5.12 NOISE

5.12.1 Introduction

This section presents a description of existing environmental acoustic conditions, predictive noise modeling, and potential noise impact assessment for the Project. The Project comprises two generating Plants sized for a nominal 53.4 MW net of solar generation each, complemented by 40 MW net of biomass-capable production. The biomass production is subordinate to production from the solar field, supplementing solar production during non-solar and shoulder solar hours. Net generating capacity for the Project, comprising both Plants, is 106.8 MW.

5.12.2 Fundamentals of Noise

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and that interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise; the perceived importance of the noise, and its appropriateness in the setting; the time of day and the type of activity during which the noise occurs; and the sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and amplitude. Frequency describes the pitch of the sound and is measured in Hertz (Hz), while amplitude describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above approximately 110 dB begin to be felt inside the human ear as discomfort and eventually pain at 120 dB and higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 1 to 2 dB. A 3 to 5 dB change is readily perceived. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or if -10 dB, halving) of the sound's loudness.

Due to the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically; however, some simple rules are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example: 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.

Sound level is usually expressed by reference to a known standard. This report refers to sound pressure level (SPL). In expressing sound pressure on a logarithmic scale, the sound pressure is compared to a reference value of 20 micropascals (µPa). SPL depends not only on the power of the source, but also on the distance from the source and on the acoustical characteristics of the space surrounding the source.

Hertz is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a number of times per second. When the drum skin vibrates 100 times per second it generates a sound pressure wave that is

oscillating at 100 Hz, and this pressure oscillation is perceived by the ear/brain as a tonal pitch of 100 Hz. Sound frequencies between 20 and 20,000 Hz are within the range of sensitivity of the best human ear.

Sound from a tuning fork contains a single frequency (a pure tone), but most sounds one hears in the environment do not consist of a single frequency but rather a broad band of frequencies differing in sound level. The method commonly used to quantify environmental sounds consists of evaluating all frequencies of a sound according to a weighting system that reflects that human hearing is less sensitive at low frequencies and extremely high frequencies than at the mid-range frequencies. This is called "A-weighting," and the decibel level measured is called the A-weighted SPL, and measured in decibels with the abbreviation "dBA." In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

Although the SPL may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources that creates a relatively steady background noise in which no particular source is identifiable. A single descriptor called the equivalent sound level (L_{eq}) may be used to describe sound that is changing in level. L_{eq} is the energy-mean dBA during a measured time interval. It is the "equivalent" constant sound level that would have to be produced by a given source to equal the acoustic energy contained in the fluctuating sound level measured. In addition to the energy-average level, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum L_{eq} (L_{max}) and minimum L_{eq} (L_{min}) indicators that represent the root-mean-square maximum and minimum noise levels measured during the monitoring interval. The L_{min} value obtained for a particular monitoring location is often called the acoustic floor for that location.

To describe time-varying character of environmental noise, the statistical noise descriptors L_{10}, L_{50}, and L_{90} are commonly used. They are the noise levels equaled or exceeded 10 percent, 50 percent, and 90 percent of the measured time interval. Sound levels associated with the L_{10} typically describe transient or short-term events, half of the sounds during the measurement interval are softer than L_{50} and half are louder, while levels associated with L_{90} often describe background noise conditions and/or continuous, steady-state sound sources.

Finally, another sound measure known as the day-night sound level (L_{dn} or DNL) is defined as the A-weighted average sound level for a 24-hour day. It is calculated by adding a 10 dB penalty to sound levels during the night period (10 p.m. to 7 a.m.) to compensate for the increased sensitivity to noise during the quieter nighttime hours.

The L_{dn} is typically used to define acceptable land use compatibility with respect to noise. Because of the time-of-day penalties associated with the L_{dn} descriptor, the L_{eq} for a continuously operating sound source during a 24-hour period will be numerically less. Sound levels of typical noise sources and environments are provided in Table 5.12-1 to provide a frame of reference.

Table 5.12-1
Sound Levels of Typical Noise Sources and Noise Environments

Noise Source (At a Given Distance)	Scale of A-Weighted Sound Level in Decibels	Noise Environment	Human Judgment of Noise Loudness
Military Jet Take-off with After-burner (50 feet), Civil-defense Siren (100 feet)	140, 130	Aircraft Carrier Flight Deck	
Commercial Jet Take-off (200 feet)	120	Thunderclap	Threshold of Pain 32 Times as Loud*
Pile Driver (50 feet)	110	Rock Music Concert	Average Human Ear Discomfort 16 Times as Loud*
Ambulance Siren (100 feet), Newspaper Press (5 feet), Power Lawn Mower (3 feet)	100		Very Loud 8 Times as Loud*
Motorcycle (25 feet), Propeller Plane Flyover (1,000 feet), Diesel Truck, 40 Miles Per Hour (50 feet)	90	Boiler Room Printing Press Plant	Likely Damage, 8-Hour Exposure 4 Times as Loud*
Garbage Disposal (3 feet)	80		Possible Damage, 8-Hour Exposure 2 Times as Loud*
Passenger Car, 65 Miles Per Hour (25 feet), Vacuum Cleaner (10 feet)	70	Data Processing Center, Department Store	Reference Loudness Moderately Loud*
Normal Conversation (5 feet), Air-conditioning Unit (100 feet)	60	Private Business Office, Restaurant	1/2 as Loud*
Light Traffic (100 feet)	50	Lower Limit of Daytime Urban Ambient Sound	1/4 as Loud*
Bird Calls (distant)	40	Quiet Urban Nighttime	1/8 as Loud*
Soft Whisper (5 feet)	30	Recording Studio, Library	Very Quiet 1/16 as Loud*
	20	Whistling, Rustling Leaves	Just Audible 1/32 as Loud*
	10	Breathing	Barely Audible 1/64 as Loud
	0		Threshold of Hearing 1/128 as Loud*

Reference: URS Corporation 2008.

Note: * Relative to a Reference Loudness of 70 Decibels.

5.12.3 Affected Environment

In accordance with CEC regulations, this subsection describes the existing noise environment on site and in the Project vicinity. Noise-sensitive receivers that may be affected are identified, as well as the laws, LORS that regulate noise levels at those receivers and along Project property boundaries.

5.12.3.1 Solar Field

The basic component of the solar field is the SCAs. The parabolic trough solar collector is a mirrored glass reflector that focuses direct solar radiation on an efficient evacuated receiver, or HCE. The two proposed Plants will each use 90 loops for their respective solar fields, where each loop includes 6 SCAs (each SCA is about 300 meters in length). A loop is composed of two SCA rows, one leading from the "cold oil header" at 550 °F and the other returning to the "hot oil header" at 740 °F. Each SCA includes 224 mirrors (arranged in a grid to form the parabolic shape collector), an independent positioning system, and a local control system.

5.12.3.2 Transmission Line

The project transmission system will require construction of approximately 6 miles of 230 kV transmission line. Two transmission line routes are proposed for this project: the northern route and the southern route (reference Figure 3.4-7). The northern route extends from the northeast corner of the Project site east, along the south side of West Jayne Avenue. The southern route extends from the southeast corner of the Project site east, along the section boundary line one mile south of and parallel to West Jayne Avenue. Both will connect to the Gates Substation.

5.12.3.3 Ambient Noise Measurements

Two (2) long-term and nine (9) short-term sound level measurements were conducted on May 8 and May 9, 2008 in order to characterize the existing noise environment near the proposed Project. A portion of these measurement locations include the long-term (LT1) and short-term (ST1-ST5) measurements in proximity of the proposed Project. Other measurement locations, ST6 and ST7, include the short-term measurements at the residential properties within a 1-mile buffer of the proposed Project. The remaining measurement locations, LT2 and ST8-ST9, include long and short-term measurements along the proposed transmission line right-of-way and near the existing substation. See Figure 5.12-1 for each location.

All sound level meters were equipped with windscreens and set for slow time-response and usage of the A-weighting scale. The instruments were field-calibrated before and after each measurement period, using acoustic calibrators. All sound level measurements conducted by URS were in accordance with International Organization for Standardization (ISO) 1996a, b, and c standards. The Certificate of Calibration and Conformance for all meters and calibrators are included in Appendix K-1.

During the survey periods, weather conditions data were measured using a portable meter (Speedtech Instruments Model: SM28, Serial Number: 03386). The measured air temperature readings ranged from 59 to 88 °F, with 27 to 55 percent relative humidity. Winds were calm throughout both days of the survey. These observed meteorological conditions were within appropriate limits for typical environmental noise measurements.

The short-term measurements were conducted using two Larson Davis Model 820 ANSI Type 1 Sound Level Meters (Serial Number: 1528 and 1597). The meters were each mounted on a tripod roughly 5 feet above the ground to simulate the average height of the human ear above grade. Measurement intervals that included intermittent noise sources considered abnormal or non-indicative of accurate background activity with respect to field observations were omitted from the analysis. A summary of the short-term measurements is presented in Table 5.12-2. Field notes are presented in Appendix K-2.

The long-term measurements were conducted using two (2) Larson Davis Model 720 ANSI Type 2 Integrating Sound Level Meters (Serial Number: 0395 and 0436). With only the windscreen-shrouded microphones exposed to the outdoor environment, the meters were each placed in locked, weather-resistant cases. The long-term measurements consisted of a set of consecutive 15 minute averages in excess of 25 hours. The instruments were checked for calibration before and after each measurement period with acoustic calibrators (CAL 150, Serial Number: 0377). A summary of the long-term measurements is presented in Table 5.12-3. Detailed long-term measurement data are presented in Appendix K-3.

The following paragraphs describe the noise measurement locations within the general study area, and are also shown on Figure 5.12-1.

5.12.3.3.1 Solar Field

LT1: This measurement location was near the northwestern corner of the Project property line, adjacent to the Coalinga State Hospital. The meter was placed approximately 600 feet from the center line of West Jayne Avenue. The measurement setup is shown in photograph #1 of Appendix K-4.

An unattended continuous 25-hour long-term measurement was conducted at this location. Noise sources at this site include vehicular traffic from West Jayne Avenue, agricultural equipment, irrigation sprinklers, insects, and distant aircraft fly-by. The long-term measurement was taken from 9:00 a.m., May 8 to 10:00 a.m., May 9, 2008 and is summarized in Table 5.12-3. The L_{dn} and L_{eq} for this period were 57 dBA and 51 dBA, respectively.

ST1: This measurement location was near LT1. This location was selected to check the results from LT1 and confirm measurement accuracy. The meter was placed approximately 100 feet south of LT1 along the western property line. The measurement setup is shown in photographs #3 and #4 of Appendix K-4.

The short-term (10-15 minutes) measurements were conducted during day, evening, and nighttime hours. Noise sources at this site were similar to LT1. The sound levels are shown in Table 5.12-2.

ST2: This measurement location was at the southwestern corner of the Project property line, adjacent to Coalinga State Hospital. The measurement setup is shown in photographs #5 and #6 of Appendix K-4.

The short-term (10-15 minutes) measurements were conducted during day, evening, and nighttime hours. Noise environment at this site was dominated by what appeared to be a pump system and accompanying generator for irrigation sprinkler operation in the vicinity. The pump was located approximately 240 feet

east of the meter and running throughout the day, resulting in little variation in measured sound levels. The sound levels are shown in Table 5.12-2.

ST3: This measurement location was approximately 3,000 feet south of West Jayne Avenue at the eastern Project property line. The measurement setup is shown in photograph #7 of Appendix K-4.

The short-term (10-15 minutes) measurements were conducted during day, evening, and nighttime hours. Noise sources at this site include distant aircraft, distant vehicular traffic from West Jayne Avenue, and birds vocalizing. The sound levels are shown in Table 5.12-2.

ST4: This measurement location was at the southern Project property line. The measurement setup is shown in photograph #8 of Appendix K-4.

The short-term (10-15 minutes) measurements were conducted during day, evening, and nighttime hours. Noise sources at this site include distant aircraft, insects, a tractor, and birds vocalizing. The sound levels are shown in Table 5.12-2.

ST5: This measurement location was approximately 2,000 feet from the western Project property line and approximately 37 feet south of West Jayne Avenue center line along the northern Project property line. Measurement setup is shown in photograph #9 in Appendix K-4.

The short-term (15-minute) measurements were conducted during day, evening, and nighttime hours. Noise sources at this site include vehicular traffic on West Jayne Avenue, and sprinklers during evening and nighttime. The sound levels are shown in Table 5.12-2.

5.12.3.3.2 Residences

Two residential areas were identified during the field survey. Four (4) houses are located along El Dorado Avenue and one (1) house is located along Sutter Avenue. The four houses along El Dorado Avenue are within the 1-mile buffer area from the proposed Project property line.

ST6: This measurement location was near residences (40434, 40445, 40455, and 40475 El Dorado Avenue), approximately 2,500 feet north of West Jayne Avenue and approximately 3,500 feet northeast of the northeastern corner of the Project property line. The meter was positioned 50 feet east of El Dorado Avenue, so that it could be considered acoustically representative of the four actual receiver locations and be exposed to the same ambient sound environment. The measurement setup is shown in photograph #10 of Appendix K-4.

The short-term (10-15 minutes) measurements were conducted during day, evening, and nighttime hours. Noise sources at this site include distant aircraft, vehicular traffic on El Dorado Avenue, and dogs barking. Although Interstate 5 (I-5) was visible from the measurement site, its contribution to the ambient sound environment was apparently not significant. The sound levels are shown in Table 5.12-2.

ST7: This measurement location was northwest of the residence (41360 Sutter Avenue) and north of Polvadero Community Golf Course (not in service). The meter was approximately 2,000 feet south of West Jayne Avenue and 50 feet west of Sutter Avenue. The residence is approximately 1-mile east of the

eastern Project property line. The measurement setup is shown in photographs #11 and #12 of Appendix K-4.

The short-term (10-15 minutes) measurements were conducted during day, evening, and nighttime hours. Noise sources at this site include vehicular traffic on Sutter Avenue and distant vehicular traffic from West Jayne Avenue and I-5. The sound levels are shown in Table 5.12-2.

5.12.3.3.3 Transmission Line

The two proposed transmission line routes would be constructed parallel with West Jayne Avenue between the Project site and Gates Substation, east of I-5. The northern route was the only one known at the time the sound survey was conducted, would collinearly follow West Jayne Avenue as a direct route between the Project site and this substation. Long- and short-term sound measurements were thus conducted along West Jayne Avenue to capture the existing ambient noise levels.

LT2: This measurement location was approximately 2,200 feet west of the Gates Substation and 90 feet north of West Jayne Avenue. The measurement setup is shown in photograph #2 of Appendix K-4.

An unattended continuous 25-hour long-term measurement was conducted at this location. Noise sources at this site include vehicular traffic from West Jayne Avenue, agricultural equipment, and distant aircraft fly-by. The long-term measurement was taken from 9:00 a.m. May 8 to 10:00 a.m. May 9, 2008, and is summarized in Table 5.12-3. The L_{dn} and L_{eq} for this period were 67 dBA and 62 dBA, respectively.

ST8: This measurement location was 50 feet south of West Jayne Avenue, approximately 9,500 feet east of the eastern Project property line, and approximately 7,000 feet west of I-5. The measurement setup is shown in photograph #13 of Appendix K-4.

The short-term (15-minute) measurements were conducted during day, evening, and nighttime hours. Noise sources at this site include vehicular traffic on West Jayne Avenue, agricultural equipment, and distant vehicular traffic from I-5. The sound levels are shown in Table 5.12-2.

ST9: This measurement location was at the southwestern corner of the Gates Substation, 50 feet north of West Jayne Avenue, and approximately 2,200 feet east of LT2. The measurement setup is shown in photograph #14 of Appendix K-4.

The short-term (15-minute) measurements were conducted during day, evening, and nighttime hours. Noise sources at this site include vehicular traffic on West Jayne Avenue and agricultural equipment. The sound level from the substation was not significant. The predominant noise source at this site is vehicular traffic on West Jayne Avenue. The sound levels are shown in Table 5.12-2.

Table 5.12-2 summarizes the results from the short-term measurements taken at the indicated ambient measurement locations. The L_{dn} values are calculated from the short-term measurements at the two indicated times of day: daytime (7 a.m. – 10 p.m.) and nighttime (10 p.m. – 7 a.m.).

Table 5.12-2
Short-term Noise Measurement Data Summary

Site ID	Measurement Location	Measurement Period			Measurement Results (dBA)				
		Start Time	End Time	Duration (minutes)	L_{eq}	L_{10}	L_{50}	L_{90}	L_{dn}
ST1	Near Northwest corner of Project property line	10:05 AM	10:20 AM	15	43	45	39	35	49
		8:05 PM	8:15 PM	10	51	55	49	46	
		1:35 AM	1:45 AM	10	41	44	39	36	
ST2	Southwest corner of Project property line	10:35 AM	10:50 AM	15	69	70	69	67	72 [C]
		7:00 PM	7:10 PM	10	64	65	64	63	
		12:30 AM	12:40 AM	10	65	66	65	64	
ST3	Eastern Project property line	11:05 AM	11:20 AM	15	44	48	40	34	42
		7:30 PM	7:40 PM	10	37	40	34	32	
		1:00 AM	1:10 AM	10	30	32	29	28	
ST4	Southern Project property line	11:30 AM	11:50 AM	20 [B]	36	40	34	31	44
		7:15 PM	7:25 PM	10	34	36	33	31	
		12:45 AM	12:55 AM	10	38	41	36	32	
ST5	Northern Project property line, West Jayne Avenue	12:05 PM	12:20 PM	15	66	70	51	35	66
		7:45 PM	8:00 PM	15	63	66	46	35	
		1:15 AM	1:30 AM	15	56	49	36	34	
ST6	Residences on El Dorado Avenue	12:30 PM	12:45 PM	15	59	53	43	36	61
		8:20 PM	8:30 PM	10	54	54	42	40	
		1:50 AM	2:00 AM	10	53	54	39	38	
ST7	Residence on Sutter Avenue	12:55 PM	1:10 PM	15	59	59	38	34	56
		8:35 PM	8:45 PM	10	50	49	45	42	
		2:05 AM	2:15 AM	10	39	41	39	37	
ST8	Proposed Transmission Line along West Jayne Avenue	1:20 PM	1:40 PM	20 [B]	70	75	60	45	68
		8:50 PM	9:05 PM	15	65	70	57	48	
		2:20 AM	2:35 AM	15	56	51	40	38	
ST9	Gates Substation	1:50 PM	2:05 PM	15	63	69	47	40	63
		9:15 PM	9:30 PM	15	66	71	57	49	
		2:40 AM	2:55 AM	15	50	47	45	43	

Notes:
A. Daytime and evening time measurements were conducted on May 8, 2008. Nighttime measurements were conducted on May 9, 2008.
B. Duration indicates 20 minutes. However, there were occasional unusual noise-producing activities, such as ambulance sirens, that occurred during the measurement. Therefore, 5 minutes of data containing these aberrations was eliminated from L_{eq} calculation.
C. At ST2, a water pump generator was in operation throughout the day.

Table 5.12-3 summarizes the results from the synchronous long-term measurements taken at the indicated ambient measurement locations.

Table 5.12-3
Long-Term Noise Measurement Data Summary

Site ID	Measurement Location	Measurement Period			25-hr Measurement Results (dBA)				
		Start Date	Start Time	Duration (hour)	L_{eq}	L_{10}	L_{50}	L_{90}	L_{dn}
LT1	Near NW Corner of Solar Field Property Line	5-8-2008	9:00 A.M.	25	51	54	45	40	57
LT2	West Jayne Avenue near Substation	5-8-2008	9:00 A.M.	25	62	66	56	45	67

Note: The meters monitored sound continuously for 25 hours.

5.12.4 Environmental Consequences

Noise will be produced at the proposed Project site both during construction and during operation. Potential noise impacts from both categories of activity will be assessed in this section. Federal, state, and local LORS that apply to the Project are presented in Section 5.12.5. These include Fresno County's general plan noise element and noise ordinance, which are intended to determine the significance of Project-generated increases in noise levels. Based on state of California and Fresno County guidelines, environmental consequences of the Project would be considered significant if one or more of the following conditions are satisfied:

1. Noise from Project construction takes place between 9 p.m. and 6 a.m. Monday through Friday, 5 p.m. and 7 a.m. on Saturday or Sunday.
2. Noise from Project operations at a rural residential land use exceeds 55 dBA L_{dn}, 50 dBA L_{50} during daytime hours (between 7 a.m. and 10 p.m.) or 45 dBA L_{50} during nighttime hours (between 10 p.m. and 7 a.m.).
3. Noise from Project operations at noise sensitive receivers (schools, parks, hospitals, and rest homes) exceeds 60 dBA L_{dn}, 55 dBA L_{50} during daytime hours (between 7 a.m. and 10 p.m.) or 50 dBA L_{50} during nighttime hours (between 10 p.m. and 7 a.m.).
4. Noise from Project operations exceeds 50 dBA at any 30 minutes, 55 dBA at any 15 minutes, 60 dBA at any 5 minutes, 65 dBA at any 1 minute, or 70 dBA at any time during daytime hours (between 7 a.m. and 10 p.m.) at noise sensitive receivers.
5. Noise from Project operations exceeds 45 dBA at any 30 minutes, 50 dBA at any 15 minutes, 55 dBA at any 5 minutes, 60 dBA at any 1 minute, or 65 dBA at any time during nighttime hours (between 10 p.m. and 7 a.m.) at noise sensitive receivers.
6. Based on CEC guidelines, if noise from the Project increases the existing background noise level by 5 dBA or more an impact may result.

For purposes of this analysis, in which Project operation noise levels are to be predicted, the duration-based thresholds in items 4 and 5 above shall be interpreted as statistical sound descriptors (L_x, the noise levels equaled or exceeded x percent in one hour), as follows:

- Noise from Project operations exceeds 50 dBA L_{50}, 60 dBA L_{10}, or 70 dBA L_{max} during daytime hours (between 7 a.m. and 10 p.m.) at noise sensitive receivers.
- Noise from Project operations exceeds 45 dBA L_{50}, 55 dBA L_{10}, or 65 dBA L_{max} during nighttime hours (between 10 p.m. and 7 a.m.) at noise sensitive receivers.

5.12.4.1 Construction Noise

The Project construction schedule will occur over 15 months between 7 a.m. and 5 p.m., Monday through Friday. During construction, a varying number of construction equipment and personnel will occupy the Project area and result in varying levels of construction noise. The Project will utilize conventional construction techniques and equipment including excavators, bulldozers, heavy trucks (*e.g.,* water truck, dump truck), and similar heavy construction equipment. A limited amount of specialized construction using trenchers and cranes may also be needed.

Project conventional construction activities (which generally exclude pile-driving and blasting) would result in a short-term, temporary increase in the ambient noise level resulting from the operation of construction equipment. The increase in noise level would be primarily experienced close to the noise source. The magnitude of the noise effects would depend on the type of construction activity, noise level generated by construction equipment, duration of the construction stages(s), and the distance between the noise source and receiver.

Construction noise impacts associated with the proposed Project were assessed with spreadsheet-based noise calculations. User inputs include as follows:

Distance from Source – the distance between the edge of the construction site (power block area) and the considered receiver;

Usage Factor – the average portion of a work day, in aggregate, that a piece of equipment is energized (stationary or mobile) and creating noise; and

Quantity – the number of equipment pieces or noise-producing events over a specific time period (*e.g.,* equipment utilization per month).

These inputs allow sound propagation prediction, using the following formula:

$$L_{eq} = \text{Source SPL} + 10 * \log_{10}(\text{Usage Factor}) + 10 * \log_{10}(\text{Quantity}) - 20 * \log_{10}(\text{Distance from Source / Reference Distance})$$

where source SPL and Reference Distance describe the typical noise, associated with a single piece of equipment, measured at a pre-defined distance. For instance, a chainsaw may have a source SPL of 78 dBA measured at a distance of 50 feet from its operator. Values for source SPL and reference distance

have either been reproduced from available manufacturer's data or calculated from industry-accepted formulas linking sound generation to the rated engine horsepower of the equipment.

For purposes of this analysis, and because construction involves mobile equipment and stationary systems that are frequently moved or re-positioned during the Project build schedule, the edge of the power block area is considered to be boundary of region where, on average, most of the construction activity would be located. This approximation is considered reasonable when, as in this case, the largest dimension of the power block footprint is small with respect to the receiver-to-edge distance.

Appendix K-5 includes the detailed information of construction equipment and sound levels.

Table 5.12-4
Calculated Construction Levels at Sensitive Receivers

Receiver Identification	Description	Direction from Center of Power Block	Dist. from Center of Power Block (ft)	Predicted SPL (dBA L_{eq})
ST6	Residence	Northeast	7,000	52-54
ST7	Residence	East	7,740	51-53
SR1	Residence	North	4,260	57-58
H1	Hospital	West	3,500	58-60
H2	Hospital	West	4,100	57-59
P1	Institution	West	6,500	53-55

Notes:
A. H1 is located at the most eastern building façade at Coalinga State Hospital.
B. H2 is located at the baseball field at Coalinga State Hospital.
C. P1 is located at the most eastern building façade at Pleasant Valley State Prison.

In Table 5.12-4, the predicted SPL range shows how the average daytime hourly L_{eq} for a typical construction work day varies by month as equipment rosters and construction activity intensity changes.

The existing ambient sound levels at ST6 and ST7 during daytime hours were 59 dBA L_{eq}. The construction noise level during the daytime hours does not exceed the existing ambient sound levels at ST6 and ST7.

Ambient sound levels at SR1, H1, H2, and P1 are not available. Thus, it was not possible to compare the construction and existing sound levels at these locations. However, Fresno County Ordinance, Chapter 8.40.060(c) exempts construction noise between 6 a.m. and 9 p.m. Therefore, the construction noise impacts are considered less than significant.

5.12.4.1.1 Occupational Noise

Compliance with California Division of Occupational Safety and Health (Cal/OSHA) regulations will help ensure that construction personnel are adequately protected from potential noise hazards. The noise exposure level to protect hearing of workers is regulated at 90 dBA over an 8-hour work shift. Project

contractors are required to comply with all Cal/OSHA regulations. Occupational noise impact relating to Project construction is, therefore, considered to be less than significant.

5.12.4.1.2 Off-site Construction Laydown, Staging, and Parking Areas

The 15-acre primary construction laydown and parking areas will be located in the center of the Project site. The estimated sound level from construction vehicles in staging and laydown areas would be an average level of 89 dBA at 50 feet (EPA 1971). The nearest noise sensitive receiver is the Coalinga State Hospital, east of the Project site. The distance from the center of the Project site to the nearest building façade would be approximately 3,500 feet. The following expression would be used to predict the sound level at the nearest building facade for the Coalinga State Hospital.

$$20 * \log_{10} (\text{Distance from Source / Reference Distance})$$

The sound level would be 52 dBA at the nearest building facade, based on above formula. However, as described in County's Ordinance, Chapter 8.40.060(c), the construction noise generated between 6 a.m. and 9 p.m. from Monday through Friday is exempt. Therefore, the noise impact from the construction staging activity is considered less than significant.

5.12.4.1.3 Construction Traffic

Access to the Project site and laydown area for construction activities will be via West Jayne Avenue from the east. The AM peak hour traffic volumes for the construction traffic would be 492 vehicles, including 3 heavy trucks, 5 delivery trucks, and 484 personnel vehicles. No-Build alternative AM peak hour traffic volumes on West Jayne Avenue would be 483 vehicles with 1% medium truck and 0.5% heavy truck.

The FHWA Traffic Noise Model Version 2.5 Look-Up Tables was used to determine the sound levels from West Jayne Avenue traffic. The No-Build alternative sound level from West Jayne Avenue traffic at a distance of 50 feet from the centerline would be 67 dBA. The expected AM peak hour construction traffic volume would be 492 and would result in a 3 dBA increase on West Jayne Avenue. Change in sound level of less than 5 dBA, per CEC Guidelines, are not significant noise impacts to local roads in the study area. Therefore, the construction traffic noise is considered less than significant.

5.12.4.2 Operational Noise

5.12.4.2.1 Prediction Methods

The Cadna/A Noise Prediction Model (Version 3.7.124) was used to estimate the Project-generated SPL at the property lines and noise-sensitive receivers. Cadna/A is commercially available Windows-based software that predicts and assesses noise levels near industrial noise sources, based on ISO 9613-2 standards for noise propagation calculations. The model uses industry-accepted propagation algorithms and accepts sound power levels (in dB re: 1 pico-Watt) provided by the equipment manufacturer and other sources. The calculations account for classical sound wave divergence, plus attenuation factors resulting from air absorption, basic ground effects, and barrier/shielding. Intervening natural and man-

made topographical barrier effects were considered as appropriate, including those from structures such as major buildings, tanks, and large equipment.

Calculations were performed using unweighted octave band sound power levels as inputs from each pre-defined noise source, as summarized in Table 5.12-5. For noise sources lacking Applicant-supplied sound data, sound levels were derived from appropriate calculation methods based on the information provided in the Project Description. The Project configuration was imported into Cadna/A from available Project CAD files. As Project operation is linked to solar exposure and monitored hourly, the Cadna/A model consequently predicts hourly sound levels. The general formula used to derive the overall SPL (in dBA) from the sound power level (PWL) is as follows:

$$SPL = PWL - 20 \text{ Log } (r) - 10.9 + C$$, where r is in meters and C is dimensionless (Harris)

Table 5.12-5
Noise Model Sound Power Level Input Parameters

Project Component	Sound Power Level (PWL, in dB) at Octave Band Center Frequency (Hz)									A-Weighted (dBA)	Unweighted (linear, dB)	Acoustic Height (feet)
	31.5	63	125	250	500	1000	2000	4000	8000			
I.D. Fan	-	121	115	113	105	98	88	84	80	108	123	10
F.D. Fan	-	120	114	112	104	97	87	83	79	107	122	5
Boiler	99	104	110	111	112	101	90	85	91	111	116	VA
Pump (Scrubber)	104	110	108	102	96	90	84	81	74	99	113	3
Pump (Wet Scrubber)	104	110	108	107	108	103	96	82	75	108	115	3
Pump (HTF)	85	86	87	89	89	92	89	85	79	96	98	3
Pump (Recycle Water)	82	83	84	86	86	89	86	82	76	93	95	3
Pump (Feed Water)	82	83	84	86	86	89	86	82	76	93	95	3
Pump (Water Treat. Facility)	83	84	85	87	87	90	87	83	77	94	96	3
Air Condition	-	-	63	68	71	68	67	64	55	74	75	3
Ventilation Fan (8 fans)	-	96	101	91	85	78	72	66	62	89	103	Roof
Biomass	-	99	86	89	87	85	81	74	72	90	100	VA
Transformer	108	111	105	105	100	94	91	88	88	102	114	6
Cooling Tower	110	113	113	110	107	103	100	97	89	109	118	26
Steam Turbine Generator	101	105	106	103	102	102	100	99	95	107	112	13

Table 5.12-5
Noise Model Sound Power Level Input Parameters
(Continued)

Project Component	Sound Power Level (PWL, in dB) at Octave Band Center Frequency (Hz)									A-Weighted (dBA)	Unweighted (linear, dB)	Acoustic Height (feet)
	31.5	63	125	250	500	1000	2000	4000	8000			
Exhaust Stack	-	119	113	111	103	96	86	82	78	106	121	100

Notes:
VA = Vertical Area Source
Roof = Sources are on the roof of buildings
Data Sources:
Energy Products of Idaho 2008
Beranek, L.L. and I.L. Ver, eds., 1992
Bies, D. and Hansen, C, 2003

While power plants and industrial facilities, in general, exhibit multiple sounds that individually vary slightly with fluctuations in performance or transient characteristics, a conservative approach adopted by this analysis is to assume the sources listed in Table 5.12-5 are generators of continuous sound or are, in other words, effectively "steady-state." This means that, within a few decibels, the predicted L_{eq} from continuous noise generators of Project operations is assumed equal to the predicted L_{50} level or other statistical descriptors (*e.g.*, L_{90}, L_{10}, etc.).

Community Noise

The results of the predictive calculations are summarized in Table 5.12-6. The table shows the existing and calculated future noise levels at the nearest noise sensitive receivers. The calculated sound levels contributed by the Project at offsite receivers range from 32 to 42 dBA L_{eq}.

Table 5.12-6
Predicted Operation Noise Levels

ID	Distance From Power Block (feet) /Direction	Existing Noise Level (dBA)			Predicted Operational Noise Level (dBA)			Future Cumulative Noise Level (dBA)		
		L_{eq} (Day)	L_{eq} (Night)	L_{dn}	L_{eq} (Day)	L_{eq} (Night)	L_{dn}	L_{eq} (Day)	L_{eq} (Night)	L_{dn}
ST1[A]	1,500 / NW	39	39	49	43	43	50	44	44	53
ST2[A]	1,750 / SW	69	65	72	42	42	49	69	65	72
ST3[A]	1,300 / E	40	29	42	46	46	53	47	46	53
ST4[A]	1,300 / S	34	36	44	45	45	52	45	45	53
ST5[A]	1,200 / N	51	36	66	47	47	54	53	47	66
ST6[B]	3,500 / NE	43	39	61	34	34	40	44	40	61
ST7[B]	4,000 / E	38	39	56	32	32	39	39	40	56

Table 5.12-6
Predicted Operation Noise Levels
(Continued)

ID	Distance From Power Block (feet) /Direction	Existing Noise Level (dBA)			Predicted Operational Noise Level (dBA)			Future Cumulative Noise Level (dBA)		
		L_{eq} (Day)	L_{eq} (Night)	L_{dn}	L_{eq} (Day)	L_{eq} (Night)	L_{dn}	L_{eq} (Day)	L_{eq} (Night)	L_{dn}
SR1[B]	2,100 / NE	-	-	-	40	40	47	40	40	47
H1[B]	3,500 / W	-	-	-	42	42	49	42	42	49
H2[B]	4,070 / W	-	-	-	41	41	48	41	41	48
P1[B]	6,500 / W	-	-	-	36	36	43	36	36	43

Notes:
A. Receivers are at the property line.
B. Receivers are at noise sensitive receivers (offsite).

Note that the future cumulative noise levels at any of the noise sensitive receivers listed in Table 5.12-6 would not exceed the threshold of significance described in LORS (see Section 5.12.4 for the brief discussion of LORS). Therefore, the operational noise impacts are considered less than significant. See Figure 5.12-2 for Ldn noise contours with the Project site.

Please refer to Section 5.12.6 for a presentation of mitigation steps intended to help keep operational noise levels compliant.

5.12.4.2.2 Occupational Noise

Based upon the noise level data, the noise levels inside and very near the Project would be similar in magnitude to comparably sized large industrial projects. These high noise levels may require the use of hearing protection as specified by federal OSHA and Cal/OSHA guidelines for worker noise exposure. Compliance with Cal/OSHA regulations will ensure that personnel are adequately protected from potential noise hazards. The noise exposure level to protect hearing of workers is regulated at 90 dBA over an 8-hour work shift. Areas above 85 dBA will be posted as high noise level areas and hearing protection will be required. The Project owners will implement a hearing conservation program for applicable employees as outlined in Cal/OSHA regulations. The survey will be conducted after the facility is in full operation, and will be conducted by a qualified person in accordance with the provisions of Title 29, CFR, Part 1910.95 (reviewed in Section 5.12.6.3) and Title 8, CCR, Section 5095-5100 (Article 105) (reviewed in Section 5.12.6.3). On the expectation that the above policy will be fulfilled, occupational noise is considered to be less than significant.

5.12.4.2.3 Operational Traffic Noise

The project-related traffic includes vehicles for operational workforce, visitors, biomass deliveries, and ash disposals. According to the traffic report generated for the Project (see Section 5.11), there would be 30 vehicles for operational workforces, one vehicle for visitor, 20 biomass delivery trucks, one

miscellaneous delivery truck, one ash disposal truck, and one miscellaneous disposal truck during AM peak hour. A total of 31 automobiles and 23 heavy trucks was assumed. Per No-Build alternative, the AM peak hour traffic volume for West Jayne Avenue would be 488 vehicles. The traffic mix for West Jayne Avenue was assumed to be 1% medium trucks and 0.5% heavy trucks.

The sound level for No-Build alternative at 50 feet from West Jayne Avenue centerline would be 67 dBA. The sound level with the Project operation would be 70 dBA. As a result of the Project operation traffic, an increase of 3 dBA would be predicted along West Jayne Avenue. The increase of 3 dBA is not considered significant. Therefore, the operational traffic noise is considered to be less than significant.

5.12.4.2.4 Power Transmission

The project transmission system will require construction of approximately 6 miles of 230 kV transmission line. Two transmission line routes are proposed for this project: the northern route and the southern route. The northern route extends from the northeast corner of the Project site east, along the south side of West Jayne Avenue. The southern route extends from the southeast corner of the Project site east, along the section boundary line one mile south of and parallel to West Jayne Avenue. Both will connect to the Gates Substation.

Noise sources associated with power transmission include occasional breaker operation in the substation, corona noise, and very low magnetostriction hum from the conductors. Breaker noise is considered impulsive in nature, lasting a very short duration and may occur only a few times per year. Corona noise is characterized as a buzz or hums and is usually worse when the conductors are wet, such as in rain or fog.

The Electric Power Research Institute (EPRI) has conducted noise tests and studies and has published reference material on transmission line noise. Consistent with all acoustic textbooks' discussion of propagation of noise from a line source, EPRI states that noise produced by a conductor decreases at a rate of 3 dB per doubling of distance from the source. The EPRI Transmission Line Reference Book indicates that the audible noise from a typical 525-kV line with two conductors per phase would likely be less than 40 dBA at a distance of 40 feet from the outside conductor at ground level. If only one conductor per phase is used, the noise level will be less. Consistent with the project description (see Section 3.0, Facility Description and Location), the levels are expected to be less than described above because the transmission line used in the Project is 230 kV (*i.e.,* less than 525 kV).

In support of the above, the existing substation was measured to be 63 dBA L_{eq} and 50 dBA L_{eq} during day and night measurements, respectively. The sound level measurements for the proposed northern route transmission line were conducted along West Jayne Avenue and results were 70 dBA L_{eq} and 56 dBA L_{eq} during day and night measurements, respectively. The sound level measurement for the proposed southern route transmission line was not conducted because the proposed southern route was not in the plan at the time of sound level measurement. However, the sound level measurement was conducted at the center of the southern property line. This location is considered to be a similar acoustic environment and would represent the ambient sound level. The sound levels at the center of southern property line were 36 dBA L_{eq} and 38 dBA L_{eq} during day and night measurements.

As described above, the audible noise from a typical 525-kV line with two conductors per phase would likely be less than 40 dBA at a distance of 40 feet from the outside conductor at ground level. Since the proposed transmission lines would be 230 kV, the expected sound levels would be less than 40 dBA. Per logarithmic calculation, the increase of the predicted sound levels at both the northern and southern routes would not be greater than 5 dBA. Therefore, the impact from the proposed power transmission is expected to be less than significant.

5.12.5 Cumulative Impacts

The closest permitted project is located approximately 0.5-miles to the south of the Project site and includes exploratory oil and gas well and production facility sites. No permitted projects within 2.0-miles of the Project site include features that are likely to contribute to any direct and or indirect impacts caused by the Project. Thus, as mentioned above, no significant cumulative impacts have been identified as a result of the construction, operation, maintenance, or long-term presence of SJS 1&2 and other projects in the area. For further discussion of cumulative impacts, see Section 5.18, Cumulative Impacts.

5.12.6 Mitigation Measures

5.12.6.1 Offsite Operation

To ensure that acoustical design goals are met by the facility while in operation, the following conditions of certification are recommended:

NOISE-1: The proposed Project design and implementation shall include appropriate noise attenuation measures adequate to ensure that the noise level produced by operation of the Project will not exceed a daytime average exterior noise level of more than 50 dBA L_{eq} at any residence. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints, as determined by the compliance project manager (CPM). Pressure relief valves shall be adequately muffled to preclude noise that draws legitimate complaints, as determined by the CPM.

Within 30 days of the proposed Project first achieving a sustained output of 80 percent or greater of rated capacity, the Applicant shall conduct a 25-hour noise survey. The noise survey shall also include short-term measurement of one-third octave-band SPL to ensure that no new noise tones have been introduced. If the results from the operational noise survey indicate that pure tones are present, then additional noise control measures shall be implemented to eliminate the pure tones. Irrespective of the specific method used for determining the Project's noise level, the character of the Project's noise shall be evaluated at the nearest residence to determine the presence of tones or other dominant sources of Project noise.

The measurement of proposed Project noise for the purposes of demonstrating compliance with this Condition of Certification may be made at a location, acceptable to the CPM, closer to the Project than the nearest residence (*e.g.,* 400 feet from the Project's acoustic center in the direction of residences) and this measured level is then mathematically extrapolated to determine the Project's noise contribution at the nearest residence. If the results from the operational noise survey indicate that the Project-only noise level exceeds 50 dBA, L_{eq} for any daytime hour and 45dBA for any nighttime hour at any residence, additional noise control measures shall be implemented to reduce noise to a level of compliance with this limit.

Within 30 days after completing the post-construction operational noise survey, the Project owner shall submit a summary report of the survey to the CPM. Included in the survey report will be a description of any additional noise control measures and a schedule (subject to CPM approval), necessary to achieve compliance with the above listed noise limits, when implementing these measures.

Within 30 days of completion of installation of these measures, the Project owner shall submit to the CPM a summary report of a new noise survey, performed as described above and showing compliance with this condition.

The contractors shall implement a noise complaint process and hotline number for the surrounding community. The Applicant will have the responsibility and authority to receive and resolve noise complaints.

5.12.6.2 Construction

Project construction would temporarily elevate the noise levels in the surrounding community. Most often, the sound levels would be moderate, with a few processes creating short-term, substantially elevated noise levels. Because construction would be of a limited duration, conducted during daylight hours and because best practices for construction noise control will be implemented, no adverse construction noise effects are expected to occur in the surrounding community.

To help ensure that noise emission assumptions relied upon herein are valid and acoustical design goals can be met by the Project during construction, the following Conditions of Certification are recommended:

NOISE-2: Construction noise emissions shall comply with the local LORS regarding hours of construction activity and permitted noise levels affecting adjacent uses.

NOISE-3: All noise-producing Project equipment and vehicles using internal combustion engines shall be equipped with mufflers; air-inlet silencers where appropriate; and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed "package" equipment (*e.g.,* arc-welders, air compressors) shall be equipped with shrouds and noise control features that are readily available for that type of equipment.

NOISE-4: All mobile or fixed noise-producing equipment used on the Project that is regulated for noise output by a local, state, or federal agency, shall comply with such regulation while in the course of Project activity.

NOISE-5: The use of noise-producing signals, including horns, whistles, electronic alarms, sirens, and bells, will be for safety warning purposes only.

NOISE-6: No construction-related public address, loudspeaker, or music system shall be audible at any adjacent noise-sensitive land use.

NOISE-7: Additionally, the contractors shall implement a noise complaint process and hotline number for the surrounding community. The Applicant will have the responsibility and authority to receive and resolve noise complaints.

5.12.6.3 Onsite Occupational Noise Exposure

NOISE-8: Within 30 days of the Stage 1 of the Project going online, the Applicant shall conduct an occupational noise survey to verify modeled noise levels and identify any additional noise hazard areas in the facility. The survey shall be conducted by a qualified person in accordance with the provisions of Title 8 CCR, Sections 5095-5099 (Article 105) and Title 29, CFR, Section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure. Areas above 85 dBA that may be accessed by any personnel shall be posted as high noise level areas. Hearing protectors shall be furnished and their use required in the posted areas.

NOISE-9: The Applicant shall prepare a report of the survey results and if necessary, identify proposed measures that will be employed to comply with the applicable state and federal regulations. Within 30 days after completing the survey, the Project owner shall submit the noise survey report to the CPM. The Applicant shall make the report available to the federal OSHA and Cal/OSHA, upon request.

5.12.7 LORS Compliance

5.12.7.1 Federal

There are no federal laws, ordinances, regulations, or standards that directly affect this Project with respect to noise. However, there are guidelines at the federal level that direct the consideration of a broad range of noise and vibration issues as listed below:

National Environmental Policy Act (42 United States Code ["USC"] 4321, *et seq.*) (PL-91-190) (40 CPR § 1506.5)

Noise Control Act of 1972 (42 USC 4910)

The USEPA has not promulgated standards or regulations for environmental noise generated by power plants; however, the EPA has published a guideline that specifically addresses issues of community noise (EPA Levels Document, Report No. 556/9-74-664). This guideline, commonly referred to as the "levels document," contains goals for noise levels affecting residential land use of L_{dn} <55 dBA for exterior levels and L_{dn} <45 dBA for interior levels.

Section 202(c)(1-9) of the BLM Land Use Planning Handbook requires that land use planning comply with all applicable state and federal noise pollution standards, but does not provide specific noise standards.

Occupational exposure to noise is regulated by Title 29, CFR, Part 1910.95 occupational noise exposure. Protection against the effects of noise exposure shall be provided when the time-weighted average (TWA) sound levels exceed 90 dBA for an 8-hour period. When employees are subjected to sound exceeding this limit, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce TWA

sound levels within 90 dBA, personal protective equipment shall be provided and used to reduce sound levels within the limits. The employer shall administer a continuing, effective hearing conservation program whenever employee noise exposures equal or exceed an 8-hour TWA of 85 dBA (slow response) or, equivalently, a dose of 50 percent. For purposes of the hearing conservation program, employee noise exposures shall be computed in accordance with CFR 1910.95 Appendix A (Noise exposure computation) without regard to any attenuation provided by the use of personal protective equipment.

5.12.7.2 State

The CEC has been delegated the authority to act as the lead agency for purposes of compliance with the CEQA (Public Resources Code Division 13, Environmental Protection, Section 21000 *et seq*.).

Occupational exposure to noise is regulated by Cal/OSHA in Title 8, Group 15, Article 105, Sections 5095 to 5100. The standard stipulates that protection against the effects of noise exposure shall be provided when sound levels exceed 90 dBA over an 8-hour exposure period. Protection shall consist of feasible administrative or engineering controls. If such controls fail to reduce sound levels to within acceptable levels, personal protective equipment (PPE) shall be provided and used to reduce exposure to the employee. Additionally, a hearing conservation program must be instituted by the employers whenever employee noise exposure equals or exceeds the action level of an 8-hour TWA sound level of 85 dBA. The hearing conservation program requirements consist of periodic area and personal noise monitoring, performance and evaluation of audiograms, provision of hearing protection, annual employee training, and record keeping.

The state also requires local jurisdictions (California Government Code Section 65302(f)) to prepare general plans that include land use and noise elements.

CEQA requires identification of significant environmental impacts and their feasible mitigation. Section XI of Appendix G of CEQA Guidelines (Cal. Code Regs., tit. 14, App. G) lists some indicators of potentially significant impacts that include 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 ground-borne vibration or ground-borne 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 2 miles of a public airport or public use airport, the project exposes people residing or working in the project area to excessive noise levels.

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

5.12.7.3 Local

Fresno County

The Project site and environs are unincorporated areas within and governed by Fresno County. Project noise at any noise sensitive receiver must comply with General Plan and Noise Control Ordinance established for maintaining noise/land use compatibility between residential and industrial land uses.

General Plan

The Fresno County General Plan Noise Element, adopted in December of 1975, establishes maximum acceptable noise levels for various land use categories. Table 5.12-7 presents Maximum Acceptable Noise Levels.

Table 5.12-7
Maximum Acceptable Noise Levels (dBA)

Land Use	L_{50}		L_{dn}	
	Daytime	Nighttime	Exterior	Interior
Rural Residential	50	45	55	45
Urban Residential & Noise Sensitive Receivers[1]	55	50	60	45
Urban Commercial	65	60		
Urban Industrial	70	70		

Note: [1]Schools, parks, hospitals, and rest homes

Ordinance

The Fresno County Ordinance, Chapter 8.40, Noise Control describes exterior noise standards and noise source exemptions applicable to this Project.

Chapter 8.40.040 indicates exterior noise levels when measured at any affected single- or multi-family residence, school, hospital, church or public library situation in either the incorporated or unincorporated area to exceed the noise level standards presented in Table 5.12-8.

Table 5.12-8
Exterior Noise Standards (dBA)

Category	Cumulative number of minutes in any 1-hour time period	Noise level standards	
		7 a.m. to 10 p.m.	10 p.m. to 7 a.m.
1	30	50	45
2	15	55	50
3	5	60	55
4	1	65	60
5	0	70	65

In addition, Chapter 8.40.060 describes the exemptions of noise sources, which would apply to this Project, as follows:

C. *Noise sources associated with construction, provided such activities do not take place before six a.m. or after nine p.m. on any day except Saturday or Sunday, or before seven a.m. or after five p.m. on Saturday or Sunday.*

G. *Noise sources associated with work performed by private or public utilities in the maintenance or modification of its facilities.*

Table 5.12.9 summarizes LORS for the proposed Project.

Table 5.12-9
Summary of LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal					
	National Environmental Policy Act (42 USC 4321, *et seq.*) (PL-91-190) (40 CPR § 1506.5)	Not applicable by statute.	5.12.5.1	U.S.EPA	
State					
	California Energy Commission 140-2006-002	Increase over existing background noise level of 5 dBA or greater at noise-sensitive areas is significant.	5.12.5.2	CEC	

Table 5.12-9
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	California Occupational Safety & Health Administration 8 CCR, General Industrial Safety Orders, Article 105	Levels over 85 dBA at 8-hr workstation require hearing conservation.	5.12.5.2	Cal/OSHA	
Local					
	General Plan Noise Element	Rural Residential: Daytime L_{50}: 50 dBA Nighttime L_{50}: 45 dBA Exterior L_{dn}: 55 dBA Interior L_{dn}: 45 dBA Schools, Hospitals: Daytime L_{50}: 55 dBA Nighttime L_{50}: 50 dBA Exterior L_{dn}: 60 dBA Interior L_{dn}: 45 dBA	5.12.5.3	Fresno County	
	Ordinance Chapter 8.40 Noise Control	Daytime: 50 dBA at any 30 minutes 55 dBA at any 15 minutes 60 dBA at any 5 minutes 65 dBA at any 1 minutes 70 dBA at any time Nighttime: 45 dBA at any 30 minutes 50 dBA at any 15 minutes 55 dBA at any 5 minutes 60 dBA at any 1 minutes 65 dBA at any time	5.12.5.3	Fresno County	

Notes:
LORS = laws, ordinances, regulations, and standards

5.12.7.4 Agencies and Agency Contacts

Agencies with jurisdiction to enforce LORS related to noise are shown in Table 5.12-10.

Table 5.12-10
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	California Energy Commission	Steve Baker	1516 Ninth Street Sacramento, CA 95814	(916) 654-3915

5.12.7.5 Permits Required and Permitting Schedule

As shown in Table 5.12-11, no permits are required for the Project in the area of noise.

Table 5.12-11
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
Federal	None required	N/A
State	None required	N/A
Local	None required	N/A

5.12.8 References

Beranek, L.L. and I.L. Ver, eds., 1992. Noise and Vibration Control Engineering. John Wiley & Sons, Inc. New York, NY.

Bies, D. and Hansen, C., 2003. Engineering Noise Control: Theory and Practice. Third Edition. Spon Press New York, NY.

California Department of Transportation (Caltrans) by Hendricks, R., October, 1998. Transportation Related Earthborne Vibrations. Technical Advisory.

California Energy Commission, 2006. Rules of Practice and Procedure, Power Plant Site Certification Regulations. CEC-140-2006-002.

California Environmental Quality Act (Public Resources Code Division 13, Environmental Protection, Section 21000 *et seq*.).

EEI, 1983. Electric Power Plant Environmental Noise Guide, 2nd Edition, Revised.

Fresno County Revised Public Review Draft Background Report, Chapter 10, Noise

Fresno County Ordinance, Chapter 8.40, Noise Control

ISO, 1996b. Description and Measurement of Environmental Noise, Basic Quantities, and Procedures, Acquisition of Data Pertinent to Land Use, Part 2, ISO 1996/2.

ISO, 1996c. Description and Measurement of Environmental Noise, Basic Quantities and Procedures, Application to Noise Limits, Part 3, ISO 1996/3.

U.S. Department of Transportation, Federal Transit Administration, May 2006, FTA-VA-90-1003-06. Transit Noise and Vibration Impact Assessment. (Prepared under contract by Harris, Miller, Miller, and Hanson). Burlington, MA.

U.S. Environmental Protection Agency, 1971. Noise from Construction Equipment and Operations, Building Equipment and Home Appliances. (Prepared under contract by Bolt, et al., Bolt, Beranek & Newman, Boston, Massachusetts.) Washington, D.C.

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Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Noise** Project: San Joaquin Solar 1&2 Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	Section 5.12	Yes	
Appendix B (g) (4) (A)	A land use map which identifies residences, hospitals, libraries, schools, places of worship, or other facilities where quiet is an important attribute of the environment within the area impacted by the proposed project. The area potentially impacted by the proposed project is that area where, during either construction or operation, there is a potential increase of 5 dB(A) or more, over existing background levels.	Figure 5.12-2	Yes	

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (4) (B)	A description of the ambient noise levels at those sites identified under subsection (g)(4)(A) which the applicant believes provide a representative characterization of the ambient noise levels in the project vicinity, and a discussion of the general atmospheric conditions, including temperature, humidity, and the presence of wind and rain at the time of the measurements. The existing noise levels shall be determined by taking noise measurements for a minimum of 25 consecutive hours at a minimum of one site. Other sites may be monitored for a lesser duration at the applicant's discretion, preferably during the same 25-hour period. The results of the noise level measurements shall be reported as hourly averages in Leq (equivalent sound or noise level), Ldn (day-night sound or noise level) or CNEL (Community Noise Equivalent Level) in units of dB(A). The L10, L50, and L90 values (noise levels exceeded 10 percent, 50 percent, and 90 percent of the time, respectively) shall also be reported in units of dB(A).	Section 5.12.3.3 Tables 5.12-2 and 5.12-3 Appendices B and C	Yes	
Appendix B (g) (4) (C)	A description of the major noise sources of the project, including the range of noise levels and the tonal and frequency characteristics of the noise emitted.	Table 12.5-5	Yes	
Appendix B (g) (4) (D)	An estimate of the project noise levels, during both construction and operation, at residences, hospitals, libraries, schools, places of worship or other facilities where quiet is an important attribute of the environment, within the area impacted by the proposed project.	Sections 5.12.4.1 and 5.12.4.2 Tables 5.12-4 and 5.12-6 Figure 5.12-2	Yes	
Appendix B (g) (4) (E)	An estimate of the project noise levels within the project site boundary during both construction and operation and the impact to the workers at the site due to the estimated noise levels.	Sections 5.12.4.1 and 5.12.4.2 Tables 5.12-4 and 5.12-6 Figure 5.12-2	Yes	

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Noise** Project: San Joaquin Solar 1&2 Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (4) (F)	The audible noise from existing switchyards and overhead transmission lines that would be affected by the project and estimates of the future audible noise levels that would result from existing and proposed switchyards and transmission lines. Noise levels shall be calculated at the property boundary for switchyards and at the edge of the rights-of-way for transmission lines.	Sections 5.12.4.1 and 5.12.4.2 Tables 5.12-4 and 5.12-6	Yes	
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Section 5.12.7 Tables 5.12-7, 5.12-8, 5.12-9	Yes	
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	Table 5.12-10	Yes	
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	Table 5.12-10	Yes	

Adequacy Issue: Adequate ____ Inadequate ____

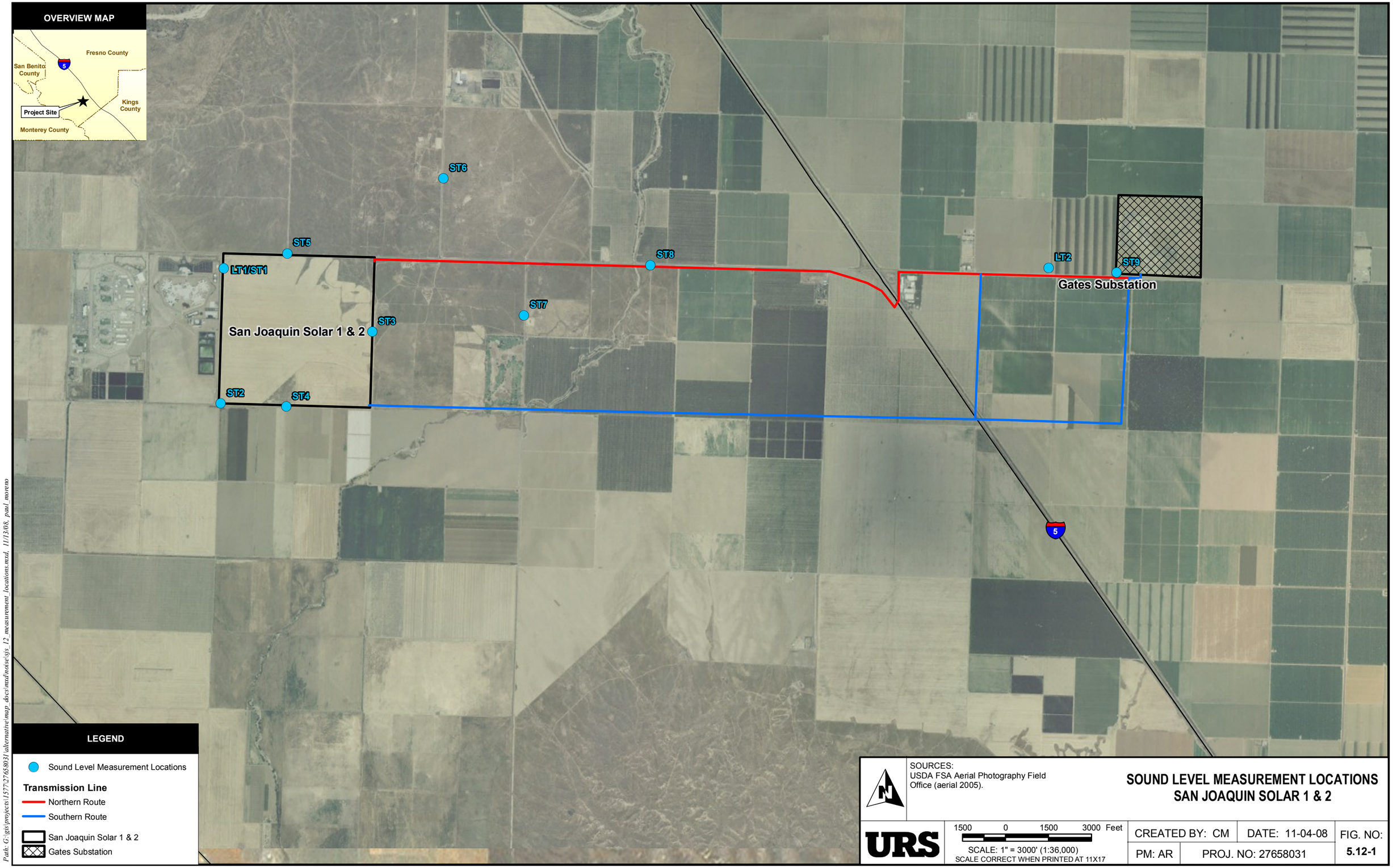
DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Noise** Project: San Joaquin Solar 1&2 Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	N/A	N/A	



SOURCES:
USDA FSA Aerial Photography Field Office (aerial 2005).

SOUND LEVEL MEASUREMENT LOCATIONS
SAN JOAQUIN SOLAR 1 & 2

URS

1500 0 1500 3000 Feet
SCALE: 1" = 3000' (1:36,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CM	DATE: 11-04-08	FIG. NO:
PM: AR	PROJ. NO: 27658031	5.12-1

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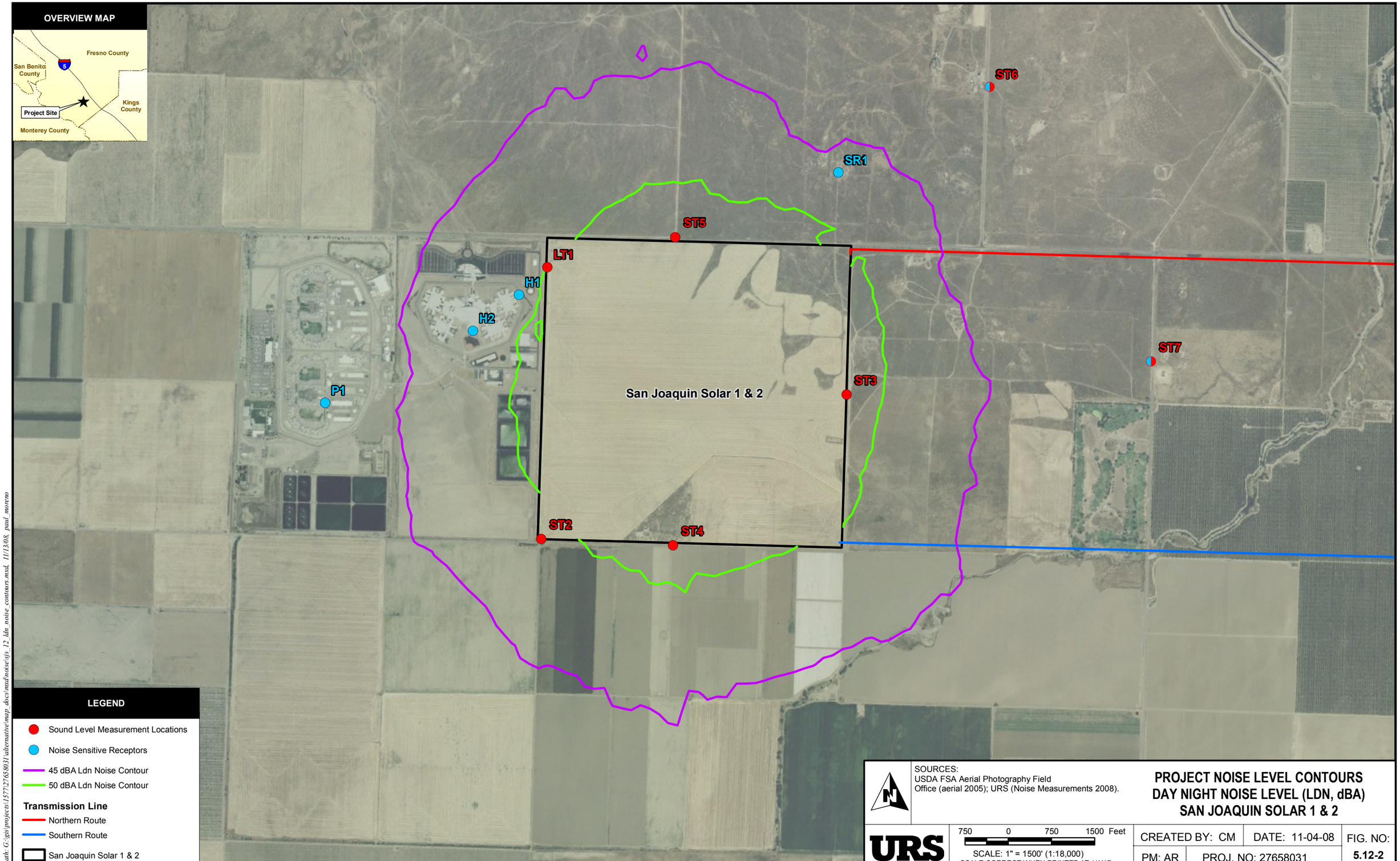

SOURCES:
USDA FSA Aerial Photography Field Office (aerial 2005); URS (Noise Measurements 2008).

PROJECT NOISE LEVEL CONTOURS
DAY NIGHT NOISE LEVEL (LDN, dBA)
SAN JOAQUIN SOLAR 1 & 2

URS

750 0 750 1500 Feet
SCALE: 1" = 1500' (1:18,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CM	DATE: 11-04-08	FIG. NO:
PM: AR	PROJ. NO: 27658031	5.12-2

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