERIAL COUNTY GENERAL PLAN CONSISTENCY ANALYSIS

General Plan Policies	Consistent with General Plan?	Analysis
		Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) to address noise and vibration. Incorporation of these features would ensure that the Project meets County noise standards during construction, operation and decommissioning. Therefore, the proposed Project is consistent with this goal.
Objective 2.2 Provide acoustical analysis guidelines which minimize the burden on project proponents and project reviewers.	Yes	The Imperial County General Plan Noise Element includes noise standards by which projects are assessed. The proposed Project was analyzed using these standards and found to be below established noise thresholds with regard to the construction, operation and decommissioning with incorporation of Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description). Therefore, the proposed Project is consistent with this objective.
Policies and Programs		
1) Acoustical Analysis of Proposed Projects The County shall require the analysis of proposed discretionary projects which may generate excessive noise or which may be impacted by existing excessive noise levels, including but not limited to the following: • An analysis shall be required for any project which would be located, all or in part, in a Noise Impact Zone as specified above. • An analysis shall be required for any project which has the	Yes	A Noise Impact Zone is an area that is likely to be exposed to significant noise. The County defines a Noise Impact Zone as an area that may be exposed to noise greater than 60 dB CNEL or 75 dB Leq. The purpose of the Noise Impact Zone is to define areas and properties where an acoustical analysis of a proposed project is required to demonstrate project compliance with land use compatibility requirements and other applicable environmental noise standards. Properties meeting at least one of the following criteria, shown below and in Table 8, are defined as being within a Noise Impact Zone if located:

TABLE 4.8-6
IMPERIAL COUNTY GENERAL PLAN CONSISTENCY ANALYSIS

<table>
<tr><th>General Plan Policies</th><th>Consistent with General Plan?</th><th>Analysis</th></tr>
<tr><td>potential to generate noise in excess of the Property Line Noise Limits stated in Table 9.
• An analysis shall be required for any project which, although not located in a Noise Impact Zone, has the potential to result in a significant increase in noise levels to sensitive receptors in the community.
• An acoustical analysis and report shall be prepared by a person deemed qualified by the Director of Planning. The report shall describe the existing noise environment, the proposed project, the projected noise impact and, if required, the proposed mitigation to ensure conformance with applicable standards.</td><td></td><td>Within the Noise Impact Zone distances to classified roadways, as indicated in Table 8;
Table 8. Roadway Noise Impact Zones
<table><tr><th>Roadway Classification</th><th>Distance from Centerline (feet)</th></tr><tr><td>Interstate</td><td>1,500</td></tr><tr><td>State Highway or Prime Arterial</td><td>1,100</td></tr><tr><td>Major Arterial</td><td>750</td></tr><tr><td>Secondary Arterial</td><td>450</td></tr><tr><td>Collector Street</td><td>150</td></tr></table>• Within 750 feet of the centerline of any railroad;
• Within 1,000 feet of the boundary of any railroad switching yard;
• Within the existing or projected 60 dB CNEL contour of any airport;[1] and/or
• Within one-quarter mile (1,320 feet) of existing farmland, which is in an agricultural zone.
The proposed Project includes parcels within a Noise Impact Zone and has the potential to generate an increase in noise. Therefore, a Noise Impact Analysis was prepared for the proposed Project consistent with this policy/program.</td></tr>
<tr><td>2) Noise/Land Use Compatibility. Where acoustical analysis of a proposed project is required, the County shall identify and evaluate potential noise/land use conflicts that could result from the implementation of the project. Projects which result in</td><td>Yes</td><td>Land use compatibility defines the acceptability of a land use in a specified noise environment.
Figure 4.8-1 provides the County's Noise/Land Use Compatibility Guidelines. When an acoustical analysis is performed, conformance of a proposed project with the</td></tr>
</table>

[1] As shown in the Imperial County Airport Land Use Compatibility Plan (ALUCP) or an approved airport master plan, which supersedes the ALUCP. Note, however, that a land use compatibility analysis, which may include an acoustical analysis, is required for projects proposed within the "airport vicinity" of each airport, as defined on the Compatibility Maps shown in the ALUCP. This may encompass a much larger area than the 60 dB CNEL contour.

TABLE 4.8-6
IMPERIAL COUNTY GENERAL PLAN CONSISTENCY ANALYSIS

General Plan Policies	Consistent with General Plan?	Analysis
noise levels that exceed the "Normally Acceptable" criteria of the Noise/Land Use Compatibility Guidelines, Table 7, shall include mitigation measures to eliminate or reduce to an acceptable level the adverse noise impacts.		Noise/Land Use Compatibility Guidelines is used to evaluate potential noise impacts and provide criteria for environmental impact findings and conditions for project approval. The County Noise/Land Use Compatibility Guidelines (**Figure 4.8-1**) identify noise levels of up to 70 dBA CNEL as "normally acceptable" in areas designated for agricultural land uses. With implementation of the Applicant Proposed Design Features, the proposed Project would not exceed to 70 dBA CNEL. Therefore, the proposed Project is consistent with this objective.
5) New Noise Generating Projects. The County shall identify and evaluate projects which have the potential to generate noise in excess of the Property Line Noise Limits. An acoustical analysis must be submitted which demonstrates the project's compliance.	Yes	Construction and decommissioning would cause short-term increases in noise on and in the vicinity of the solar field site parcels/CUPs. Likewise, noise levels generated during operation of the Solar Energy Center could cause noise levels to rise in excess of standards. Implementation of the Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) would ensure that noise generated in association with construction and decommissioning activities does not exceed Property Line Noise Limits. Therefore, the proposed Project is consistent with this objective.
6) Project Which Generate Off-site Traffic Noise. The acoustical analysis shall identify and evaluate projects which will generate traffic and increase noise levels on off-site roadways. If the project site has the potential to cause a significant noise impact to sensitive receptors along those roadways, the acoustical analysis report shall consider noise reduction measures to reduce the impact to a level less than significant.	Yes	Construction, operation and decommissioning off-site traffic noise would generate a negligible noise increase. As such the proposed Project does not have the potential to cause a significant noise impact to sensitive receptors along the roadways. Operational vehicle trip noise impacts to sensitive receptor would be well below the limit of 10 dBA for a substantial permanent ambient noise increase due to off-site traffic. Therefore, the proposed Project is consistent with this objective.

Operational Standards

The County of Imperial Land Use Code, Title 9 (Land Use Ordinance), Division 7.0 Noise Abatement and Control (Noise Ordinance), establishes standards to regulate noise within certain zones in the County. County Ordinance, Title 9, Division 7 states that it is unlawful for any person to make or cause any noise to the extent that the one-hour average sound level, at any point on or beyond the boundaries of the individual's property, exceeds the applicable limits shown in **Table 4.8-7**.

TABLE 4.8-7
PROPERTY LINE NOISE LEVEL LIMITS

Zone	Time	Applicable Limit One-hour Average Sound Level
Residential Zones (all R-1)	7 a.m. to 10 p.m.	50 dB
	10 p.m. to 7 a.m.	45 dB
Multi-residential Zones (all R-2)	7 a.m. to 10 p.m.	55 dB
	10 p.m. to 7 a.m.	50 dB
Commercial Zones	7 a.m. to 10 p.m.	60 dB
	10 p.m. to 7 a.m.	55 dB
Light Industrial/Industrial Park Zones	Anytime	70 dB
General Industrial Zones	Anytime	75 dB
When the noise-generating property and the receiving property have different uses, the more restrictive standard shall apply. When the ambient noise level is equal to or exceeds the Property Line noise standard, the increase of the existing or proposed noise shall not exceed 3 dB L_{eq}. The sound level limit between two zoning districts (different land uses) shall be measured at the property line between the properties. Fixed-location public utility distribution or transmission facilities located on or adjacent to a property line shall be subject to the noise level limits of subsection A of this section, measured at or beyond six feet from the boundary of the easement upon which the equipment is located. This section does not apply to noise generated by helicopters at heliports or helistops authorized by a conditional use permit. This section does not apply to noise generated by standard agricultural field operating practices such as planting and harvesting of crops. The County of Imperial has a Right to Farm Ordinance (1031) which serves as recognition to agricultural practices to new development. Agricultural/industrial operations shall comply with the noise levels prescribed under the general industrial zones.		

Source: Imperial County 1993.
Notes: The sound level limit between two zoning districts (different land uses) shall be measured at the property line between the properties. Fixed-location public utility distribution or transmission facilities located on or adjacent to a property line shall be subject to the noise level limits above, measured at or beyond six feet from the boundary of the easement upon which the equipment is located.

The limits shown in **Table 4.8-7** imply the existence of a sensitive receptor on the adjacent, or receiving, property. In the absence of a sensitive receptor, an exception or variance to the standards may be appropriate. These standards do not apply to construction noise and are intended to be enforced through the County's code enforcement program on the basis of complaints received from persons impacted by excessive noise. It is important to note that a noise nuisance may occur even though an objective measurement with a sound level meter is not available. In such cases, the County may act to restrict disturbing, excessive, or offensive noise which causes discomfort or annoyance to reasonable persons of normal sensitivity residing in an area.

The solar farm site parcels and immediate properties are currently designated "Agriculture" use by the Imperial County Land Use Plan (Imperial County 2007a). Likewise, the solar field site parcels and surrounding properties are zoned A-3 (Agricultural, Heavy), A-2-R (General Agricultural Rural Zone), and A-2 (Agricultural, General). Because none of the parcels are zoned for Agricultural-Industrial Use AM-1 or AM-Z, the Noise Ordinance does not prescribe a property line noise level limit on Project operations per **Table 4.8-7**. Conversion of the solar field site parcels from agricultural to solar generation facility does not change the land use zone; therefore, there is no operational noise level limit at the property line.

It should also be noted that the property line noise limits shown in **Table 4.8-7** do not apply to construction activities. The Noise Ordinance does not set new limitations on construction; rather, its mechanisms can be used to enforce the construction noise level limits and the time of day/day of week limitations set by the County Noise Element.

Construction Noise Standards

The Imperial County General Plan Noise Element states that construction noise, from a single piece of equipment or a combination of equipment, shall not exceed 75 dB Leq when averaged over an 8-hour period, and measured at the nearest sensitive receptor. This standard assumes a construction period relative to an individual sensitive receptor of days or weeks. In cases of extended construction times, the standard may be tightened so as not to exceed 75 dB Leq when averaged over a 1-hour period.

Construction activities would move around the solar field site parcels, Electric Collector Line Corridor and Gen-Tie structures. Based on the mobile nature of construction, no activities are anticipated to be performed proximate to a sensitive receptor more than a few days or weeks.

The Noise Element of the County General Plan also limits the operation of construction equipment to between the hours of 7 a.m. and 7 p.m. Monday through Friday, and 9 a.m. to 5 p.m. on Saturday. No commercial construction operations are permitted on Sunday or holidays.

Noise/Land Use Compatibility Guidelines

Land use compatibility refers to the acceptability of a land use in a specified noise environment. **Figure 4.8-1** provides the Imperial County Noise/Land Use Compatibility Guidelines. The figure includes acceptable and unacceptable community noise exposure limits for various land use categories as currently defined by the State of California. When an acoustical analysis is performed, conformance of a proposed project with the Noise/Land Use Compatibility Guidelines is used to evaluate the potential noise impacts and provide criteria for environmental impact findings and conditions for project approval.

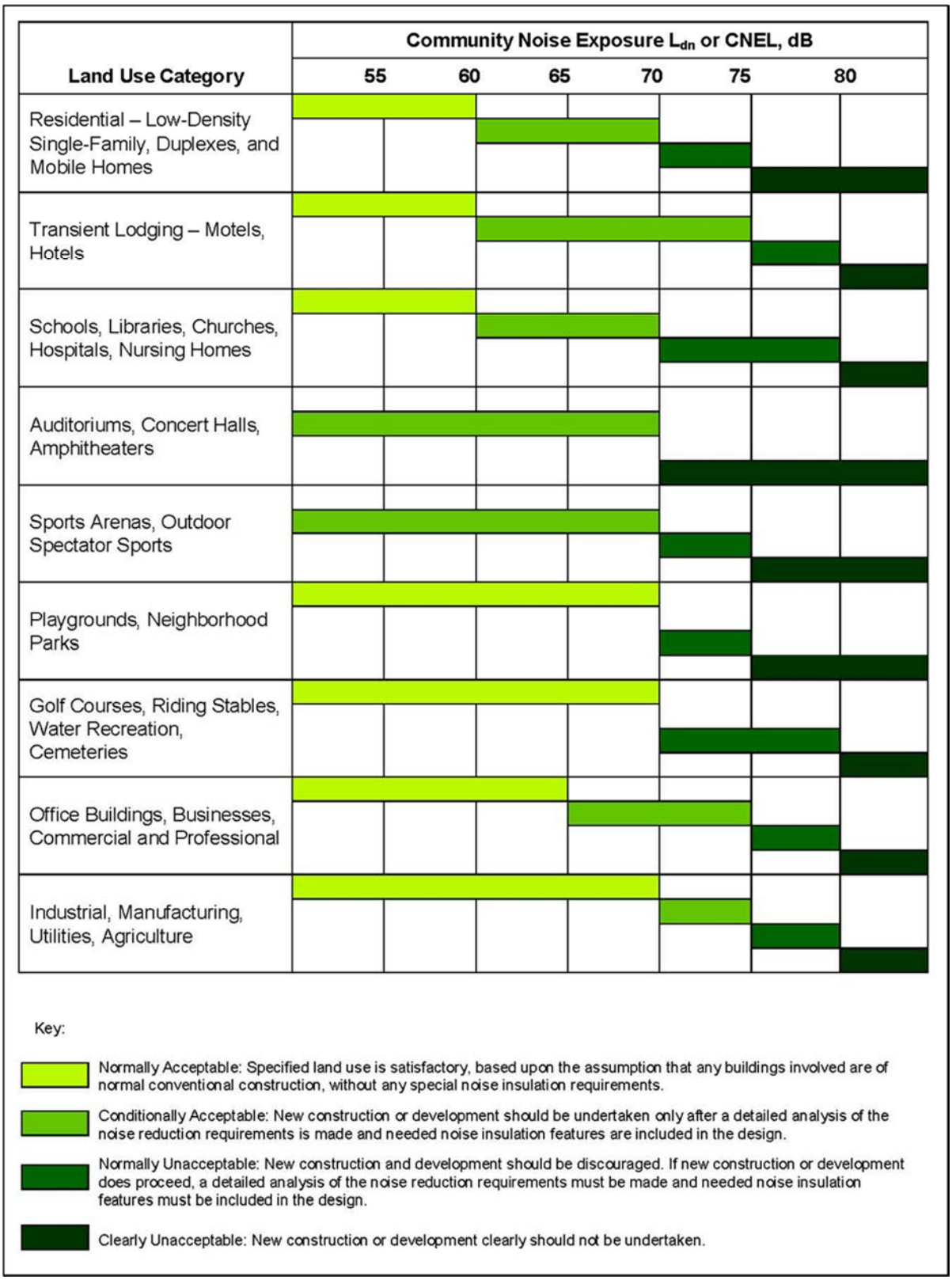
The increase of noise levels generally results in an adverse impact to the noise environment. The Noise/Land Use Compatibility Guidelines are not intended to allow the increase of ambient noise levels up to the maximum without consideration of feasible noise reduction measures. The following guidelines are established by the County of Imperial for the evaluation of significant noise impacts (Imperial County 1993).

a) If the future noise level after the Project is completed will be within the "normally acceptable" noise levels shown in the Noise/Land Use Compatibility Guidelines, but will result in an increase of 5 dB CNEL or greater, the Project will have a potentially significant noise impact and mitigation measures must be considered.

b) If the future noise level after the Project is completed will be greater than the "normally acceptable" noise levels shown in the Noise/Land Use Compatibility Guidelines, a noise increase of 3 dB CNEL or greater shall be considered a potentially significant noise impact and mitigation measures must be considered.

Interior Noise Standards

In addition to the California Code of Regulations Title 24 standards, the Imperial County General Plan Noise Element established the following additional interior noise standards to be considered in acoustical analyses: The interior noise standard for detached single family dwellings shall be 45 dB CNEL.



Source: Imperial County 1993c, Table 7.

FIGURE 4.8-1
COUNTY OF IMPERIAL NOISE/LAND USE COMPATIBILITY

Guidelines for the Determination of Significance

To be conservative, the most restrictive applicable sound limits identified in Section 90702.00 of the Noise Ordinance were used in this analysis to accommodate not only the existing residential uses but also potential future residential uses that could be adjacent to the proposed CUPs. Section 90702.00 of the Noise Ordinance, which is used as the limit for CUPs, sets a residential sound level limit of 50 dBA Leq for daytime hours from 7 a.m. to 10 p.m. and 45 dBA Leq during the noise sensitive nighttime hours from 10 p.m. to 7 a.m. Most of the proposed Project components would operate only during the daytime hours. However, work at night may be performed occasionally on limited areas of the CUPs. Therefore, to be conservative the most restrictive nighttime standard of 45 dBA Leq is applied at the boundary of the CUPs.

4.8.2 ENVIRONMENTAL SETTING

The solar field site parcels and surrounding land uses consist of privately owned agricultural fields; a dairy farm (to the west of CUP 13-0049); dirt roads; dispersed single-family farmhouses associated with agricultural operations; and IID-owned lateral canals and drains.

Noise sensitive receptors currently located within and adjacent to the solar field site parcels include single-family homes associated with the agriculture land uses. Currently occupied single-family residential properties are located primarily adjacent to proposed CUPs 13-0036, 13-0037, 13-0038, 13-0039, 13-0042, 13-0049, and 13-0050 of the Project. The addresses of these sensitive receptors are provided in **Table 4.8-8** below and shown in **Figure 4.8-2.**

TABLE 4.8-8
LIST OF SENSITIVE RECEPTORS NEAR CUPS

SR	Address	CUP
SR 12	1095 U.S. Highway 98, Calexico CA, 92231	CUP 13-0036
SR 17 SR 19 SR 18	904 West U.S. Highway 98, Calexico CA, 92231 874 West U.S. Highway 98, Calexico CA, 92231 876 West U.S. Highway 98, Calexico CA, 92231	CUP 13-0037
SR 11	619 Rockwood Road, Calexico CA, 92231	CUP 13-0038
SR 14 SR 15 SR 16	865 Kubler Road, Calexico CA, 92231-9749 852 Kubler Road, Calexico CA, 92231-9749 603 George Road, Calexico CA, 92231-9794	CUP 13-0039
SR 4 SR 5 SR 6 SR 7 SR 8 SR 9 SR 10	691 Brockman Road, Calexico CA, 92231-9717 695 Brockman Road, Calexico CA, 92231-9717 652 Brockman Road, Calexico CA, 92231-9717 648a Brockman Road, Calexico CA, 92231-9717 648b Brockman Road, Calexico CA, 92231-9717 644 Brockman Road, Calexico CA, 92231-9717 1160 Kubler Road, Calexico CA, 92231-9749	CUP 13-0042
SR 2 SR 3	905 Brockman Road, El Centro, CA 92243 907 Brockman Road, El Centro, CA 92243	CUP 13-0049
SR 13	105 Rockwood Road, Calexico CA, 92231-9603	CUP 13-0050

Source: EGI 2014, Goodson 2014.

A. SOLAR ENERGY CENTER

Existing Noise Levels

On-site Ambient Noise

Ambient noise measurements were taken in the vicinity of the solar field site parcels as part of the Imperial Solar Energy Center South (ISECS) Construction Acoustical Site Assessment prepared Investigative Science and Engineering, Inc. (ISE) in 2010. The measurements are representative of the Project site's rural industrial setting proximate to industrial solar facilities and reveal a baseline ambient noise level with an hourly average of approximately 43 dBA Leq.

Noise measurements were taken in two areas: Monitoring Location (ML) 1 and ML 2. ML 1 is located along Mandrapa Road near the U.S./Mexico Border. ML 2 is located on Pullman Road, on the eastern portion of the ISECS project site. **Figure 4.8-2** shows the noise monitoring locations. The noise monitoring locations were determined based on site access and noise impact potential. Both locations had a direct line of sight to the adjacent roadways. ML 1 experienced dominant noise from the movement of U.S. Border Patrol units. In contrast, ML 2 experienced background community noise and far-field (i.e. not in the immediate proximity of the measurement point) noise. The existing noise levels at the solar field site parcels consist primarily of U.S. Border Patrol vehicle movements, community background noise and far-field background noise.

Table 4.8-9 summarizes the results of the noise monitoring at ML 1 and ML 2.

TABLE 4.8-9
MEASURED AMBIENT NOISE LEVELS - MEASURED JULY 30, 2010

Location	Description	Start Time	Noise Levels (dBA)					
			L_{eq}	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}
ML 1	ISECS, near Mandrapa Road	11:00 a.m. - 12:00 a.m.	44.2	75.8	36.3	43.6	40.2	38.7
ML 2	Along Pullman Road	11:30 a.m. - 12:30 a.m.	43.3	66.8	30.7	42.8	36.2	34.3

Source: AECOM 2014c.

As shown in **Table 4.8-3**, the ambient Leq noise levels measured during the late morning were found to be between 43.3 to 44.2 dBA Leq and 90 percent (L90) of the noise levels were measured at 34.3 and 38.7 dBA L90. The existing noise levels at both monitoring locations were found to be below County thresholds (identified in **Figure 4.8-1**) for all sensitive land uses (i.e. less than 50 dBA Leq).

B. GEN-TIE

The proposed Project will use the existing Gen-Tie that extends from the solar field site parcels through the Mount Signal Solar Farm Project to the ISECS switchyard. The Gen-Tie line is expected to generate corona noise as previously described under "Definitions and Terminology." Refer to **Table 4.8-9** for a summary of typical noise levels for Gen-Tie lines with wet conductors.

4.8.3 IMPACTS AND MITIGATION MEASURES

A. STANDARDS OF SIGNIFICANCE

The impact analysis provided below is based on the following CEQA Guidelines, as listed in Appendix G. The Project would result in a significant impact to noise if it would result in any of the following:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

e) For a project located within an airport land use plan or where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels.

B. ISSUES SCOPED OUT AS PART OF THE INITIAL STUDY

Criteria "e" and "f" were originally eliminated from the Initial Study checklist because the solar field site parcels are not located within two miles of a public airport and the Johnson Brothers Private Airstrip is generally more than 2 miles from the majority of the proposed CUPs. Based on the nature of the proposed Project, the Johnson Brothers Private Airstrip is not anticipated to present a safety hazard for people working in the Project area. However, the *Noise Impact Analysis, Wistaria Ranch Solar Energy Center Project, Imperial County, California* prepared by AECOM (AECOM 2014c) included a discussion of airport-related noise impacts which is likewise included in this section under Impact 4.8.4.

C. METHODOLOGY

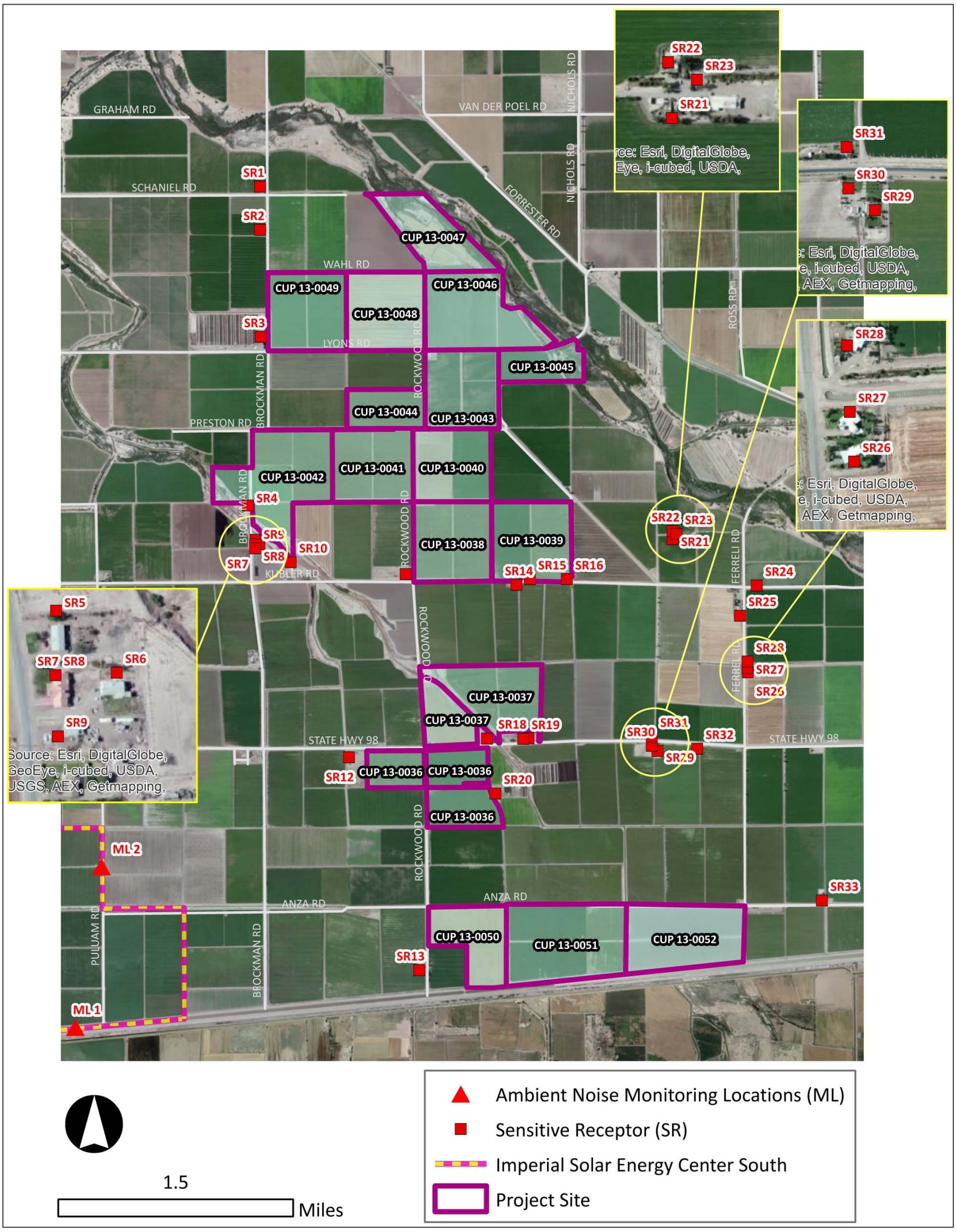
The County of Imperial standards and CEQA Guidelines, Appendix G thresholds were used to evaluate noise and vibration effects associated with implementation of the Project. In addition, a *Noise Impact Analysis, Wistaria Ranch Solar Energy Center Project, Imperial County, California* (AECOM 2014c) was prepared for the Project. The findings of the Noise Impact Analysis have been incorporated into the discussion of noise impacts.

Construction Noise

Calculations of the expected construction noise impacts were estimated based on the type of construction activity, the noise level generated by various pieces of construction equipment (refer to **Table 4.8-2**, above), the duration of the activity and the attenuation distance between the activity and the noise sensitive receivers. Construction noise impacts are based on the proximity of noise sensitive receptors to the construction activity, the magnitude and duration of construction noise at the nearest sensitive receptor, and the day of week/time of day.

Off-site Traffic Noise

Sources of off-site traffic noise include vehicles, community background noise and far-field background noise. The Applicant provided the estimate of construction period vehicle trips for use in the Noise Impact Analysis. The estimate is based on the Applicant's previous permitting and development experience with similar solar projects in the Project vicinity.



Sources: © Harris Corp, Earthstar Geographics LLC © 2013 Microsoft Corporation © 2010 NAVTEQ © and ESRI; AECOM; Wistaria 2013; Investigative Science and Engineering, Inc. 2010.

FIGURE 4.8-2
SENSITIVE RECEPTOR AND NOISE MONITORING LOCATIONS

Sensitive Receptors

Where a project has the potential to cause a significant noise impact to sensitive receptors along area roadways, the County requires measures to reduce the impact to a less than significant level. Possible measures include a reduction of the intensity of the proposed project; construction of noise attenuation walls and/or landscaped earth berms; or other changes in project design or its proposed access. For non-residential projects, reduced hours of operation may also be required by the County.

Operational Noise

Operational noise impacts are based on current daytime ambient noise levels, the County Noise/Land Use Compatibility Guidelines and measurements of similar equipment and standard noise attenuation calculations of solar facilities. Land disturbance acreages, equipment, schedule, mileage and workforce information is based on the most up-to-date engineering available from the Applicant and typically represent conservative estimates.

Daytime ambient noise levels were measured between 43.3 and 44.2 dBA Leq (refer to **Table 4.8-8**), based on 1-hour daytime measurements. The ambient noise level represents the daytime ambient noise levels and is expressed as Leq (average over sample length). A noise increase of 10 dBA Leq, is considered a substantial increase in noise. Based on the County Noise/Land Use Compatibility Guidelines (**Figure 4.8-1**), noise levels of up to 70 dBA CNEL are considered to be "normally acceptable" in areas designated for agricultural land uses.

Corona Noise/Corona Discharge

The permanent noise sources that would occur within the solar field site parcels are limited to corona noise from the Gen-Tie line. The potential for noise from corona discharge is greatest with high voltage lines during wet weather or near inconsistencies or cuts in the metal surface of the line itself. The corona noise associated with a 230-kV line is not expected to exceed 40 dBA (AECOM 2014c).

Decommissioning Noise

Decommissioning noise impacts are based on the proximity of the decommissioning activity to noise sensitive receptors, the magnitude and duration of deconstruction noise at the nearest sensitive receptor, and the day of week/time of day.

The Gen-Tie and collector lines will be decommissioned with the respective CUP. However, if the Gen-Tie and/or collector line of the CUP is still being utilized by another CUP, or nearby project, the line and/or structures of the respective Gen-Tie and/or collector line will remain. For example, if the Mount Signal Solar Farm or Calexico Solar Farms is using the Gen-Tie, it will not be decommissioned.

D. Project Impacts and Mitigation Measures

Noise Levels in Excess of Standards/Substantial Temporary Noise Increase

Impact 4.8.1 Construction and decommissioning activities would cause short-term increases in noise on and in the vicinity of the Project. Likewise, operation of the Full Build-out Scenario or the Phased CUP Scenario could cause noise levels to rise in excess of standards. However, the Project includes noise- and vibration-reducing design features which would reduce noise levels during construction, operation and decommissioning to be within County standards. Therefore, impacts with regard to noise levels in excess of standards and substantial temporary noise increases are considered **less than significant**.

FULL BUILD-OUT SCENARIO/PHASED CUP SCENARIO

Construction

Construction noise impacts are based on the proximity of noise sensitive receptors to the construction activity, the magnitude and duration of construction noise at the nearest sensitive receptor, and the day of week/time of day. As shown in **Figure 4.8-2**, a total of 33 noise sensitive receptors were identified with 18 located in the immediate proximity of several CUPs. These receptors include single-family homes/farmhouses associated with the agriculture land uses.

Construction of the Project would generate noise from site preparation and installation of the solar facilities. All of these activities would result in temporary increases in noise levels and are analyzed further in the following discussion.

Construction Equipment Use

Site preparation involves demolition, grading, compacting, and excavating, which would include backhoes, bulldozers, loaders, excavation equipment (e.g., graders and scrapers), pile drivers, and compaction equipment. Finishing activities may include the use of pneumatic hand tools, scrapers, concrete trucks, vibrators, and haul trucks. As shown in **Table 4.8-2**, maximum noise levels from general construction equipment typically range from approximately 71 (Portable Generators) to 99 dBA Lmax (Rock Drills) at a distance of 50 feet from the source.

Site preparation and panel installation are expected to produce the most noise during Project construction. Earthmoving and pile driving equipment generating approximately 85 dBA Lmax (**Table 4.8-2**) at a distance of 50 feet is the maximum sound level for analysis purposes. Typical operating cycles involve 2 minutes of full power, followed by 3 or 4 minutes at lower settings. Therefore, hourly average noise levels at some construction sites typically range from approximately 65 to 88 dB Leq at a distance of 50 feet, depending on the activities performed. However, at this particular site with the equipment proposed to be used, the hourly average construction noise levels would be approximately 75 dBA Leq at a distance of 50 feet from the construction activity.

In accordance with the Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description), all construction vehicle and equipment operation shall be sited at least 50 feet from sensitive receptors on, or in the vicinity the each CUP (13-0036 thru 13-0052). Therefore, even when construction activities occur near sensitive receptors, the appropriate distance of at least 50 feet is maintained. In a worst-case scenario, Project construction noise levels would not exceed the 75 dBA Leq standard averaged over an 8-hour workday. As a general rule, worker breaks, equipment adjustments, and transitions between activities occur over an 8-hour workday so that equipment does not run continuously for 8 hours. The Imperial County General Plan Noise Element limits construction noise to 75 dBA Leq over an 8-hour average, measured at the receptor (i.e., occupied residence). Likewise, major construction activities (e.g., earthmoving activities) involving construction equipment would generally occur between 7:00 a.m. and 5:00 p.m. Monday through Friday and 9:00 a.m. and 4:00 p.m. on Saturday. These activities are permitted under the Imperial County General Plan Noise Element between 7 a.m. and 7 p.m. from Monday through Friday, and between 9 a.m. and 5 p.m. on Saturday. Construction of the proposed Project would occur during these hours consistent with the County Noise Element.

For all of these reasons, Project construction noise would not exceed the County's construction noise level threshold at an occupied farmhouse (i.e., SR 15). Therefore, impacts associated with construction noise levels in excess of standards or a substantial temporary noise increase would be **less than significant** for the both the Full Build-out Scenario and the Phased CUP Scenario.

Operation

Due to the relatively quiet nature of PV technology, operation of the proposed Project would not generate high noise levels. In addition, the Project would operate during daylight hours when ambient noise levels are highest. Sources of operational noise include on-site maintenance and security vehicle operation, as well as general operation of the facility, including the on-site substation and the inverters within the solar arrays. Limited on-site intermittent maintenance vehicle traffic would also occur but is not expected to generate off-site noise impacts.

The County Noise Ordinance prohibits operational noise from exceeding applicable 1-hour average sound levels (refer to **Table 4.8-7**) on or beyond the boundaries of the property on which the noise is produced, based on the designated land use. Because all CUPs (13-0036 thru 13-0052) and surrounding properties are located are not zoned for Agricultural-Industrial Uses AM-1 or AM-Z, the Noise Ordinance does not prescribe a property line noise level limit on Project operations.

Based on the County General Plan Noise Element, Noise/Land Use Compatibility Guidelines (refer to **Figure 4.8-1**), noise levels of up to 70 dBA CNEL are considered "normally acceptable" in areas designated for agricultural land uses. Based on the Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) , all Project components (e.g., inverters, trackers, substation, energy storage units, etc.), and equipment operation will be sited at least 50 feet from farmhouses on-site or in the vicinity of the Project. Therefore, impacts associated with operational noise levels in excess of standards or a substantial temporary noise increase would be **less than significant** for both the Full Build-out Scenario and the Phased CUP Scenario.

Inverter Noise

The solar array inverters, if unshielded, would produce low noise levels during operation. The inverters would operate primarily during daylight hours (from sunrise to sunset), when the solar arrays are generating electricity. Daytime noise generation from an inverter (manufacturer rated at 77 dBA at a distance of 5 feet) (AECOM 2014c, p. 31) would attenuate to approximately an hourly average of 58 dBA Leq at a distance of 50 feet. If inverter noise is conservatively assumed to occur over 24 hours, the noise level would average to approximately 64.7 dBA CNEL hours (though nighttime inverter noise would be substantially less) and as such would not exceed the County Noise/Land Use Compatibility Guidelines threshold of 70 dBA CNEL for an agricultural use. In addition, the Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) require the following:

- All Project components (e.g., inverters, trackers, substation, energy storage units, etc.) and equipment operation shall be sited at least 50 feet from farmhouses on-site or in the vicinity of the Project.
- Any inverters located within 100 feet of an existing occupied residence shall be shielded with a structural barrier capable of reducing the inverter's noise and the ambient increase at the receptor to less than 5 dBA CNEL and less than 10 dBA equivalent continuous noise level (Leq) in order to avoid a substantial permanent increase in ambient noise.

Therefore, operational noise generated by Project inverters would result in a **less than significant impact** with regard to noise levels in excess of standards or a substantial temporary noise for both the Full Build-out Scenario and the Phased CUP Scenario.

Transformer Noise

Transformers at the on-site substations would have cooling fans that operate during daytime hours. Daytime noise generation from the on-site substations (manufacturer rated at 60 dBA at a distance of 5 feet) (AECOM 2014c, p. 31) would be approximately 41 dBA Leq at a distance of 50 feet. If transformer

noise is conservatively assumed to occur over 24 hours, the noise level would average to approximately 41.7 dBA CNEL hours (though nighttime transformer noise would be substantially less) and would not exceed the County Noise/Land Use Compatibility Guidelines threshold of 70 dBA CNEL for an agricultural use. In addition, the Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) require the following:

- All Project components (e.g., inverters, trackers, substation, energy storage units, etc.), and equipment operation shall be sited at least 50 feet from farmhouses on-site or in the vicinity of the Project.

Therefore operational noise generated by Project transformers would result in a **less than significant impact** with regard to noise levels in excess of standards or a substantial temporary noise for both the Full Build-out Scenario and the Phased CUP Scenario.

Energy Storage Facility Noise

The proposed energy storage facility, if unshielded, would produce low levels of noise during facility operations. However, noise generated by the energy storage facility would primarily occur during daytime hours. Daytime noise generation from the facility (manufacturer rated at 85 dBA Leq at a distance of 1 meter [3 feet, 3 and 3/8 inches]) (AECOM 2014c, p. 31) would be approximately 61 dBA Leq at a distance of 50 feet. If conservatively assumed to occur over 24 hours, energy storage facility noise would average to approximately 67.7 dBA CNEL hours (though nighttime facility noise would be substantially less) and would not exceed the County Noise/Land Use Compatibility Guidelines threshold of 70 dBA CNEL for an agricultural use. In addition, the Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) require the following:

- Any energy storage facilities located within 150 feet of an existing occupied residence shall be shielded with a structural barrier capable of reducing the facility's noise and the ambient increase at the receptor to less than 5 dBA CNEL and less than 10 dBA equivalent continuous noise level (Leq), in order to avoid a substantial permanent increase in ambient noise.

Therefore operational noise generated by Project energy storage facilities would result in a **less than significant impact** with regard to noise levels in excess of standards or a substantial temporary noise for both the Full Build-out Scenario and the Phased CUP Scenario.

Combined Operational Noise

The potential of combined operational noise levels of an unshielded inverter (58 Leq at a distance of 50 feet), an unsheilded transformer (41 dBA Leq at a distance of 50 feet), and an unshielded energy storage facility (61 Leq at a distance of 50 feet) would be approximately 62.8 dBA Leq at a distance of 50 feet. If combined operational noise is conservatively assumed to occur over 24 hours, the noise level would average to approximately 69.7 dBA CNEL hours (though nighttime combined operational noise would be substantially less). While close to the threshold, the combined operational noise level at a distance of 50 feet from a transformer, an energy storage facility, and an inverter would still be below the County Noise/Land Use Compatibility Guidelines threshold of 70 dBA CNEL. In addition, the Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) require the following:

- Wherever all three operational facilities (inverters, transformers, and energy storage facilities) are located together within 180 feet of an existing occupied residence, the facilities shall be shielded with a structural barrier capable of limiting the combined noise generated and ambient increase at the receptor to less than 5 dBA CNEL and less than 10 dBA Leq in order to avoid a substantial permanent increase in ambient noise.

Therefore, combined operational noise would result in a **less than significant impact** with regard to noise levels in excess of standards or a substantial temporary noise increase for both the Full Build-out Scenario and the Phased CUP Scenario.

Gen-Tie Line Noise

As described in Chapter 2.0, Project Description, the Project's 230-kV Gen-Tie line will co-locate with the Mount Signal Solar Farm Project Gen-Tie line. Even during worst-case weather conditions that contribute to high corona noise (e.g., high humidity, fog and rain), the corona noise associated with a 230-kV line is not expected to exceed 40 dBA Leq (AECOM 2014, p. 32) directly below the conductor. Likewise, the noise level at the edge of the transmission line corridor right-of-way would not the County Noise/Land Use Compatibility Guidelines threshold of 70 dBA CNEL for an agricultural use. Therefore operational noise generated by the Gen-Tie would result in a **less than significant impact** with regard to noise levels in excess of standards or a substantial temporary noise increase for both the Full Build-out Scenario and the Phased CUP Scenario.

Decommissioning

Decommissioning activities are similar to construction activities but generate approximately half the vehicle traffic and equipment compared to construction activities. Overall, decommissioning activities are not anticipated to last as long as construction activities. However, even though the decommissioning activities would move around the each CUP (13-0036 thru 13-0052), the duration of the decommissioning activities (e.g., demolition, excavation, restoration) immediately proximate to a sensitive noise receptors would be approximately the same as would occur during construction. Decommissioning noise impacts are based on the proximity of the activity to noise sensitive receptors, the magnitude and duration of construction noise at the nearest sensitive receptor, and the day of week/time of day.

Decommissioning of the each CUP (13-0036 thru 13-0052), would generate noise from the removal of the solar facilities and site restoration. Noise would vary depending on the activity, type of mobile and stationary equipment and vehicles, and duration of activities. Facilities removal and site restoration involves demolition, grading, compacting, and excavating, which would include backhoes, bulldozers, loaders, and excavation equipment (e.g., graders and scrapers).

During Project decommissioning, site demolition and restoration are expected to produce the highest noise levels. Earthmoving activities generate hourly average construction noise levels of approximately 75 dBA Leq at a distance 50 feet. However, noise from earthmoving activities would be substantially less when averaged over an 8-hour workday. The Imperial County General Plan Noise Element limits construction noise to 75 dBA Leq over an 8-hour average, measured at the receptor (i.e., occupied residence). Decommissioning noise for the Project is not anticipated to exceed the County Noise/Land Use Compatibility Guidelines threshold of 70 dBA CNEL at an occupied farmhouse when averaged over an 8-hour period. In addition, the Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) require the following:

- During the construction and decommissioning phases, in the event that activities are anticipated to occur outside the hours of 7 a.m. to 7 p.m., Monday through Friday, and 9 a.m. to 5 p.m. on Saturday, the activities shall not include the operation of construction equipment. No commercial construction operations are permitted on Sunday or holidays.

For all of these reasons, Project decommissioning noise would not exceed the County's construction noise level threshold at an occupied farmhouse (i.e., SR 15). Therefore, impacts associated with

decommissioning noise levels in excess of standards or a substantial temporary noise increase would be **less than significant** for both the Full Build-out Scenario and the Phased CUP Scenario.

Mitigation Measures

None required.

Significance After Mitigation

Not applicable.

Noise Level Increases at Sensitive Receptors

Impact 4.8.2 Sensitive receptors located adjacent to several CUPs could be subject to increases in noise levels exceeding County standards during construction, operation and decommissioning activities. However, sensitive receptors would be protected from excessive noise through the incorporation of Project Design Features including setbacks and barriers. Therefore, noise level increases at sensitive receptors would result in a **less than significant impact**.

CUPs 13-0036, 13-0037, 130038, 13-0039, 13-0042, 13-0049, AND 13-0050

Construction

As shown in **Table 4.8-2**, maximum noise levels from construction equipment typically range from approximately 80 dBA to 96 dBA Lmax at a distance of 50 feet from the source.

Noise sensitive receptors in proximity to the CUPs are residences, specifically farmhouses. **Figure 4.8-2** shows the single-family farmhouses (identified as sensitive receptors [SR#]) currently located adjacent, or in close proximity, to CUPs 13-0036 (SR 12), 13-0037 (SR 17, 18 and 19), 13-0038 (SR 11), 13-0039 (SR 14, 15 and 16), 13-0042 (SR 4, 5, 6, 7, 8, 9 and 10), 13-0049 (SR 2 and 3), and 13-0050 (SR 13). Based on the location of these sensitive receptors, construction activities could occur adjacent to the farmhouses at various times over the course of site preparation and equipment installation.

As previously noted, the Applicant proposes implementation of specific features to reduce construction noise impacts to nearby sensitive receptors. The Applicant proposed Measures/Project Design Features require the following:

- All Project construction vehicle, and equipment operation shall be sited at least 50 feet from farmhouses on-site or in the vicinity of the Project.
- Construction equipment shall be operated at approximately 600 feet or more away from sensitive receptors. When construction equipment is planned to occur within the 50- to 600-foot range of occupied sensitive receptors, the following measures shall apply:
  - All diesel equipment shall be operated with closed engine doors and shall be equipped with factory-recommended mufflers or better; and
  - Equipment staging areas shall be located away from occupied residences (i.e., farmhouses) to the extent feasible.
- Temporary long-term construction equipment staging areas shall be located away from occupied residences and schools.
- During the construction and decommissioning phases, in the event that activities are anticipated to occur outside the hours of 7 a.m. to 7 p.m., Monday through Friday, and 9 a.m. to 5 p.m. on

Saturday, the activities shall not include the operation of construction equipment. No commercial construction operations are permitted on Sunday or holidays.

- Vibratory rollers and other ground compaction equipment shall not be used within 50 feet of residences in order to avoid the potential for structural damage from vibration.

In accordance with the above Project Design Features, all construction vehicle and equipment operation will be set back at least 50 feet from farmhouses in the vicinity of CUPs 13-0036 (SR 12), 13-0037 (SR 17, 18 and 19), 13-0038 (SR 11), 13-0039 (SR 14, 15 and 16), 13-0042 (SR 4, 5, 6, 7, 8, 9 and 10), 13-0049 (SR 2 and 3), and 13-0050 (SR 13). Maximum noise levels from construction equipment typically range from approximately 80 dBA to 96 dBA Lmax at a distance of 50 feet from the source. In a worst-case scenario, construction noise levels would not exceed the 75 dBA Leq standard averaged over an 8-hour workday when a distance of at least 50 feet from a farmhouse/residence is maintained (AECOM 2014c). Therefore, with implementation of the Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) , construction noise level increase impacts would be **less than significant** for sensitive receptors on CUPs 13-0036 (SR 12), 13-0037 (SR 17-19), 13-0038 (SR 11), 13-0039 (SR 14, 15 and 16), 13-0042 (SR 4, 5, 6, 7, 8, 9 and 10), 13-0049 (SR 2 and 3), and 13-0050 (SR 13) for both the Full Build-out Scenario and the Phased CUP Scenario.

Construction Period Vehicle Trips

Vehicle trips generated by construction of CUPs 13-0036, 13-0037, 130038, 13-0039, 13-0042, 13-0049, and 13-0050 would result in a negligible increase in existing traffic volumes and noise levels along SR-98 and at residences (SR 12, 17, 18, 19, 29, 30, 31 and 32) adjacent to the materials delivery route along SR-98 and other smaller roadways in the Project area. Worst-case Project construction traffic assumes 664 ADT, with approximately 209 peak hour trips. Existing traffic volumes on SR-98 adjacent to CUPs 13-0036 and 13-0037 are approximately 1,800 ADT, with 200 peak hour trips (AECOM 2014c, p. 33). Therefore, Project ADT of 664 would be less than half of the existing roadway ADT of 1,800; peak hour Project construction trips would approximately double existing peak hour trips (i.e. 209 + 200 = 409) along SR-98.

As described with regard to sensitive receptors under "Definitions and Terminology" above, when traffic volumes are doubled, noise levels increase by 3 dBA, which is barely perceptible to the human ear. A 10 dBA increase is considered by many agencies (e.g., Caltrans) as a substantial increase, because an increase of 10 dBA sounds twice as loud to the human ear (AECOM 2011f, p. 11). Traffic noise associated with Project construction is anticipated to increase by less than 3 dBA and will not cause a substantial temporary increase in ambient noise levels. Therefore, impacts resulting from construction vehicle noise level increases would be **less than significant** for sensitive receptors on CUPs 13-0036 (SR 12), 13-0037 (SR 17-19), 13-0038 (SR 11), 13-0039 (SR 14, 15 and 16), 13-0042 (SR 4, 5, 6, 7, 8, 9 and 10), 13-0049 (SR 2 and 3), and 13-0050 (SR 13) for both the Full Build-out Scenario and the Phased CUP Scenario.

Operation

Daytime ambient noise levels were measured at between 43.3 and 44.2 dBA Leq (refer to **Table 4.8-8**), based on 1-hour daytime measurements. Therefore, the hourly average ambient noise level of 43 dBA represents the daytime ambient noise levels and is expressed as Leq (AECOM 2014c, p. 27). A noise increase of 10 dBA Leq was used in this analysis to assist in defining a substantial increase for sensitive receptors associated with CUPs 13-0036 (SR 12), 13-0037 (SR 17, 18 and 19), 13-0038 (SR 11), 13-0039 (SR 14, 15 and 16), 13-0042 (SR 4, 5, 6, 7, 8, 9 and 10), 13-0049 (SR 2 and 3), and 13-0050 (SR 13). In addition, the Project's site plan for CUP 13-0039 includes a 5-acre buffer of undeveloped area around the SR 15 farmhouse because the home site would be retained by the homeowner; the homeowner would lease the remaining land to the Project.

Inverter Noise

Inverter noise of 58 dBA Leq at a distance of 50 feet would result in an increase in daytime ambient noise levels (43 dBA Leq) by approximately 15 dBA Leq at the inverter on all CUPs (13-0036 thru 13-0052). The Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) require unshielded inverters to be located 100 feet from a noise sensitive receptor. Inverter noise would attenuate with distance to approximately 52 dBA Leq at 100 feet. An increase of 9 dBA Leq (from 43 dBA Leq to 52 dBA Leq) would not be a significant permanent noise increase because it is less 10 dBA Leq. In addition, the Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) require the following:

- All Project components (e.g., inverters, trackers, substation, energy storage units, etc.) and equipment operation shall be sited at least 50 feet from farmhouses on-site or in the vicinity of the Project.
- Any inverters located within 100 feet of an existing occupied residence shall be shielded with a structural barrier capable of reducing the inverter's noise and the ambient increase at the receptor to less than 5 dBA CNEL and less than 10 dBA equivalent continuous noise level (Leq) in order to avoid a substantial permanent increase in ambient noise.
- Inverters and transformers shall be situated outside the 5-acre buffer of undeveloped area around the SR 15 farmhouse. (Note: this buffer is reserved by the homeowner with the remaining land leased to the Project). The 5-acre buffer far exceeds the minimum 50-foot distance required by the Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) .

Therefore, impacts resulting from inverter noise level increases would be **less than significant** at sensitive receptors on CUPs 13-0036 (SR 12), 13-0037 (SR 17, 18 and 19), 13-0038 (SR 11), 13-0039 (SR 14, 15 and 16), 13-0042 (SR 4, 5, 6, 7, 8, 9 and 10), 13-0049 (SR 2 and 3) and 13-0050 (SR 13) for both the Full Build-out Scenario and the Phased CUP Scenario.

Transformer Noise

Transformer noise of approximately 41 dBA Leq at a distance of 50 feet during the daytime would result in a negligible increase over ambient noise levels of less than approximately 1 dBA Leq at the transformer location. Daytime ambient noise levels at transformers are estimated at 43 dBA. Thus, transformer noise would not result in a substantial permanent increase in ambient noise levels. Likewise, an increase of 1 dBA Leq would be less than a 5 dBA CNEL increase. In addition, the Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) require the following:

- All Project components (e.g., inverters, trackers, substation, energy storage units, etc.), and equipment operation shall be sited at least 50 feet from farmhouses on-site or in the vicinity of the Project.
- Inverters and transformers shall be situated outside the 5-acre buffer of undeveloped area around the SR 15 farmhouse. (Note: this buffer is reserved by the homeowner with the remaining land leased to the Project). The 5-acre buffer far exceeds the minimum 50-foot distance required by the Project Design Features.

Therefore, impacts resulting from transformer noise level increases are considered **less than significant** at sensitive receptors on CUPs 13-0036 (SR 12), 13-0037 (SR 17, 18 and 19), 13-0038 (SR 11), 13-0039 (SR 14, 15 and 16), 13-0042 (SR 4, 5, 6, 7, 8, 9 and 10), 13-0049 (SR 2 and 3), and 13-0050 (SR 13) for both the Full Build-out Scenario and the Phased CUP Scenario.

Energy Storage Facility Noise

The energy storage facility, if unshielded, would generate noise of approximately 61 dBA Leq at a distance of 50 feet. This would result in an increase in daytime ambient noise levels (43 dBA Leq) of approximately 18 dBA Leq at an inverter on all of the CUPs (13-0036 thru 13-0052). The Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) require:

- Any energy storage facilities located within 150 feet of an existing occupied residence shall be shielded with a structural barrier capable of reducing the facility's noise and the ambient increase at the receptor to less than 5 dBA Community Noise Equivalent Level (CNEL) and less than 10 dBA equivalent continuous noise level (Leq), in order to avoid a substantial permanent increase in ambient noise.

Energy storage facility noise would attenuate with distance to approximately 52 dBA Leq at 150 feet. An increase of 9 dBA Leq (from 43 dBA Leq to approximately 52 dBA Leq) would not be a significant permanent noise increase because it is less than a 10 dBA Leq increase. Therefore, impacts resulting from transformer noise level increases would be **less than significant** at sensitive receptors at CUPs 13-0036 (SR 12), 13-0037 (SR 17, 18 and 19), 13-0038 (SR 11), 13-0039 (SR 14, 15 and 16), 13-0042 (SR 4, 5, 6, 7, 8, 9 and 10), 13-0049 (SR 2 and 3) and 13-0050 (SR 13).

Combined Operational Noise

Combined operational noise levels of an unshielded inverter (58 Leq at a distance of 50 feet), an unshielded transformer (41 dBA Leq at a distance of 50 feet), and an unshielded energy storage facility (61 dBA Leq at a distance of 50 feet) would be approximately 62.8 dBA Leq at a distance of 50 feet. The combined operational noise levels (63 dBA Leq) would result in an increase in existing daytime ambient noise levels (43 dBA Leq) by approximately 20 dBA Leq on all CUPs (13-0036 thru 13-0052). However, the combined operational noise would attenuate with distance to approximately 52 dBA Leq at a distance of 180 feet. The Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) require:

- Wherever all three operational facilities (inverters, transformers, and energy storage facilities) are located together within 180 feet of an existing occupied residence, the activities shall be shielded with a structural barrier capable of limiting the combined noise generated and ambient increase at the receptor to less than 5 dBA CNEL and less than 10 dBA Leq in order to avoid a substantial permanent increase in ambient noise.
- Inverters and transformers shall be situated outside the 5-acre buffer of undeveloped area around the SR 15 farmhouse. (Note: this buffer is reserved by the homeowner with the remaining land leased to the Project). The 5-acre buffer far exceeds the minimum 50-foot distance required by the Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) .

With implementation of the barrier and buffer specific to SR 15, a substantial permanent increase in ambient noise resulting from combined operations would be avoided. Likewise, the Project's combined operational noise will not create a substantial permanent increase in the existing ambient noise levels. Therefore, impacts resulting from combined operation noise level increases would be **less than significant** at sensitive receptors at CUPs 13-0036 (SR 12), 13-0037 (SR 17, 18 and 19), 13-0038 (SR 11), 13-0039 (SR 14, 15 and 16), 13-0042 (SR 4, 5, 6, 7, 8, 9 and 10), 13-0049 (SR 2 and 3) and 13-0050 (SR 13) for both the Full Build-out Scenario and the Phased CUP Scenario.

Gen-Tie Line Noise

As described under Impact 4.8.1, the corona noise associated with a 230-kV line is not expected to exceed 40 dBA Leq (AECOM 2014c, p. 35) directly below the conductor, even during worst-case weather conditions. Therefore, the Gen-Tie noise level at the edge of the transmission line corridor right-of-way would result in an increase of less than 3 dBA Leq in daytime ambient noise levels (43 dBA Leq). This increase would not be significant (i.e., greater than a 10 dBA Leq increase). Therefore, impacts resulting from Gen-Tie line noise level increases would be **less than significant** at sensitive receptors at CUPs 13-0036 (SR 12), 13-0037 (SR 17, 18 and 19), 13-0038 (SR 11), 13-0039 (SR 14, 15 and 16), 13-0042 (SR 4, 5, 6, 7, 8, 9 and 10), 13-0049 (SR 2 and 3) and 13-0050 (SR 13) for both the Full Build-out Scenario and the Phased CUP Scenario.

Operational Vehicle Trips

Operation of all CUPs (13-0036 thru 13-0052) is expected to generate approximately 30 ADT from maintenance and security personnel. As previously discussed, a doubling of the energy of a noise source would result in a 3 dBA increase in noise levels. An increase in noise below 3 dBA is not perceptible to the human ear. In order to increase ambient noise levels by 3 dBA, the Project would need to result in a doubling in traffic along affected roadways.

Existing traffic volumes on SR-98 adjacent to or near CUPs 13-0036 (SR 12), 13-0037 (SR 17, 18 and 19), 13-0038 (SR 11), 13-0039 (SR 14, 15 and 16), 13-0042 (SR 4, 5, 6, 7, 8, 9 and 10), 13-0049 (SR 2 and 3), and 13-0050 (SR 13) are approximately 1,800 ADT, with 200 peak hour trips (AECOM 2014c, p. 35). The Project's 30 ADT for operation of the Project are substantially less than the 1,800 ADT necessary to double traffic volumes, that the operational period vehicle trips would be far below 3 dBA and not perceptible to the human ear. Therefore, impacts resulting from operational vehicle trip noise level increases would be **less than significant** at sensitive receptors at CUPs 13-0036 (SR 12), 13-0037 (SR 17, 18 and 19), 13-0038 (SR 11), 13-0039 (SR 14, 15 and 16), 13-0042 (SR 4, 5, 6, 7, 8, 9 and 10), 13-0049 (SR 2 and 3) and 13-0050 (SR 13) for both the Full Build-out Scenario and the Phased CUP Scenario.

Decommissioning

As discussed with regard to construction, daytime ambient noise levels were previously measured in the Project area between 43.3 and 44.2 dBA Leq (refer to **Table 4.8-8**) with an assumed hourly average of approximately 43 dBA Leq (AECOM 2014, p. 27). Worst-case hourly average daytime construction noise levels would be approximated at 75 dBA Leq at the nearest sensitive receptor (i.e., farmhouse). Decommissioning activities would result in a temporary ambient increase of approximately 32 dBA Leq at the receptor. A substantial noise increase (temporary or permanent) is typically defined as an increase of 10 dBA above existing conditions, based on an increase of 10 dBA sounding twice as loud to the human ear. The Imperial County General Plan Noise Element guidelines for determining substantial increases based on land use capability apply to future ambient noise levels, after a project is completed, and therefore do not apply to temporary decommissioning activities.

A substantial temporary increase in noise does not automatically trigger a significant noise impact. Rather, it is a screening threshold that triggers a further evaluation of increase in the context of all the Project Design Features and the circumstances in the vicinity of the Project (i.e. sensitive receptors) to determine if the substantial increase is also a significant environmental impact.

The properties adjacent to CUPs 13-0036 (SR 12), 13-0037 (SR 17, 18 and 19), 13-0038 (SR 11), 13-0039 (SR 14, 15 and 16), 13-0042 (SR 4, 5, 6, 7, 8, 9 and 10), 13-0049 (SR 2 and 3), and 13-0050 (SR 13) are zoned for agriculture. Decommissioning noise adjacent to these farmhouses would, by definition, result in a substantial temporary increase in daytime ambient noise levels. However, given the existing

agricultural activities occurring on-site and the adjacent properties, the daytime operation of agricultural equipment near these farmhouses would produce noise levels similar to decommissioning sources. Furthermore, the operation of Project decommissioning equipment would not occur at night. Therefore, ambient noise levels during night hours (i.e., when sleeping activities occur) would not be affected.

It is also important to note that the farmhouses are not within a residential zoning designation. If that were the case, a residential zone would have more stringent (i.e. lower) ambient noise limits than an agricultural use. Finally, the increase in ambient noise level during decommissioning would be less than the County construction noise level limit of 75 dBA Leq averaged over an 8-hour daytime period and would occur within the County's allowable daytime construction hours. Furthermore, the Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) , when combined with the factors described above, would prevent substantial temporary increases in noise from rising to the level of a significant temporary noise impact. Therefore, impacts resulting from decommissioning noise increases would be **less than significant** at sensitive receptors at CUPs 13-0036 (SR 12), 13-0037 (SR 17, 18 and 19), 13-0038 (SR 11), 13-0039 (SR 14, 15 and 16), 13-0042 (SR 4, 5, 6, 7, 8, 9 and 10), 13-0049 (SR 2 and 3) and 13-0050 (SR 13) for both the Full Build-out Scenario and the Phased CUP Scenario.

Decommissioning Period Vehicle Trips

The vehicle trips generated by decommissioning of the Project would result in a negligible increase in existing traffic volumes and noise levels along SR-98 at CUPs 13-0036 (SR 12), 13-0037 (SR 17, 18 and 19), 13-0038 (SR 11), 13-0039 (SR 14, 15 and 16), 13-0042 (SR 4, 5, 6, 7, 8, 9 and 10), 13-0049 (SR 2 and 3), and 13-0050 (SR 13) adjacent to the materials delivery route along SR-98 and other smaller roadways in the Project area. Decommissioning ADT (332 ADT) and peak hour trips (105) are anticipated to be half those of construction (i.e. approximate 664 ADT with 209 peak hour) and therefore well below the existing roadway ADT (1,800) and peak hour trips (200).

As previously discussed, a 10 dBA noise increase is considered substantial because it sounds twice as loud to the human ear. However, when traffic volumes are doubled, noise levels increase by 3 dBA, which is barely perceptible to the human ear. As noted above, decommissioning traffic is anticipated to be half the number of trips associated with construction and would not generate a noticeable increase in traffic noise. Therefore, impacts resulting from decommissioning vehicle trip noise increases would be **less than significant** at sensitive receptors on CUPs 13-0036 (SR 12), 13-0037 (SR 17, 18 and 19), 13-0038 (SR 11), 13-0039 (SR 14, 15 and 16), 13-0042 (SR 4, 5, 6, 7, 8, 9 and 10), 13-0049 (SR 2 and 3) and 13-0050 (SR 13) for both the Full Build-out Scenario and the Phased CUP Scenario.

Mitigation Measures

None required.

Significance After Mitigation

Not Applicable.

Groundborne Vibration or Groundborne Noise Level Impacts

Impact 4.8.3 The proposed Project would generate groundborne vibration or noise levels associated with construction and operation of on-site equipment. However, the levels are anticipated to be below the level of human annoyance and the significance threshold. Therefore, groundborne vibration and noise impacts are considered **less than significant.**

FULL BUILD-OUT SCENARIO/PHASED CUP SCENARIO

Construction

The County of Imperial does not have established significance criteria for groundborne vibration or groundborne noise. The Federal Transit Administration (FTA) has identified guideline vibration damage criteria for various structural categories (AECOM 2014c). These criteria are utilized in absence of County-specific criteria. **Table 4.8-4**, above, summarizes the FTA guideline criteria. As shown, vibration levels that exceed 0.20 in/sec ppv can risk structural damage to buildings of typical construction.

The FTA thresholds for human disturbance due to groundborne noise summarized in **Table 4.8-5** identify a vibration level of 0.1 in/sec ppv as the threshold of human annoyance. Vibration-generating construction equipment is limited to 7:00 a.m. to 7:00 p.m. Monday through Friday and 9:00 a.m. to 5:00 p.m. on Saturday by the Imperial County General Plan Noise Element.

As shown in **Table 4.8-5**, at 25 feet, construction equipment generates vibration at levels exceeding the threshold of human annoyance (0.1 in/sec ppv), as well as exceeding the threshold of risk of structural damage (0.2 in/sec ppv). However, at a distance of 50 feet, this equipment is below the thresholds of human annoyance (0.1 in/sec PPV) and structural damage (0.2 in/sec ppv). Vibration would not result in structural damage to farmhouses if construction equipment is not operated within 50 feet of structures. The Applicant-proposed Design Features (refer to Table 2.0-9 in Chapter 2.0, Project Description) require:

- Construction equipment shall be encouraged to operate 600 feet or more away from sensitive receptors. When construction equipment is planned to occur within the 50- to 600-foot range of occupied sensitive receptors, the Applicant shall implement the following measures:
- All diesel equipment shall be operated with closed engine doors and shall be equipped with factory-recommended mufflers or better; and
- Equipment staging areas shall be located away from occupied residences (i.e., farmhouses) or schools to the extent feasible.
- Whenever feasible, electrical power shall be used to run air compressors and similar power tools.
- Temporary long-term construction equipment staging areas shall be located away from occupied residences and schools.
- During the construction and decommissioning phases, in the event that activities are anticipated to occur outside the hours of 7 a.m. to 7 p.m., Monday through Friday, and 9 a.m. to 5 p.m. on Saturday, the activities shall not include the operation of construction equipment. No commercial construction operations are permitted on Sunday or holidays.
- Vibratory rollers and other ground compaction equipment shall not be used within 50 feet of residences, in order to avoid the potential for structural damage from vibration.

Because all Project components, construction vehicles, and equipment operation must be sited at least 50 feet from farmhouses, vibration would be well below the level of human annoyance and a sufficient distance to avoid structural damage from vibration. Therefore, construction groundborne vibration or noise level impacts would be **less than significant** for farmhouses located near the Project for both the Full Build-out Scenario and the Phased CUP Scenario.

Operation

Operation of both the Full Build-out Scenario and the Phased CUP Scenario would generate negligible ground-borne vibration at the source (i.e., inverters, energy storage components, transformers, trackers, and transmission lines, etc.). As a result, Project operation would not result in ground-borne vibration impacts at the nearest residences. No significant impact would occur. Therefore, operational groundborne vibration or noise level impacts would be **less than significant** for farmhouses located near the Project for both the Full Build-out Scenario and the Phased CUP Scenario.

Decommissioning

As described under the discussion of construction, the County of Imperial does not have established significance criteria for groundborne vibration or groundborne noise. Instead, the FTA guidelines for vibration damage criteria for various structural categories and the FTA thresholds for human disturbance due to groundborne noise are applied. Potential for groundborne vibration during decommissioning would be similar to construction. As with construction, vibration would not result in structural damage to farmhouses if construction equipment is not operated within 50 feet of structures and all Project Design Features (as listed above) are implemented. Because all Project decommissioning activities must be sited at least 50 feet from farmhouses, vibration would be well below the level of human annoyance and structural damage. Therefore, decommissioning groundborne vibration or noise level impacts would be **less than significant** for farmhouses located near the Project for both the Full Build-out Scenario and the Phased CUP Scenario.

Mitigation Measures

None required.

Significance After Mitigation

Not applicable.

Airport-Related Noise Impacts

Impact 4.8.4 The closest airport to the Project area is the Johnson Brothers Private Airstrip. However, this private airstrip does not experience high levels of air traffic nor can it accommodate large, noisy aircraft. Therefore, airport-related noise impacts at the Project site are considered **less than significant**.

FULL BUILD-OUT SCENARIO/PHASED CUP SCENARIO

Construction, Operation and Decommissioning

The County's General Plan Noise Element provides criteria for Airport Land Use Compatibility in order to evaluate aircraft noise impacts. However, none of the proposed CUPs (13-0036 thru 13-0052) are located within the sphere of influence of a public or private airport. The nearest airport is the Johnson Brothers Private Airstrip, located approximately 1.5 miles to the northeast of the southern CUP cluster. It is closest to CUP 13-0052. All other CUPs are over 2 miles from the airstrip. Other airports in the vicinity of the Project include the Calexico International Airport (located 3.4 miles to the east of the southern CUP cluster) and the Naval Air Facility, El Centro (located approximately 5 miles north of the northern CUP cluster).

The proposed Solar Energy Center, does not include the addition of new sensitive receptors to the Project area. In addition, the Project would not place O&M buildings within 2 miles of a public airport. Based on the distance from private and public airports, the Project would not expose individuals to excessive noise levels resulting from proximity to an airport. Therefore, airport-related noise impacts are considered **less than significant** during construction, operation and decommissioning of both the Full Build-out Scenario and the Phased CUP Scenario.

Mitigation Measures

None required.

Significance After Mitigation

Not applicable.

4.8.4 CUMULATIVE SETTING, IMPACTS AND MITIGATION MEASURES

A. CUMULATIVE SETTING

The geographic scope for cumulative noise impacts is the area surrounding the proposed solar field site parcels where other potential project development similar to the proposed Project is occurring, such as: Rockwood Solar, Lyons Solar, Ferrell Solar, Centinela Solar Energy Project, Mount Signal and Calexico Solar Farm Projects. Construction, operational, and decommissioning noise and vibration associated with the Project, combined with noise generated by other foreseeable developments in the vicinity of the solar field site parcels is considered in determining the potential to result in cumulative impacts to noise-sensitive receptors in the Project area. The cumulative projects are identified Table 3.0-1 in Chapter 3.0, Introduction to the Environmental Analysis and Assumptions Used.

B. CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Noise Increases

Impact 4.8.5 Long-term operation of the proposed Project, in combination with other proposed, approved and reasonably foreseeable projects, would not result in a substantial contribution to cumulative noise levels. Therefore, cumulative noise impacts would be considered **less than cumulatively considerable.**

FULL BUILD-OUT SCENARIO/PHASED CUP SCENARIO

Construction

The proposed Project is located in an area of other potential cumulative development, including other solar projects (refer to Table 3.0-1 and Figure 3.0-1 in Chapter 3.0, Introduction to the Environmental Analysis and Assumptions Used). Project construction noise and vibration combined with construction noise generated by other foreseeable developments in the Project vicinity is considered in determining the potential to result in cumulative impacts to noise-sensitive receptors in the Project area.

The noise sensitive receptors in the Project vicinity (refer to **Figure 4.8-2**), would be subject to noise and vibration generated during construction activities. As previously described in Impacts 4.8.1, 4.8.2 and 4.8.3, noise sensitive receptors would not be subject to construction noise levels in excess of County and/or FTA standards (for vibration). These same sensitive receptors are located too far from construction noise and vibrations generated by other cumulative projects. Construction noise and vibration from other cumulative projects is localized to large agricultural parcels surrounded by other large agricultural parcels; occurs over a relatively short-term duration during daytime hours; and, is limited to construction of uninhabited facilities with small O&M buildings.

Therefore, the contribution of construction noise and vibration generated by the Full Build-out Scenario or the Phased CUP Scenario to cumulative construction noise impacts would be **less than cumulatively considerable**. Likewise, construction noise and vibration from the Full Build-out Scenario or the Phased CUP Scenario, when combined with negligible construction noise and vibration impacts from other cumulative projects, would result in a **less than cumulatively considerable impact** on the sensitive receptors in the Project area.

Operation

Once constructed, the proposed facilities would operate at relatively low localized noise levels during periods of daytime ambient noise levels. Vehicle trip noise associated with operation of the Full Build-out Scenario or the Phased CUP Scenario would be negligible based on the low volume of trips (30 ADT for Full Build-out Scenario). Substantial land area is present to act as a noise attenuation buffer between cumulative projects. Therefore, the contribution of operational noise and vibrations generated by the Full Build-out Scenario or the Phased CUP Scenario to cumulative noise impacts would be **less than cumulatively considerable**. Likewise, operational noise and vibration from the Full Build-out Scenario or the Phased CUP Scenario, when combined with negligible noise and vibration impacts from other cumulative projects, would result in a **less than cumulatively considerable impact** on the sensitive receptors in the Project area.

Decommissioning

Project decommissioning would entail removal of all Project components, and restoration of the solar field site parcels to agricultural uses. Project decommissioning noise and vibration combined with potential decommissioning of other cumulative projects in the vicinity is considered in determining the potential to result in cumulative impacts to noise-sensitive receptors in the Project area.

The noise sensitive receptors in the Project area (refer to Figure 4.8-2), would be subject to decommissioning noise and vibration. As previously described in Impacts 4.8.1, 4.8.2 and 4.8.3, noise sensitive receptors would not be subject to decommissioning noise levels in excess of County and/or FTA standards (for vibration). These same sensitive receptors are located too far from decommissioning noise and vibrations potentially generated by other cumulative projects that may be undergoing decommissioning at the same time as the Full Build-out Scenario or any phase of the Phased CUP Scenario. As with construction, decommissioning noise and vibration from other cumulative projects would be localized and occur for a short duration during daytime hours. None of the on-site uses being removed as part of decommissioning are sensitive receptors (i.e. O&M Buildings). Therefore, the contribution of decommissioning noise and vibrations generated by the Full Build-out Scenario or the Phased CUP Scenario to potential cumulative decommissioning noise impacts would be **less than cumulatively considerable**. Likewise, decommissioning noise and vibration from the Full Build-out Scenario or the Phased CUP Scenario, when combined with potential negligible decommissioning noise and vibration impacts from other cumulative projects, would result in a **less than cumulatively considerable impact** on the sensitive receptors in the Project area.

Mitigation Measures

None required.

Significance After Mitigation

Not applicable.

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