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SECTION ACRONYMS/ABBREVIATIONS

ACRONYM/ ABBREVIATION	DEFINITION
B & K	Brüel and Kjær
CAISO	California Independent System Operator
Cal-OSHA	California Occupational Safety and Health Act
CCR	California Code of Regulations
CEC	California Energy Commission
CERL	Construction Engineering Research Laboratory
CFR	Code of Federal Regulations
CTGs	combustion turbine generators
CVC	California Vehicle Code
dB	Decibels
dBA	Decibel, A-weighted
dBC	Decibel, C-weighted
EPA	U.S. Environmental Protection Agency
KV	Kilovolt
KVA	Kilovolt Ampere
LD	Larson and Kjaer
LORS	Laws, Ordinances, Regulations, and Standards
OSHA	Occupational Safety and Health Act
SCR	Selective Catalytic Reduction
SDG&E	San Diego Gas & Electric Company
SLM	Sound Level Meter
SPPE	Small Power Plant Exemption

6.12 NOISE

6.12.1 Introduction and Project Overview

This section presents an evaluation of sound levels associated with the Project. The power plant Site is located in north San Diego County, approximately 3.5 (air) miles northeast of I-15 on SR-76, near the community of Pala (see Figures 2.2-1, 2.2-2, and 2.2-3). It is on the north east corner of the intersection of SR-76 and Pala Del Norte Road. The area around and near the Site is rural with very few receptors of any kind in the area. As described in Section 6.9 – Land Use, there are eight residential structures within approximately one mile of the site and no other sensitive receptors nearby.

The Plant design includes two GE LM6000 PC SPRINT CTGs with an air inlet chiller package, exhaust ducting, selective catalytic reduction (SCR) emission control systems, gas compressor equipment, black-start generator, and water treatment/storage facilities. An onsite switchyard will be constructed near the south end of the Site.

Generally, the design basis for noise control is the most stringent noise level required by any of the applicable laws, ordinances, regulations, or standards (LORS). This design philosophy will ensure that the noise from this project will comply with the County of San Diego Noise Regulations, as well as the California Energy Commission (CEC) guideline for the late-night noise increase increment.

These local requirements and CEC guidelines will be met with a combination of project design features that optimize noise reduction and control from the expected major noise sources. These noise reduction features involve both architectural and equipment considerations. Architectural considerations involve the sound isolation performance of the architectural components, including the walls, roof, doors, windows, and louvers, of buildings housing equipment. Equipment considerations involve reduced noise emissions from the equipment sources themselves, as well as sound treatment systems including enclosures, silencers, and/or localized barriers. Each equipment component will be evaluated during the Project's detailed engineering phase to determine the noise control strategies necessary to support the overall project acoustical design.

Subsection 6.12.2 presents the fundamentals of acoustics while a description of the LORS is presented in Subsection 6.12.3. The affected environment is described in Subsection 6.12.4 and the environmental consequences (i.e., the potential project effects from both construction and operation) are analyzed in Subsection 6.12.5. While the Project design features and noise control strategies will yield noise impacts that are below the level of significance (per applicable standards and criteria), Subsection 6.12.6 presents mitigation measures aimed at (1) enabling feedback for community concerns regarding noise, (2) reducing noise during demolition and construction, and (3) establishing a mechanism for verifying compliance following commercial operation of the Project. The involved agencies and agency contacts are listed in Subsection 6.12.7. The permits and permitting schedule are discussed in Subsection 6.12.8. Subsection 6.12.9 provides the references for this noise section.

6.12.2 Fundamentals of Acoustics

Acoustics is the study of sound, and noise is defined as unwanted sound. Airborne sound is a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure creating a sound wave.

Acoustical terms used in this subsection are summarized in Table 6.12-1.

Table 6.12-1 - Definitions of Acoustical Terms

TERM	DEFINITION
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise or sound at a given location. The ambient level is often defined by the L_{eq} level (see below for more information on special noise metrics).
Background Noise Level	The underlying, ever-present lower level noise that remains in the absence of intrusive or intermittent sounds. Distant sources, such as traffic, typically make up the background noise level. The background level is generally defined by the L_{90} percentile noise level.
Intrusive Noise	Noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence, tonal content, the prevailing ambient or background noise level, and the sensitivity of the receiver. The intrusive level is generally defined by the L_{10} percentile noise level.
Decibel (dB)	A decibel is a dimensionless unit of level which denotes the logarithmic (base 10) ratio between two quantities that are proportional to power; the denominator of this ratio is a reference standard which must be specified to give the decibel level any meaning. Decibels (abbreviated dB) describe the loudness of sound and noise in terms of sound pressure levels and sound power levels.
Sound Pressure Level	The level, expressed in terms of decibels, that is 20 times the logarithm of the given sound pressure over the reference pressure of 20 micropascals = 2×10^{-5} Newtons/m^2 = 0.0002 μbar = 2×10^{-4} dynes/cm^2. Sound Pressure Level, abbreviated SPL or Lp, is dependent on the distance from the source to the receiver.
Sound Power Level	The level, also expressed in terms of decibels, which is 10 times the logarithm of the given sound power over the reference power of 1 picowatt. Sound Power Level, abbreviated PWL or Lw, is an inherent characteristic of the noise source and, therefore, is independent of distance from the source.
A-Weighted Sound Level (dBA)	The sound level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. Thus, A-weighted sound pressure levels are the most common noise metric used to describe community noise and all sound levels in this report are A-weighted.
Frequency	The number of times in 1 second that a periodic phenomenon repeats itself. The units of frequency are the hertz (Hz) which corresponds to one cycle per second.

TERM	DEFINITION
Band Pressure Level or Band Sound Level	The sound pressure level within a specified frequency band. The bandwidth is usually indicated by a descriptive modifier, such as octave band level or third-octave band level. As an example, the octave band level is the sound level within a frequency band corresponding to a specified octave. An octave is the frequency interval between two sounds whose basic frequency ratio is 2 (e.g. 500 Hz and 1,000 Hz are one octave apart). Note that octave band center frequencies and band limits are standardized by international agreement.
Equivalent Noise Level (L_{eq})	The energy-equivalent noise level over a specified period of time (e.g., 1 hour). It is an equivalent single value of sound that includes the same acoustic energy as the actual, varying sound levels in a given period of time.
Day-Night Noise Level (L_{dn} or DNL)	This metric was developed to account for an increased human sensitivity to nighttime noise levels and for the greater potential annoyance of noise during the nighttime hours. The actual nighttime noise levels are adjusted, based on the premise that both exterior and interior noise levels are generally lower than daytime levels and, therefore, nighttime noise can be more noticeable (than daytime conditions at the same location). Also, since most people sleep at night, there is often an increased sensitivity to intrusive noises. The day-night noise level, abbreviate L_{dn}, is the energy-average A-weighted sound level over a 24-hour period with an added 10 dB adjustment (penalty) for sounds that occur between 10 p.m. and 7 a.m.
Community Noise Equivalent Level, CNEL	The CNEL was developed in California for evaluating noise levels in residential communities. The CNEL is similar to the L_{dn}, but differs in that a 5 dB evening penalty is also added to sounds that occur between 7 p.m. and 10 p.m. (as well as the L_{dn} penalty of +10 dB for nighttime sounds). In a large percentage of cases for general community noise, the L_{dn} and CNEL can be considered as equivalent.
Percentile Noise Level or Statistical Sound Level (L_n)	The noise level exceeded during *n* percent of the measurement period, where *n* is a number between 0 and 100. The most common statistical sound levels used in community noise analyses are the L_{90}, L_{50} and L_{10} levels. The L_{90} is the sound level exceeded 90 percent of the time and is often considered the effective background or residual noise level. The L_{50} is the sound level exceeded 50 percent of the time and is known as the median noise level. The L_{10} is the sound level exceeded 10 percent of the time, is a measurement of intrusive sounds, such as aircraft flying overhead, and is commonly known as the effective maximum or intrusive sound level.

Sources: Alliance Acoustical Consultants, Inc.

Loud noise can be annoying and it can have negative health effects. The effects of noise on people can be listed in three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, learning.
- Physiological effects such as startling and hearing loss (both temporary and permanent).

In most cases, environmental noise produces effects in the first two categories only. However, unprotected workers in some industrial work settings may experience noise effects in the last category. Sections 6.12.3.1 and 6.12.3.2 address how the Project will comply with pertinent

worker noise exposure protection regulations to safeguard against employee hearing loss. It should be noted that this plant is intended to be primarily run as an unmanned facility.

Given the wide variation in individual thresholds of annoyance, habituation to noise, and situational reactions to noisy environments, there is no common standard for assessing the subjective effects of noise, or to measure the corresponding reactions of annoyance and dissatisfaction. Thus, an important way of determining a person's subjective reaction to a new noise is by comparing it to the existing or ambient environment which that person is familiar with. In general, the more the level or the tonal (frequency) variations of a noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by each exposed individual.

As a frame of reference for bridging objective sound levels to subjective impressions, Table 6.12-2 shows the A-weighted noise levels of sounds measured in common interior and exterior environments relative to their typical subjective impression.

Table 6.12-2 - Typical Sound Levels Measured in the Environment and Industry

EXAMPLE NOISE SOURCE OR EXAMPLE NOISE ENVIRONMENT	A-WEIGHTED SOUND LEVEL IN DECIBELS	SUBJECTIVE IMPRESSION
Shotgun (at shooter's ear) or on a carrier flight deck	140	Painfully loud
Civil defense siren (100 ft)	130	
Jet takeoff (200 ft)	120	Threshold of pain
Loud rock music	110	
Pile driver (50 ft)	100	Very loud
Ambulance siren (100 ft) or in a boiler room	90	
Pneumatic drill (50 ft) or inside a noisy restaurant	80	
Busy traffic; hair dryer	70	Moderately loud
Normal conversation (5 ft) or in a data processing center	60	
Light traffic (100 ft); rainfall or in a private business office	50	
Bird calls (distant) or inside an average living room or library	40	Quiet
Soft whisper (5 ft); rustling leaves of inside a quiet bedroom	30	
In a recording studio	20	
Normal breathing	10	Threshold of hearing

Source: Beranek, 1998.

6.12.3 Laws, Ordinances, Regulations, and Standards

This section presents and discusses the pertinent LORS that apply to noise generated by the project, with regard to federal, state, and local agencies and jurisdictions. An overview of the LORS is presented in Table 6.12-3 and the referenced subsections provide further details and explanatory notes.

Table 6.12-3 - Applicable Laws, Ordinances, Regulations, and Standards

LORS	PURPOSE	SPPE SUBSECTION DISCUSSING APPLICABILITY AND DETAILS
Federal Offsite		
U.S. EPA	Guidelines for state and local governments.	6.12.3.1
U.S. Fish and Wildlife Service	Prevention of impacts to wildlife.	6.12.3.1
Federal Onsite		
OSHA	Exposure of workers over 8-hour shift limited to 90 dBA.	6.12.3.1, 6.12.5.2 and 6.12.5.3. Also see Section 8.7, Worker Safety
State Onsite		
Cal/OSHA, 8 CCR Article 105 Sections 5095 et seq.	Exposure of workers over 8-hour shift limited to 90 dBA.	6.12.3.2, 6.12.5.2 and 6.12.5.3. Also see Section 8.7, Worker Safety
State Offsite		
CA Vehicle Code Sections 23130 and 23130.5	Regulates vehicle noise limits on California highways.	6.12.3.2 Delivery trucks and other vehicles will meet Code requirements.
CA Fish and Game Dept.	Prevention of impacts to wildlife.	6.12.3.2
Calif. Energy Commission (CEC)	Guidelines for power plant noise emissions into the community.	6.12.3.2
Local		
California Government Code Section 65302	Requires local government to prepare plans that contain noise provisions.	Subsection 6.12.3
County of San Diego	See text.	6.12.3.3

Source: Alliance Acoustical Consultants, Inc.

6.12.3.1 Federal

U.S. Environmental Protection Agency (EPA). Guidelines are available from the U.S. EPA (1974) to assist state and local government entities in development of state and local LORS for noise. Because there are local LORS that apply to this project, these federal guidelines are not applicable.

Occupational Safety and Health Administration (OSHA). Onsite noise levels are regulated by the Occupational Safety and Health Act of 1970 (29 Code of Federal Regulations [CFR] 1910.95). The noise exposure level of workers is limited to 90 dBA, over a time-weighted average (TWA) eight-hour work shift to protect hearing. If there are workers exposed to a

$TWA_{8\text{-}hr}$ above 85 dBA (i.e. the OSHA Action Level), then the regulations call for a worker hearing protection program that includes baseline and periodic hearing testing, availability of hearing protection devices, and training in hearing damage prevention. Given previous experience at similar modern, simple cycle facilities, onsite noise levels during normal operations are expected to generally be in the range of 70 to 85 dBA. The relatively few areas that may be above 85 dBA will be posted as high noise level areas and hearing protection will be required therein. The power plant will implement a hearing conservation program for applicable employees and maintain $TWA_{8\text{-}hr}$ exposure levels below 90 dBA. As this plant is being designed for unmanned operations, the possibility for significant worker exposure to noise is very limited.

6.12.3.2 State of California

California Occupational Safety and Health Administration (Cal-OSHA). The California Department of Industrial Relations, Division of Occupational Safety and Health enforces California Occupational Safety and Health Administration (Cal-OSHA) regulations (found in Title 8 of the California Code of Regulations (CCR), General Industrial Safety Orders, Article 105, Control of Noise Exposure, Sections 5095, et seq.). These California worker protection regulations are the same as the federal OSHA regulations described above.

California Vehicle Code (CVC). Noise limits for highway vehicles are regulated under the CVC, Sections 23130 and 23130.5. The limits are enforceable on the highways by the California Highway Patrol and by the County Sheriff Department.

California Fish and Game Dept. Please see the Biological Section 6.6 for a discussion of potential noise impacts to biological resources.

California Energy Commission (CEC). The Commission has determined that a significant noise impact may occur if noise from a new facility increases existing late-night L_{90} noise levels by 5 or more dB at nearby residential areas (Baker, 1999). An increase of 10 or more dB is a very significant impact, while the transition zone between +5 and +10 dB necessitates additional considerations (Baker, 2007).

6.12.3.3 Local

The California State Planning Law (California Government Code Section 65302) requires that all cities, counties, and entities (such as multi-city port authorities) prepare and adopt a General Plan to guide community change. The Project and its surroundings are located in the County of San Diego, which has noise abatement and control regulations, as discussed below.

County of San Diego. The county's noise regulations are found in the Code of Regulatory Ordinances, Title 3 Public Safety, Morals And Welfare; Division 6. Disorderly Conduct, Places And Publications; Chapter 4. Noise Abatement and Control, with the most relevant requirements in Section 36.404 (Sound Level Limits) and Section 36.410 (Construction Equipment). These requirements are summarized in the following table.

Table 6.12-4 - Noise Standards for the County of San Diego

NOISE SOURCE CONDITIONS	RECEIVING LAND USE	NOISE LEVEL LIMIT, A-WEIGHTED HOURLY L_{EQ},
Normal Operations (per Section 36.404)	Single-family residential (RS)*, Duplex residential (RD), Rural residential (RR), Mobile home residential (RMH), Limited & General Agricultural (A70, A72), General Rural use (S92), and other uses with a density of less than 11 dwelling units/acre (RV & RU <11)	50 dBA daytime**, 45 dBA nighttime**
	Multi-family residential (RM), Recreation oriented residential (RRO), Office-Professional (C30), Parking (S86), and other uses with a density of 11 or more dwelling units/acre (RV & RU ≥11)	55 dBA daytime, 50 dBA nighttime
	Commercial and transportation/utility corridors (S94)	60 dBA daytime, 55 dBA nighttime
	Light Industrial (M50, M52, M54)	70 dBA anytime
	Heavy Industrial (M58)	75 dBA anytime
Construction/demolition activities (per Section 36.410)	All areas	Construction activities prohibited between 7 p.m. and 7 a.m. and limited to producing no more than 75 dBA average sound level at any property line with a legal dwelling unit.

Source: Alliance Acoustical Consultants, Inc., 2005
Notes:
* Land use designations from the County's General Plan, Part II Regional Land Use Element.
** Daytime and Nighttime defined as follows: daytime = 7 a.m. to 10 p.m.; nighttime = 10 p.m. to 7 a.m.;
For boundaries between different land use zones, the numerical average of the two zones' noise limits will apply.

6.12.4 Affected Environment

The Site is a former citrus grove. Existing uses adjacent to the Site include an SDG&E electric substation, the private Pala Del Norte Road, additional grove land, and open space. To the west, north and east of the Site, moderately steep slopes of open space rise up to two ridgelines, with three houses near the ridgeline northeast of the Site. Zalinda Farms Nursery and a few single family homes occur close to a mile away to the east and northeast of the site, beyond the ridgeline. The Pala Casino Resort and Spa occurs approximately 1.5 miles to the east. On the south side of the Site, between the site and SR-76, is an SDG&E storage yard. On the south side of SR 76 is a former aggregate mine where ponds now occur in the mine pits. The nursery and the SDG&E storage yard currently have on-property care-taker residences, but the storage yard care-taker will reportedly not be living in this house after December of 2007.

Other than these on-property care-takers near the Project Site (at the nursery facility), the closest residential structures are along the ridgeline northeast of the Site (house numbers 10692 and 10960[1]). These houses are approximately 2,400 and 3,100 feet, respectively, from the project site centroid. Farther to the north, approximately 3,900 feet, is a third residential use (accessed from Pala del Norte Road). There are also some scattered houses to the south of the site, south of the retention ponds (near the base of a large hill). There were no other residential, commercial, or sensitive receptors (schools, medical facilities, churches, etc.) noted in the vicinity of the Project Site. See also Figure 6.9-3 for additional land use and project vicinity information.

6.12.4.1 Ambient Noise Survey Information

As part of the small power plant exemption (SPPE) analysis, baseline ambient noise level measurements were collected on April 18 and 19, 2007 at the locations depicted in Figure 6.12-1. Table 6.12-5 summarizes these April 2007 ambient survey locations and their individual importance regarding community noise assessment around potential power plants. One location was monitored over a 25-hour period (per CEC guidelines), two locations involved short-term A-wtd sound level data (typically 15-minute samples acquired during mid-day, evening, and late-night periods), and the fourth location was for documenting daytime and nighttime frequency band level data for a tonal baseline.

In general, environmental noise in the vicinity of the project site is dominated by traffic flows on Hwy 76, certainly during the daytime and even into the late-night hours. Other sources of noise are mechanical equipment in the vicinity as well as general operations of the Pala Casino and Resort (located approximately 1.5 miles to the east of the site). Occasional aircraft-related sources (i.e. airplane/helicopter fly-overs) were observed, but there were no train-related sources noted during the ambient survey. At night, during lulls in the Hwy 76 traffic, animals, such as frogs, crickets, and barking dogs had some influence on the ambient conditions. In general, the noise environment around the site was observed to be typical for a sparsely-populated rural setting that included a fairly heavily traveled roadway. Additional details on each measurement type and location are provided below.

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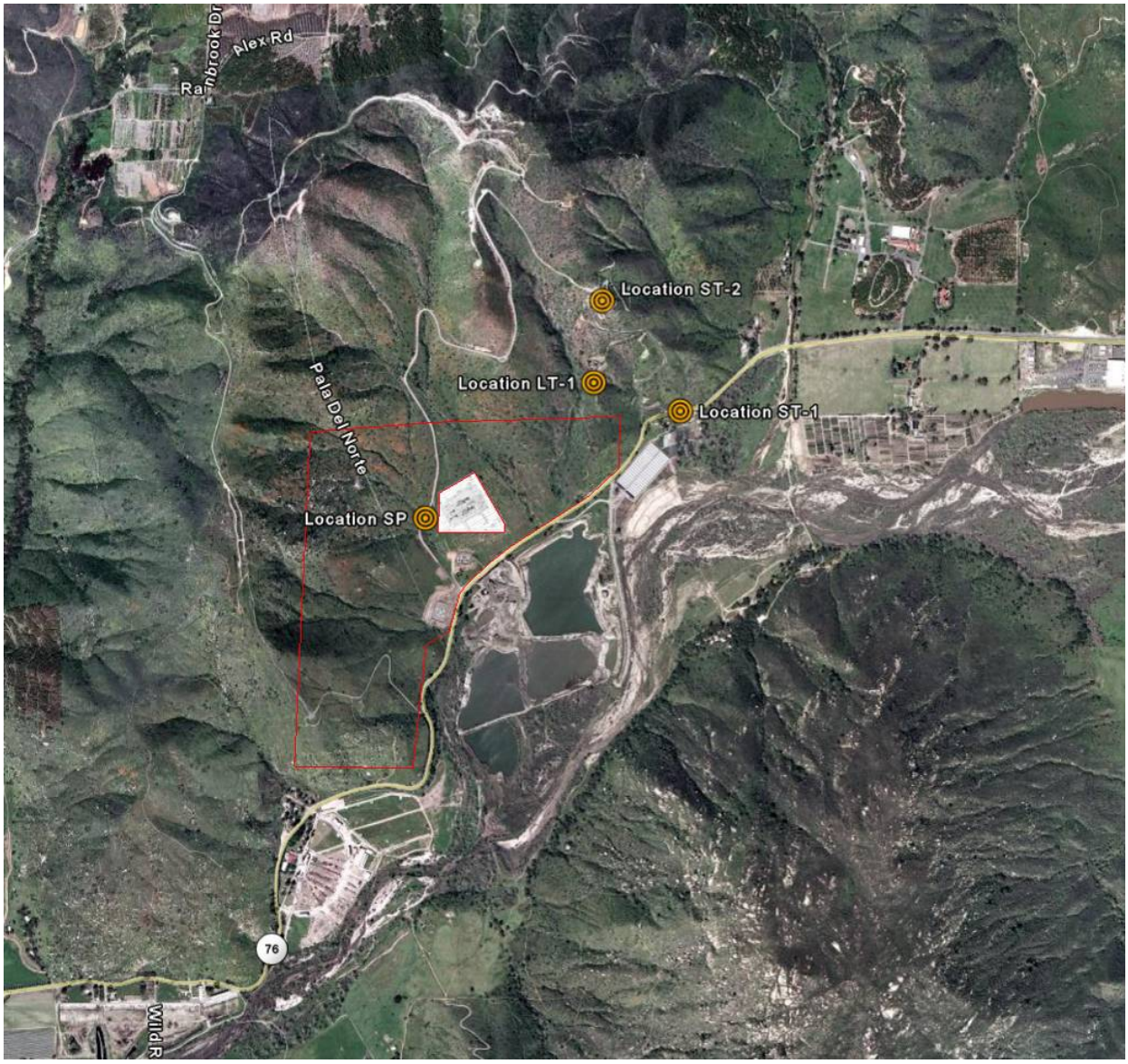
[1] This house is under foreclosure and is currently vacant.

Figure 6.12-1 – Ambient Measurement Location Map (Apr 07, 2007)



Orange Grove Project - SPPE Application

Source: Alliance Acoustical Consultants, Inc., 2007 Map Source: Google Earth

Table 6.12-5 - Summary of SPPE Ambient Measurement Locations and Relevance

Location	Full Description	Importance
LT-1	South side of closest house along ridgeline northeast of project site. Approximately 2,400 feet from the center of the planned turbine installation. Coordinates are: N33° 21.787' by W117° 06.385'	Closest regular single-family residential land use.
ST-1	At main entrance to Zalinda Farms Nursery at 10693 Hwy 76 (in small turn-out). This is near the care-taker residences to the nursery. Approximately 2,700 feet from the center of the planned turbine installation. Coordinates are: N33° 21.735 by W117° 06.191'	Nearby residential dwelling, although this is a special case as these are care-taker residences for the nursery.
ST-2	At edge of concrete driveway on the south of the second closest of three houses along the ridgeline to the northeast. Approximately 3,100 feet from the center of the planned turbine installation. Coordinates are: N33° 21.944' by W117° 06.371'	Second-closest regular single-family residential land use.
SP (Spectral)	At edge of roadway along Pala del Norte near approximate location of future secondary entrance to project site. Approximately 450 feet from the center of the planned turbine installation. Coordinates are: N33° 21.523' by W117° 06.774'	Typical and representative location for spectral environmental of site and surrounding area.

Source: Alliance Acoustical Consultants, Inc., 2007

Note: Another long-term measurement location (LT-2) was established at the NE corner of the fenced SDG&E storage yard; approximately 600 feet from the center of the planned turbine installation. Coordinates were: N33° 21.468' by W117° 06.665'. Sound level data was monitored here from 04/18/07 16:13 to 04/19/07 17:31. However, instrumentation failure yielded no useable noise data.

Long-term, A-weighted Noise Levels. Measurement results for the 25-hour, long-term ambient sound level monitoring during the April 2007 survey are summarized in Table 6.12-6. This table provides measurement period at each location, as well as the key noise metrics in terms of the L_{90} (residual) sound level, the L_8 (intrusive) sound level[2], and the one-hour L_{eq} (energy-equivalent) sound level. The latter metric is important since the County of San Diego Noise Ordinance is built around this averaged sound level type.

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[2] Note that the L_8 was the actual noise metric sampled during the survey, but it is considered to be effectively equivalent to the L_{10} (intrusive) sound level for community noise assessments. These two metrics will, therefore, be used interchangeably in this document.

Table 6.12-6 - Summary of Long-term SPPE Ambient Measurement Results

Location	Brief Description	Long-term Monitoring Period [date with hr:min]	Long-term Monitoring Data Ranges*		
			15-min. L_{90} (min, max times) [hr:min]	1-hour L_{eq} (min, max times) [hr:min]	15-min. $L_8 \approx L_{10}$ (min, max times) [hr:min]
LT-1	South side of closest house	04/18/07 15:35 to 04/19/07 17:04	26.8 – 40.3 dBA 03:30, 15:30	30.6 – 47.0 dBA 03:00+, 15:00+	31.5 – 51.1 dBA 03:30, 15:00

Source: Alliance Acoustical Consultants, Inc., 2007

* Data acquisition used 15-minute sampling periods which are reported for L_{90} and L_8 metrics, while the 15-minute L_{eq} data were post-processed to arrive at the reported one-hour L_{eq} value (for use with respect to the County of San Diego Noise Ordinance).

The time-history record of sound levels over the 25-hour survey period for Location LT-1 is shown in Figure 6.12-2. This chart presents the pertinent sound levels over time at the nearest 'regular' residential land use. This Location LT-1 record indicates that the noise environment can be described as quiet most of the time. The noise levels are fairly stable throughout the day, and exhibit a slight, but steady decline into the evening and nighttime hours due to decreasing traffic flows on SR-76. The daytime levels were typically in the range of 34 to 38 dBA L_{eq} and 28 to 33 dBA L_{90}. The overnight noise levels 'bottomed-out' between approximately 2 a.m. and 5 a.m., after which there was a pronounced increase back up to the daytime levels (most probably due the new day's onset of daytime traffic flows). The overnight lows were 27 dBA for the L_{90} metric and 31 for the L_{eq} metric. Maximum noise levels, due to pass-bys of particularly noisy vehicles, could be in the mid-50's (or higher) during the daytime and in the mid-40's at night. There appear to be more maximum excursions in the morning rush hours, most likely related to traffic. During the second daytime period, some interference from winds (and rustling vegetation) was noted for Locations LT-1 and ST-2.

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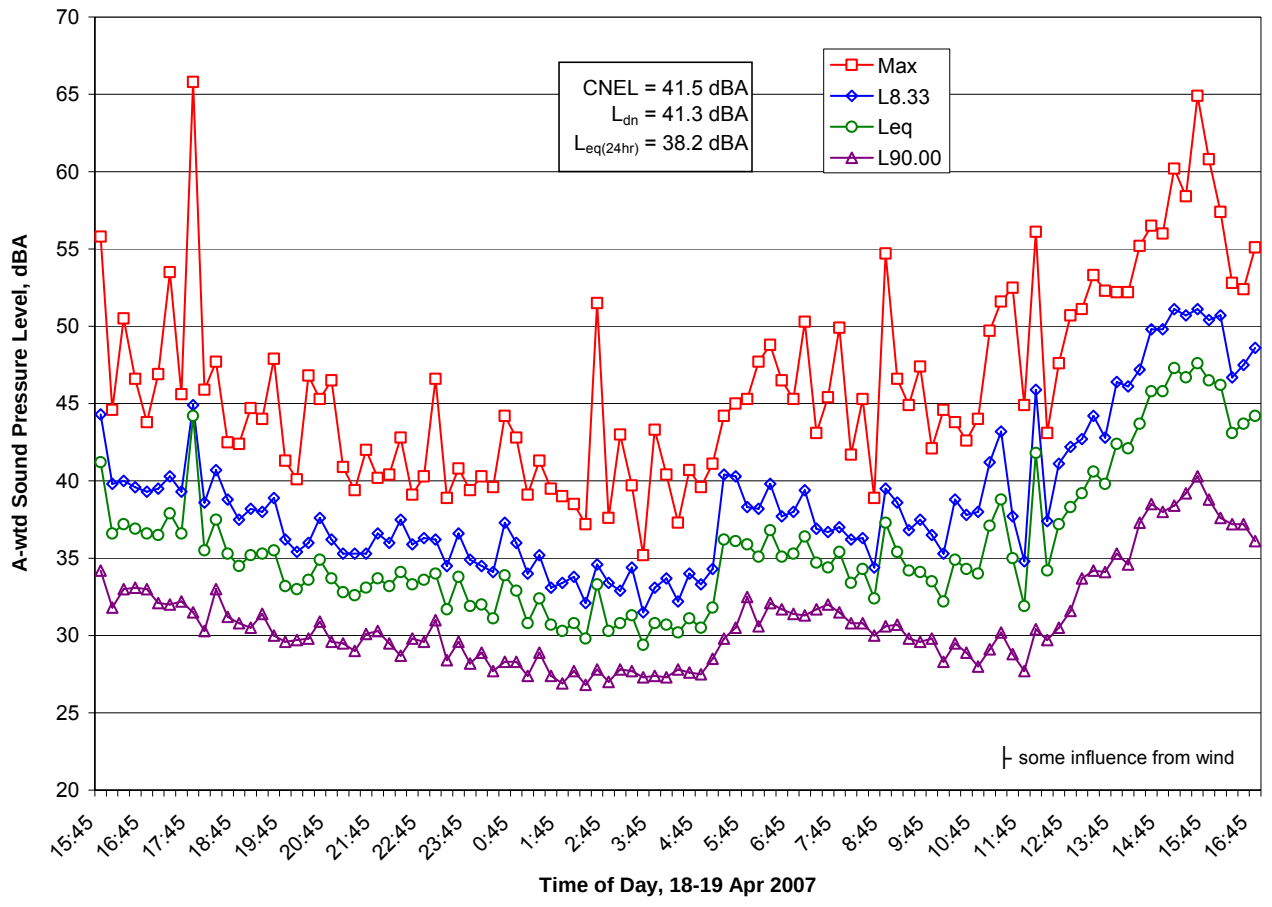
Figure 6.12-2 – Ambient Measurement Time History for Loc LT-1 (Apr 07, 2007)



TRC	Project: **Orange Grove Project - SPPE Application**
	Source: Alliance Acoustical Consultants, Inc., 2007

Short-term and Spectral Noise Levels. In addition to the long-term, A-weighted monitoring efforts, additional locations were studied in terms of short-term (i.e. approximately 15 minute) A-wtd and spectral sampling to investigate the noise characteristics of other nearby receptors.

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Table 6.12-7 - Summary of Short-term SPPE Ambient Measurement Results

Location	Brief Description	Short-term Monitoring Periods [date with start time and duration in hr:min:second] and associated A-wtd L_{eq} Sound Levels		
		Mid-day	Evening	Nighttime
ST-1	At main entrance to Zalinda Farms Nursery (in turn-out).	4/19/07 (Thur) 15:14:47 0:16:14 53.6 dBA	4/18/07 (Wed) 20:32:45 0:12:14 63.6 dBA/	4/19/07 (Thur) 2:00:00 0:14:58 58.9 dBA
ST-2	At driveway of second closest house (currently vacant).	4/19/07 (Thur) 14:45:00 no data due to strong winds	4/18/07 (Wed) 21:15:00 0:15:00 45.6 dBA	4/19/07 (Thur) 1:29:00 no data due meter problem
SP	Pala del Norte Road, near future secondary entrance to Project Site.	4/19/07 (Thur) 15:48:22 0:11:26 47.4 dBA	no sample	4/19/07 (Thur) 2:33:41 0:10:17 44.7 dBA

Source: Alliance Acoustical Consultants, Inc., 2007

The frequency-band record of sound levels for different times of the day and night at the Project Site is shown in Figure 6.12-3. This chart presents the pertinent sound levels in industry-standard octave bands at Location SP during the discrete sampling periods given above. These samples are representative of the Project Site during the indicated time periods.

This Location SP spectral record is indicative of an environment that is primarily controlled by roadway noise sources. The daytime curve shape, in particular, is typical of traffic noise. Note how the A-weighted levels, separated by roughly 12 hours, are within 3 dB of each other. Given this result and the similar shapes of the curves in the bands that control the A-weighting function, the only significant parameter that is changing over the course of a typical 24-hour period is the number of vehicles traversing the adjacent roadway.

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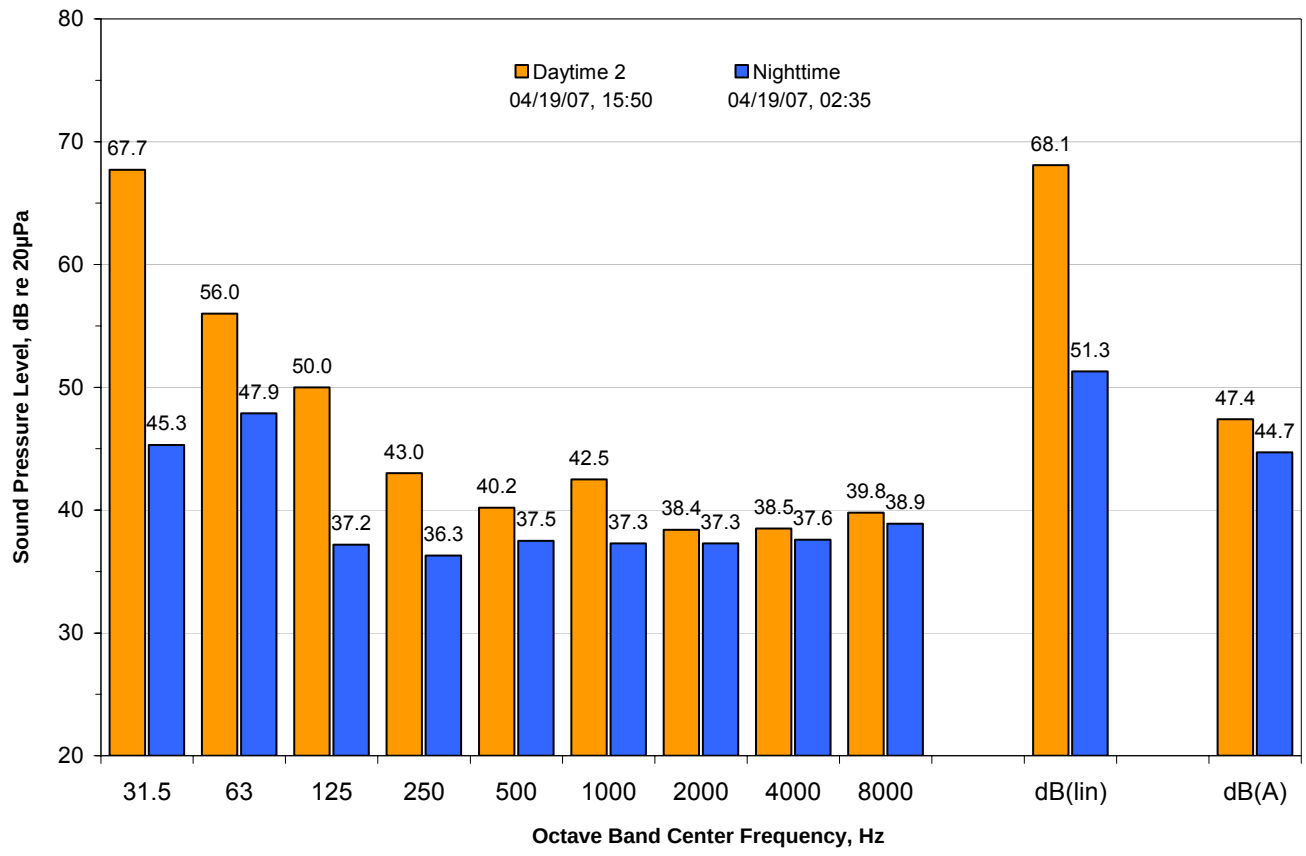
Figure 6.12-3 – Ambient Measurement Frequency-Band Record for Loc SP (Apr 07, 2007)



TRC	Project: **Orange Grove Project - SPPE Application**
	Source: Alliance Acoustical Consultants, Inc., 2007

The 24-hour metrics, CNEL and L_{dn}, were calculated from the sampled energy-average, L_{eq}, values, starting at the sample period nearest the first whole hour. The results of these calculations are given below.

Table 6.12-8 - Summary of 24-hour Ambient Noise Level Metrics, A-wtd Sound Pressure Level

Location	Brief Description	24-hour L_{eq}, dBA	L_{dn}, dBA	CNEL, dBA
LT-1	10692 Pala Road	38.2	41.3	41.5

Source: Alliance Acoustical Consultants, Inc., 2007

Generally speaking, these long-term noise metrics indicate a fairly quiet environment as would be expected for a sparsely populated, rural area with few significant noise sources. As previously mentioned, the major consistent noise source in the area is from traffic flows on SR-76. These flows were observed to be considerable during the daytime and evening hours. The

flow of cars and trucks was reduced during the late-night hours, but was still noteworthy in terms of overall noise level contributions around the project site and adjoining areas.

In summary, the general ambient noise environments around the Pala Project Site, as measured and observed in April of 2007, are condensed in Table 6.12-9. More details on the ambient survey methodologies are contained in Appendix 6.12-A.

Table 6.12-9 - Summary of SPPE Ambient Noise Environments

LOCATION	BRIEF DESCRIPTION	GENERAL NOISE ENVIRONMENT
LT-1	South side of closest house.	Traffic noise on Hwy 76 is dominant during the daytime. In the evening, traffic noise is still significant, but not as pronounced as during the daytime. Frogs and crickets are secondary contributors during the evening hours. Late-night levels are very quiet with sporadic traffic in the distance and no frogs/crickets. As this location is on a ridgeline, winds can be of note by blowing through the trees and rustling the vegetation on the property.
ST-1	At main entrance to Zalinda Farms Nursery (in turn-out).	As this location is just off the travel lanes for Hwy 76, traffic flow noise is the dominant noise source at all hours of the day and night. Only during lulls in traffic can other sources be heard (such as distant dogs barking, frogs, or crickets). Traffic flows were observed to be approximately 650 vehicles per hour during the daytime, 430 per hour during the evening, and 130 per hour late at night.
ST-2	South side of second closest house (currently vacant)	This location was subject to noise from a nearby 20 kW portable generator that appeared to be powering a temporary cellular antenna installation slightly down the hill from the house lot. Vehicles on the distant SR-76 were audible during most periods of the day and night, but did not dominate the noise environment. In the absence of the temporary generator, it is believed that this site would have noise levels that would be consistent with location LT-1. As this location is near the peak of a ridgeline, winds can be of note by blowing through the trees and rustling the vegetation on the property.
SP	Pala del Norte Road, near future secondary entrance to Project Site.	Traffic noise on Hwy 76 is dominant during the daytime and evening hours. Distant frogs, crickets, and dogs are secondary contributors during the evening hours. Reduced late-night levels are from the sporadic traffic with some contributions from frogs, crickets, and dogs.

Source: Alliance Acoustical Consultants, Inc., 2007

6.12.5 Environmental Consequences

Potential noise impacts from construction, start-up, and operation activities are assessed in this subsection.

6.12.5.1 Significance Criteria

The County has established quantitative standards for determining appropriate noise levels for various land use districts. Noise impacts may be considered significant if project operational activities conflict with the Noise Level Limits by Land Use District summarized in Table 6.12-4.

In addition to the County criteria, the CEC has a criterion that a potential for a significant noise impact exists where the noise of a project during operations exceeds the background noise by 5 dB or more at residential receptors (CEC, 2002). It is important to note that the potential for an impact does not mean that there is an impact. Rather, it means that the project noise levels need further evaluation.

Also, the CEC maintains that construction noise is typically insignificant if (1) the construction activity is temporary, (2) use of heavy equipment and noisy activities is limited to daytime hours, and (3) all feasible noise abatement measures are implemented for noise-producing equipment (CEC, 2002).

6.12.5.2 Construction Impacts

Prior to commercial operations, noise will also be produced at the Site and in the area during the construction phase of the project. This subsection addresses the various components of construction noise and vibration.

Worker Exposure to Noise. Worker exposure levels during construction phases of the Project will vary depending on the phase of the project and the proximity of the workers to the noise-generating activities. Hearing protection will be available and its use will be enforced for workers and visitors, as needed, throughout the duration of the construction period. A Hearing Protection Plan, which complies with Cal-OSHA requirements, will be incorporated into the Health and Safety Plan.

General Construction Noise. Construction activities on the Site and nearby (due to digging trenches and laying fuel gas and potable water pipelines) are expected to be typical of other small power plants in terms of schedule, equipment used, and other types of activities. The Project construction schedule is anticipated to be approximately six (6) months in duration (see Section 2.0 for more details on the Site and linear facilities construction phasing and timetables).

The construction process for the Orange Grove Project would be expected to generate noise during the following phases:

- Site Preparation
- Excavation
- Foundation Placement
- Plant and Building Construction
- Exterior Finish and Cleanup

Equipment utilized during the construction process would differ from phase to phase. In general, heavy equipment (bulldozers, dump trucks, and concrete mixers) will be used during the excavation and concrete pouring activities. Most other phases involve the delivery and erection of the building components.

The noise levels from construction activities will vary during the different activity periods, depending upon the activity location(s) and the number and types of equipment being used.

Typical types of construction equipment are expected for this project, including trucks, cranes, dozers, backhoes, and compressors. For representative groupings of these equipment types for each general construction phase, the site-average sound levels are presented in Table 6.12-10.

Table 6.12-10 – Standard Construction Equipment Aggregate Noise Emissions Values

CONSTRUCTION PHASE	AGGREGATE EQUIPMENT NOISE LEVEL, SOUND PRESSURE LEVEL AT 50 FEET (DBA)
Site Clearing	84
Excavation	89
Foundations	77
Building Construction	84
Finishing	89

Source: USEPA (BBN), 1971

The highest site-average sound levels (89 dBA) are associated with the excavation and finish phases of construction. It is important to note, though, that not all the equipment included herein is used in every phase of construction. Further, the equipment used is not generally operated continuously, nor is it necessarily operated simultaneously.

For the construction noise impact analyses, the worst-case periods of activity were investigated to calculate their respective noise emissions into the surrounding community.

Plant Construction Noise. The Project construction process will be centered around the power block of the new plant, a relatively small area. Since the construction zone is relatively small, a single centroid was used to define the aggregate equipment noise for the construction noise evaluations. The specific mix of equipment that is expected to be used during the construction program was provided by Industrial Construction Co. (as discussed in Section 2.13). The construction activities were laid out in terms of expected construction equipment to be used at any given time during the month-to-month execution of the Project building program.

These monthly equipment sets were located at the centroid of the Project power block, their aggregate noise levels were calculated, and attenuation factors for spreading loss and for barrier effects were used to compute the expected, worst-case noise levels at each receptor location. The analyses used the same receptor locations as were used for the ambient survey, as well as additional locations, to evaluate potential impacts to nearby receptor locations. These receptor locations for the construction analysis are shown on Figure 6.12-4.

Figure 6.12-4 – Map of Construction Noise Analysis Locations

Orange Grove Project - SPPE Application

Data Source: Alliance Acoustics Consultants Inc.
Map Source: Google Earth

The analyses indicated that the worst-case situation would occur in the first two months of construction. The results of this worst-case analysis are given in Table 6.12-11, which compares the predicted construction noise levels at each receptor location to the existing ambient noise environment. More details on the construction analysis methodologies and techniques are contained in Appendix 6.12-B.

Table 6.12-11 - Comparison of Predicted Noise Levels from Project Construction Activities to Existing Ambient Sound Levels

RECEPTOR LABEL	RECEPTOR DESCRIPTION[a]	HIGHEST PREDICTED CONSTRUCTION A-WTD SOUND LEVEL, DBA	MEASURED EXISTING AMBIENT DAYTIME LEQ NOISE LEVEL[a], DBA	DIFFERENCE BETWEEN CONSTRUCTION NOISE AND AMBIENT, DB
Community Receptor Locations (inhabited)				
LT-1	South side of closest house.	48	35	+13
ST-1	At main entrance to Zalinda Farms Nursery (in turn-out).	27	54	-27
ST-2	At driveway of second closest house (currently vacant).	44	~35[b]	+9
House B	Third house up ridgeline from LT-1 and ST-2 houses.	41	~35[b]	+6
House C	South of Project site near base of large hill.	28	~35[b]	+7
Casino	Pala Casino and Spa Resort.	<25	~45 (estimate)	-20

Source: Alliance Acoustical Consultants, Inc., 2007
Notes: [a]. nominal Leq value across the daytime hours.
[b]. estimated value from similar locations and conditions.

As shown in this table, the majority of inhabited (community) receptor locations may be expected to have construction-related noise levels that would be from 6 to 13 dB above the general existing ambient level. For these locations, construction noise would be expected to be clearly audible during most of the daytime hours; depending on the actual, on-site construction activities, as well as the actual, moment-to-moment traffic conditions on SR-76. These periods of perceptibility are not considered significant, however, based on the temporary nature of the construction phases and the intermittent duration of the worst-case activities.

Other locations, that are behind hillsides (such as ST-1) or are large distances from the project site (such as the Casino), would have construction-related noise levels well below current daytime ambient levels and on-site activities would be inaudible at these community locations.

In summary, the worst-case construction noise levels are expected to be clearly audible at the closest receptors, as compared to the current ambient conditions. However, due to the small number of inhabitants, the short-term nature of these activities, and their limitation to daytime hours (per County Code), these construction noise levels would not be considered significant.

Linear Facilities Construction Noise. In addition to the plant site construction, the Project will require the construction of linear facilities. That is, a pipeline will need to be laid along SR 76 from the Site to approximately Rice Canyon Road to tie into an existing natural gas transmission line, and another pipeline will be laid along Pala Del Norte Road north of the site to tie in to a Rainbow Water District water main. This construction of water and gas pipelines will involve the short-term digging of trenches for new supply lines to service the Project. Noise emissions

from these trenching operations will be localized in the vicinity of the activities on any given day. Furthermore, as the trenching progresses along the pipeline pathway, the localized area with construction noise levels will move from week to week. Given the very sparse number or receptors along the pathway, these localized and temporary noise emissions will not be significant.

Plant Start-up and Commissioning Noise. Once the plant construction is completed, the Project will move into the start-up and commissioning phase in preparation of licensed operations. Other than the operations of some or all of the plant equipment, working up to a normal, full-load configuration, the major noise sources during start-up and commissioning involve air purging and rotating equipment run-ups. The vast majority of the air purging are related to line cleaning of the process piping to remove foreign objects, welding slag, dirt, and other debris that may have found its way into the piping during plant construction. Although commissioning and initial start-up only lasts a few weeks between the end of construction and the beginning of long-term, normal operations, and although line-cleaning only occurs during this relatively short-lived phase of a plant's life cycle, the frequency, length, and noise intensity of air purging can be significant. Therefore, temporary vent silencers are often used during this period to reduce the discharge noise levels.

To summarize, typical commissioning and initial start-up activities will generate considerable, but intermittent, noise levels. Some of these discharges (line cleaning), given their continuous or near-continuous duration, are typically silenced to reduce the noise in the community to insignificant levels. However, start-up activities may be quite discernible and could be a potential source of annoyance. These potential annoyances would be short-term and, thus, would be experienced intermittently and only temporarily during Commissioning and Initial Start-up and are, therefore, not expected to result in significant impacts, based on the criteria thresholds.

Plant Emergency Situation Noise. Following start-up and commissioning, a specialized situation is if an emergency shut-down is needed (during an abnormal event or equipment malfunction). These rare, emergency-related events are not expected to produce significant noise levels on the Project Site or at nearby receptor locations. Thus, less than significant impacts are expected for these plant emergency situations.

Construction Vibration. The main source of vibration during typical heavy industrial construction is normally taken to be from pile driving activities. Standard pile installation involves impacting each pile with a large weight or hydraulic ram; much like using a hammer to pound a nail into wood. This technique can generate significant ground-borne vibration levels, depending on the soil characteristics and proximity of vibration-sensitive receptors. However, it is not anticipated that pile driving will be needed at this site due to the relatively small equipment and buildings being planned (as compared to a full-size power generation facility). If piles are needed for foundations, it is assumed that they will not be installed using the classic pile-driving

techniques, but, rather, with quieter and less vibration-producing auguring installation techniques.[3]

Other than potential auger piling, other vibration sources could entail the movements of concrete mixer trucks and heavy-haul equipment delivery trucks over roadway discontinuities. However, these project-related truck movements are not expected to be any different than the current heavy truck movements on the adjacent SR-76.

As such, and given the relatively long distances for ground-borne vibration to propagate to the nearest receptor installation, no measurable vibration levels at any off-site receptor are expected. Thus, potential construction vibration impacts are considered to be less than significant and no additional mitigation is required.

6.12.5.3 Operational Impacts

This subsection describes the expected noise impacts from operation of the plant.

Worker Exposure to Operational Noise. Nearly all components of the Project will be specified not to exceed near-field maximum noise levels of 90 dBA at 3 feet (or 85 dBA at 3 feet where available as a vendor-standard). Since there are no permanent or semi-permanent workstations located near any piece of noisy plant equipment, no worker's time-weighted average exposure to noise should approach the level allowable under OSHA guidelines. Nevertheless, signs requiring the use of hearing protection devices will be posted in all areas where noise levels commonly exceed 85 dBA. Outdoor levels throughout the plant will typically range from 90 dBA near certain equipment to roughly 65 dBA in areas more distant from any major noise source.

Transmission Line and Substation Noise Levels. Noise from energized transmission lines is exhibited via a humming noise caused by the corona effect, which is a localized ionization of air around the transmission line. Corona noise is generally a principle concern with transmission lines of 345 kV and higher. The Project's main voltages of 69 kV will thus preclude many corona effects. Also, the Project's underground cabling from the Site switchyard to the existing SDG&E sub-station is not expected to contribute significantly to the existing corona effects. Further, no additional corona noise, due to the Project, is expected from the high-voltage transmission lines that are near the Project Site (to the east and near location ST-2).

[3] Standard pile installation involves impacting each pile with a heavy weight or hydraulic ram, much like pounding a nail into wood. Besides the high noise levels (typically ranging from 101 to 106 dBA at 50 feet, CERL, 1978), standard pile driving can be very annoying due to the repeated, pounding nature of the operation. Significant ground vibrations can also result from the heavy impact forces being generated. Auger cast piles, in contrast, are more analogous to drilling a hole into a piece of wood and filling it with putty. Noise levels from augered pile installation are from 5 to 15 dB quieter than for standard driving techniques and do not include the annoying pounding, impact sounds. Rather, noise levels from auger piling are dominated by diesel engine noise, much akin to noise from cement trucks or trenching machines. Likewise, augered piles generate substantially less ground-borne vibration levels than driven pile processes.

Consequently, no noise impact is expected from the operation of the Project electrical transmission lines.

Process Water Supply Pipeline and Water Pump Station Noise Levels. Operations of the buried process water supply pipeline are not anticipated to generate any audible noise. The water pump station will be designed to comply with the County's noise requirements and is not anticipated to increase offsite noise level by a measurable amount.

Natural Gas Supply Pipeline and Fuel Gas Compressor Station Noise Levels. Likewise, operational noise from the buried fuel gas supply pipeline is not anticipated to generate any audible sound levels. The fuel gas compressor station is planned to be inside of an acoustically treated building and will be designed to limit gas system noise emissions such that the Project will comply with the County's noise requirements.

Plant Operation Noise Levels. To evaluate the noise environments associated with the Project, the Applicant has undertaken a noise prediction study to identify and incorporate special design features that will be added to the Project to help control noise emissions.

A noise model of the proposed Project has been developed based on the plant layout configurations and equipment information for the proposed facility. The noise model used source input levels derived from manufacturers' data, field surveys of similar equipment, and past experience with many comparable power plant projects. The noise emissions from the plant have been calculated at the residential receptors of potential concern. The noise levels presented represent the anticipated steady-state level from the plant with essentially all equipment operating at full-load conditions.

Specifically, the study focused on the potential noise generated by the proposed two trains of gas-fired combustion turbines (General Electric LM 6000's), inlet chiller/cooling tower, fin/fan oil-to-air coolers, water pumps, power transformers, and other associated process and support equipment. The model divides the proposed facility into a list of individual point and area noise sources representing each piece of equipment that produces a significant amount of noise. The sound power levels representing the standard performance of each of these components are assigned based either on field measurements of similar equipment made at other existing plants, data supplied by manufacturers, or information found in the technical literature. Using these sound power levels to define the individual sources, the model calculates the sound pressure level that would occur at each defined receptor from each source given a set of sound propagation factors and attenuation effects that have been adopted from industry standards. These attenuation and reduction factors include losses from distance, air absorption, ground attenuation effects, and intervening barriers (both building and topography) are considered. The sum of all these individual source levels, after incorporating the propagation terms, is the total plant level at the selected receptor location. More details concerning the inputs and methodologies of the predictive noise modeling analyses are contained in Noise Appendix 6.12-C.

The new plant was modeled as an open-air plant. That is, potential barrier effects from the small service building and the water storage tanks were neglected. However, topographical features

are important to this site and the ridgelines around the Site were included in the noise prediction model. A reasonable attenuation factor for vegetation (e.g. trees and ground cover, both existing and future) was considered. Lastly, as is standard practice in the description of environmental noise, stable atmospheric conditions were assumed (suitable for reproducible measurements and that are favorable for noise to travel greater distances). These inherent conservative factors and assumptions result in a noise model that tends be biased to higher predicted values than would be expected in the actual environment around the Project.

The modeling study was based on the conservative scenario that the entire new Project could operate at maximum loads for an entire 24-hour period. This scenario is conservative because electricity demand normally ramps downward at night when commercial activities decline and when residential usage decreases (as people turn off lights, televisions, and appliances before going to sleep). For a peaking plant of this type, there would only be very rare instances wherein the CAISO would call for operations past 10 p.m. – estimated to be on the order of 40 hours per year over a 20- to 40-day period in the hottest months. The running of this plant beyond midnight would connote that there is a serious problem on the power grid and such late-night operations could be categorized as 'exceedingly rare' (to the point of 'almost never' occurring). Nevertheless, the modeling was performed assuming 24 hours of maximum loads to assure that even under this unusual condition, the Project will comply with the San Diego County noise ordinance requirements at all hours of the day and night, and will provisionally adhere to the CEC's late-night noise guidelines (for those rare cases of peaking generation operations after 10 p.m.).

The modeling effort was repeated in an iterative fashion to analyze increasingly quiet configurations of plant equipment until a plant design was arrived at that was considered the feasibility limit for practical noise mitigation techniques and that resulted in compliance with the County's regulations and provisionally with the CEC significant impact threshold. This feasibility-constrained array of noise control design features, as discussed in Section 6.12.6, were included in the plant noise modeling.

Compliance with each standard is discussed briefly below.

<u>San Diego Noise Ordinance</u>

The County of San Diego noise level limits for stationary sources were presented in Table 6.12-5. The pertinent and most restrictive limits with respect to the Project (assuming the capability of full-load operations around the clock) are the nighttime limits for Single-Family Residential zones (hourly Leq of 45 dBA), for Multi-Family Residential zones (hourly Leq of 50 dBA), and for Commercial zones (hourly Leq of 60 dBA). It should be noted that these values are the <u>nominal</u> noise level limits. Per San Diego Code 36.404: "If the measured ambient level exceeds the applicable limit noted (in the 36.404 table) above, the allowable one hour average sound level shall be the ambient noise level." This stipulation for adjustment of the limit relative to the existing ambient is particularly pertinent for Location ST-1.

These County noise level limits, which are the pertinent standards in this situation, must be met at the receiving land use property boundary. Results of the modeling described above, as they

relate to the San Diego Noise Standards are presented in Tables 6.12-12 and 6.12-13 for the daytime and nighttime periods, respectively.

As this table indicates, the San Diego Noise Standards will be met at surrounding sensitive land uses, given the existing ambient noise environments, which are often considerably higher than the nominal noise level limits. Therefore, the Project will comply with the San Diego Noise Standards.

CEC Requirement (+5 dB criterion)

The CEC has determined that a significant noise impact will occur if operational noise from a new facility increases existing late-night L_{90} noise levels by 10 or more dB at nearby residential areas (Baker, 1999, 2002, 2007). For levels above +5 dB, additional considerations are warranted to account for the number and type of potentially impacted land uses, the nature of the existing noise environment (as compared to the future environment), and other extenuating circumstances. The results of the modeling described above as it relates to the CEC criterion are presented in Table 6.12-14.

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Table 6.12-12 - Comparison of Predicted Noise Levels from Project On-Going Operations to County of San Diego DAYTIME Noise Level Limits

Receptor Label	Receptor Description [a]	County of San Diego Land Use Type	NOMINAL County of San Diego DAYTIME Noise Level Limit, Hourly L_{eq}, dBA[b]	Measured Existing Ambient DAYTIME L_{eq} Noise Level, dBA	EFFECTIVE County of San Diego DAYTIME Noise Level Limit, Hourly L_{eq}, dBA[C]	Predicted Project Operations Noise Contributions, DBA	Difference between total future environment and San Diego EFFECTIVE Limit, dB
Existing Community Locations subject to County of San Diego Municipal Code							
LT-1	South side of closest house.	Rural Res. (RR)	50	35-38	50	35	12 dB under limit
ST-1	At main entrance to Zalinda Farms Nursery (in turn-out)	Rural Res. (RR)	50	54	54	19	No change to existing ambient conditions [g]
ST-2	At driveway of second closest house (currently vacant)	Rural Res. (RR)	50	46[d]	50	30	No change to existing ambient conditions [g]
SP	Pala del Norte Road, near future secondary entrance to Project Site	Border of Ind. and Open Space	62.5	48	62.5	58	>4 dB under limit
House B	Further up ridgeline, north of LT-1 and ST-2	Rural Res. (RR)	50	<35[e]	50	30	>14 dB under limit
House C	South of nursery, near base of large hill	Rural Res. (RR)	50	<35[e]	50	31	>14 dB under limit
Casino	Pala Resort and Casino	Recreation Residential (RRO)	55	Not avail.	55[f]	24	No change to existing ambient conditions [g]

Source: Alliance Acoustical Consultants, Inc., 2007

Notes:
a. April 2007 Ambient Survey Locations that are not residential areas (and, therefore, not relevant to this comparison) are not listed.
b. San Diego noise level limits as written into the Municipal Code.
c. Allowance in the San Diego Municipal Code for situations wherein the existing ambient noise is higher than the as-written limit.
d. Using evening time period data (which is artificially influenced by operations of nearby portable generator).
e. Estimated, using measurement data from similar locations.
f. Effective limit is assumed to be the same as the nominal limit with no modification by the existing ambient.
g. Project noise levels will have zero contributions to the existing conditions and are expected to be inaudible.

Table 6.12-13 - Comparison of Predicted Noise Levels from Project On-Going Operations to County of San Diego NIGHTTIME Noise Level Limits

Receptor Label	Receptor Description [a]	County of San Diego Land Use Type	NOMINAL County of San Diego NIGHTTIME Noise Level Limit, Hourly L_{eq}, dBA [b]	Measured Existing Ambient NIGHTTIME L_{eq} Noise Level, dBA	EFFECTIVE County of San Diego NIGHTTIME Noise Level Limit, Hourly L_{eq}, dBA [C]	Predicted Project Operations Noise Contributions, dBA	Difference between total future environment and San Diego EFFECTIVE Limit, dB
Existing Community Locations subject to County of San Diego Municipal Code							
LT-1	South side of closest house.	Rural Res. (RR)	45	30-33	45	35	9 dB under limit
ST-1	At main entrance to Zalinda Farms Nursery (in turn-out)	Rural Res. (RR)	45	59	59	19	No change to existing ambient conditions [h]
ST-2	At driveway of second closest house (currently vacant)	Rural Res. (RR)	45	46 [d]	45 [f]	30	No change to existing ambient conditions [h]
SP	Pala del Norte Road, west of Project Site	Border of Ind. and Open Space	60	45	60	58	2 dB under limit
House B	Further up ridgeline, north of LT-1 and ST-2	Rural Res. (RR)	45	<30 [e]	45	30	12 dB under limit
House C	South of nursery, near base of large hill	Rural Res. (RR)	45	<30 [e]	45	31	11 dB under limit
Casino	Pala Resort and Casino	Recreation Residential (RRO)	50	Not avail.	50 [g]	24	No change to existing ambient conditions [h]

Source: Alliance Acoustical Consultants, Inc., 2007

Notes:
a. April 2007 Ambient Survey Locations that are not residential areas (and, therefore, not relevant to this comparison) are not listed.
b. San Diego noise level limits as written into the Municipal Code.
c. Allowance in the San Diego Municipal Code for situations wherein the existing ambient noise is higher than the as-written limit.
d. Using evening time period data (which is artificially influenced by operations of nearby portable generator).
e. Estimated, using measurement data from similar locations.
f. Under normal circumstances (w/o temporary, portable generator running), this house would be expected to have a nighttime ambient below 30 dBA.
g. Effective limit is assumed to be the same as the nominal limit with no modification by the existing ambient.
h. Project noise levels will have zero contributions to the existing conditions and are expected to be inaudible.

Table 6.12-14 - Comparison of Predicted Noise Levels from Project Operations to Existing Ambient Sound Levels, with respect to the CEC's +5 dB criterion.

Receptor Label	Receptor Description[a]	Measured Existing Ambient Nighttime L_{90} Noise Level, dBA	CEC Effective Plant Allowance (column 3 Levels + 5 dB)	Predicted Project Operations Noise Contributions, dBA	Total Future Noise Environment (Project plus existing L_{90}), dBA	Difference between total future environment and CEC criterion, dB
LT-1	South side of closest house.	27	32	35	36 (27 + 35 = 36)	4 dB over L_{90}+5 guideline
ST-1	At main entrance to Zalinda Farms Nursery (in turn-out)	33	38	19	33 (33 + 19 = 33)	5 dB under L_{90}+5 guideline and no change to existing conditions
ST-2	At driveway of second closest house (currently vacant)	34[b]	~39	30	~35 (34 + 30 = 35)	~4 dB under L_{90}+5 guideline
House B	Further up ridgeline, north of LT-1 and ST-2	~27-30[c]	~32-35	30	~32-33 (27 + 30 = 32) (30 + 30 = 33)	at guideline to ~2 dB under L_{90}+5 guideline
House C	South of nursery, near base of large hill	~27-30[c]	~32-35	31	~32-34 (27 + 31 = 32) (30 + 31 = 34)	at guideline to ~1 dB under L_{90}+5 guideline

Source: Alliance Acoustical Consultants, Inc., 2007

Notes: a. April 2007 Ambient Survey Locations that are not residential areas (and, therefore, not relevant to this comparison) are not listed.
b. Using evening time period data (which is artificially influenced by operations of nearby portable generator).
c. Estimated, using measurement data from similar locations.

As this table indicates, noise increases due to the Project will be less than 5 dB at all of the surrounding residential locations with respect to the lowest, late-night residual (L_{90}) noise metric, with the sole exception of Location LT-1. At this house, the closest to the project site, the predicted increase is predicted to be 9 dB above the measured late-night L_{90} level (which is very low, given its isolated, rural setting). The next closest houses, represented by House 'B' and House 'C', are just within a +5 dB increase, and may be slightly higher or lower on any given night (when the plant is operating past midnight); depending on the particular ambient circumstances (from traffic flows), atmospheric conditions, and plant operating parameters.

The reason for the L_{90}+ 9 dB increase at Location LT-1 is due to this location's inherently low nighttime ambient noise levels. These low, late-night ambient levels are driven by the sporadic traffic flows on SR-76. While these intermittent vehicle pass-bys could be seen as being more intrusive or attention-getting than the steady-state noise output of a power plant, a 9 dB increase in the L_{90} (or equivalently in this case, a 5 dB increase in the hourly L_{eq} metric) is a considerable noise level increment.

While the project is envisioned to 'almost never' operate past midnight (except when due to a serious problem with the overall power grid), the 24/7 permit application enables an evaluation of at least the possibility of late-night operations that could impact the residents of this household.

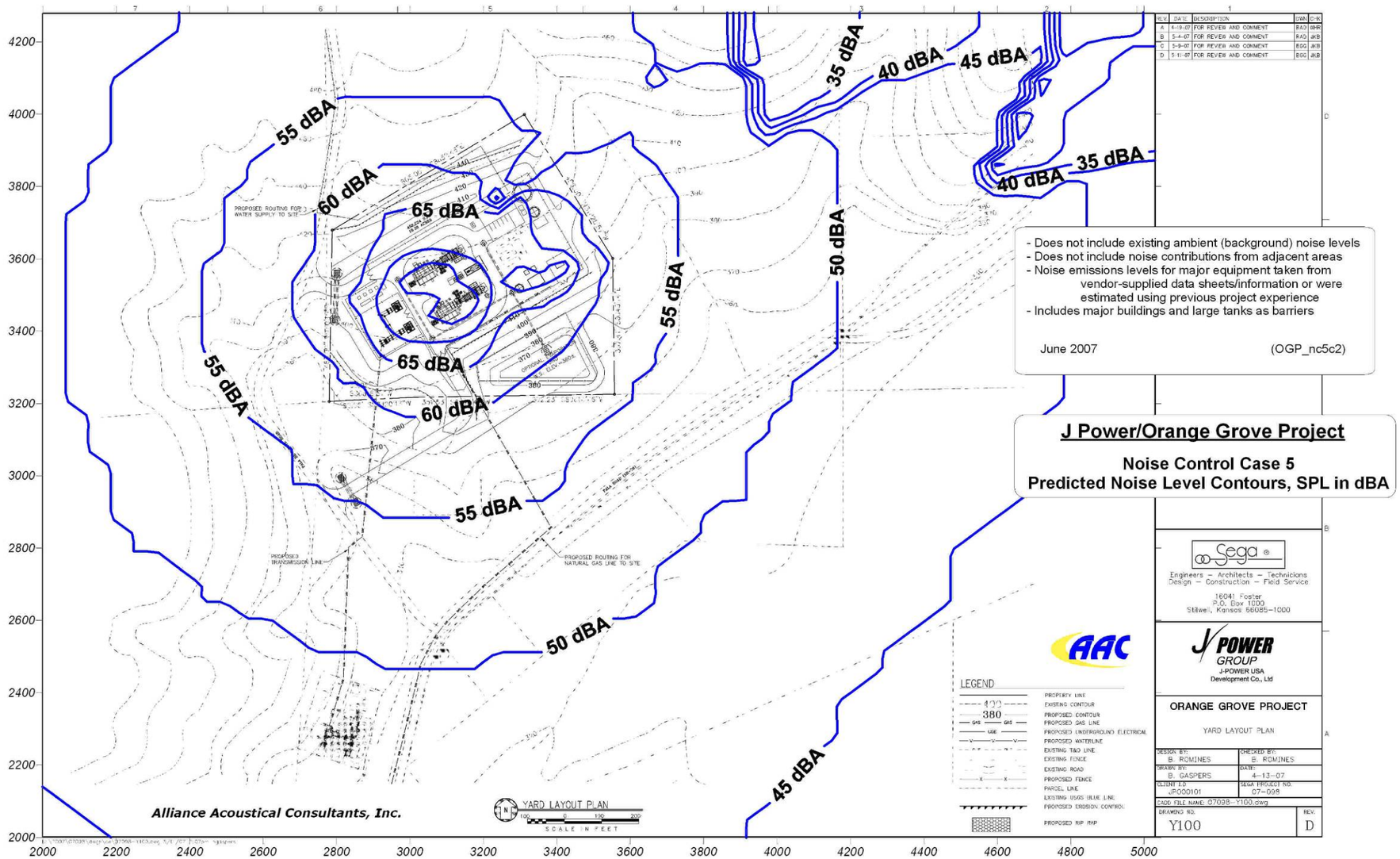
For such circumstances (i.e., very low ambient levels and very few impacted households), the CEC has typically mandated secondary treatment of the receiving property; in addition to the primary mitigation strategy of noise control treatments to the project itself (Baker, 2007). These treatments to the receiving property could include one or more of the following potential remedies:

- upgrading the windows to acoustically-rated double- or triple-paned glazing systems;
- upgrading all exterior doors to acoustically-rated, solid-core doors;
- upgrading the ventilation/air-conditioning system to allow for interior climate control with all windows closed; and/or
- upgrading or installing suitable acoustical insulation in attic areas and crawlspaces.

With these provisional treatments to the identified house, the Project will not cause a significant noise impact at nearby residences and will, therefore, be in compliance with the CEC's impact threshold criterion.

In summary, since the Project complies with the pertinent San Diego Standards as well as provisionally with the CEC's guidelines, it can be concluded that there are no residences, hospitals, libraries, schools, places of worship or other facilities where quiet is an important attribute of the environment where there is a potential significant impact from noise levels resulting from the Project's operations. These compliant conditions are graphically given in Figure 6.12-5, which shows the predicted noise level contours for the Project contribution into the surrounding areas.

Figure 6.12-5 – Noise contour map of predicted Project contributions



TRC	Project: **Orange Grove Project - SPPE Application**
	Source: Alliance Acoustical Consultants, Inc., 2007

6.12.5.3.1 Tonal Noise

As a general rule, simple-cycle power plants that do not include noise controls in the exhaust gas path can possibly produce significant low-frequency noise that may be noticeable or objectionable at nearby receptor locations. However, for this project, substantial silencing is planned for the SCR system which will preclude excessive exhaust path noise emissions from being released into adjacent areas. Therefore, at the monitoring locations modeled here, no significant tones are anticipated.

Other sources within the plant such as the combustion turbine inlets, transformers, pump motors, gearboxes, etc. have been known to sometimes produce audible tones. It is the Applicant's intention to anticipate the potential for audible tones in the design and specification of the plant's equipment and take necessary steps to prevent sources from emitting tones that might be disturbing at the nearest receptors.

6.12.5.3.2 Operations Vibration

Experience at similar facilities demonstrates a very low probability for either ground-borne or airborne-induced vibration impacts to surrounding land uses. The Project equipment that would be used in the proposed project is well balanced and is designed to produce very low vibration levels throughout the life of the project. An imbalance could contribute to ground vibration levels in the vicinity of the equipment. However, vibration-monitoring systems installed in the equipment are designed to ensure that the equipment remains balanced. Also, given the distances from the actual equipment to the nearest receptor locations, as well as the inherently low vibration levels from the plant's well-balanced machinery, ground-borne vibrations would not expected to be even detectable above the residual background vibration environment at the nearest receptors.

As mentioned above, the gas turbines exhausting into a SCR duct and then a stack can possibly produce low frequency noise, which is the main source of airborne-induced vibration of or in nearby structures. Given the project's used of considerable exhaust path silencing, the airborne energy that might cause induced structural vibrations will be alleviated to the extent that airborne-induced vibrations are not expected to be above the threshold of detectability.

Thus, impacts from operations vibrations will be less than significant.

6.12.5.3.3 Cumulative Noise Impacts

The most prevalent existing noise in the area is from Hwy 76, even during late-night/early-morning hours. This source may actually provide beneficial masking of the proposed Project noise emissions, particularly during the busy daytime hours. Some future, proposed projects in the vicinity of the Orange Grove Project, such as the Pala Casino Expansion and the Warner Ranch Development, may increase traffic on SR-76 somewhat after the Orange Grove Project is operational, but such volume increases would not be expected to significantly change noise levels in the area.

Additionally, potential future noise sources near the Project site, which may contribute to cumulative sound levels in the local area, are summarized in Section 6.1.2. These future discretionary projects are expected to contribute negligible, if any, noise levels to the environment around the Project site as they are generally too far from the Project site or separated by substantial topographical characteristics (e.g. hillsides and ridgelines) or both. The closest potential projects are the Verizon Cell Tower Generator (see 6.1.2.5) and the Prominence at Pala (see 6.1.2.8). The cell tower backup generator is a replacement and its impact is expected to be comparable to the existing generator, which has been accounted by measurements at Noise Location ST-2. The Prominence at Pala is not considered reasonably foreseeable for the purposes of this cumulative impact analysis. Therefore, there are no know future noise sources in the San Diego/Pala area that will contribute to Project noise levels in a manner that would result in additional cumulative impact.

Based on the absence of other notable noise sources in the Pala area, which would be additive to Project noise, cumulative noise impacts for the Project are not considered significant.

6.12.6 Noise Design Features and Mitigation Measures

The following noise reduction design features are included in the project to ensure meeting the appropriate noise criteria during normal operations.

- Implementation of substantial silencing in the exhaust path within the SCR (pre-catalyst bed, post-catalyst bed, or in the stack);
- Low-noise sound level specifications for the combustion turbine air inlets, filters, and compartments (including compartment vent silencers);
- Low-noise sound level specifications for the chiller/cooling tower system (and secondary/support equipment items);
- Low-noise sound level specifications for the fin/fan oil-to-air coolers (including low-speed fans);
- Low-noise package and/or enclosures around process equipment skids (e.g. ammonia injection and water injection skids);
- Low-noise sound level specifications for the major pumps (possibly using enclosures and/or casing blanket packages);
- Enclosures around the tempering/dilution air fan systems;
- Housing the fuel gas compressors inside an acoustically treated building;
- Noise mitigation strategies for the heating, ventilation, and air conditioning (HVAC) systems; and
- Low-noise sound level specifications for the transformers

The implementation of these design features during the detailed design process will result in the Project meeting the San Diego Noise Ordinance, as well as provisionally meeting the CEC's

significance impact threshold. Consequently, no significant noise impacts during on-going operations are expected and, thus, no mitigation measures are expected to be required. However, to confirm that noise impacts remain less than significant, the following noise reduction and monitoring program is included for the Project.

6.12.6.1 Noise Mitigation Measure #1

The project design and implementation shall include noise reduction and noise control design features to the extent feasible ensure that operation of the project will not exceed the effective noise standards of the County Code while accounting for ambient noise conditions.

6.12.6.2 Noise Mitigation Measure #2

With respect to the CEC noise guidelines, should the project operate past midnight, late-night operating noise levels are expected to be above the CEC's +5 criterion at one or more residences (even with Mitigation Measure #1's extensive noise control features). This very rare late-night noise situation shall be mitigated by offering and, if accepted, installing noise reduction features at the impacted receiving house(s) to reduce nighttime noise levels from intruding into interior spaces. These at-receiver noise reduction measures may include upgraded windows, doors, ventilation/cooling systems, and/or attic/crawlspace insulation.

6.12.6.3 Noise Mitigation Measure #3

The Project shall establish a telephone number for use by the public to report any significant undesirable noise conditions associated with the construction and operation phases of the Project. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

6.12.6.4 Noise Mitigation Measure #4

Throughout the construction, and operation of the Project, the Project owner shall document, investigate, evaluate, and attempt to resolve all legitimate, project-related noise complaints.

The Project or authorized agent shall:

- Use the Noise Complaint Resolution Form typically suggested by the CEC or functionally equivalent procedure to document and respond to each noise complaint.
- Attempt to contact the person(s) making the noise complaint within 24 hours.
- Conduct an investigation to attempt to determine the source of noise related to the complaint.
- If the noise complaint is legitimate, take all feasible measures to reduce the noise at its source.

6.12.6.5 Noise Mitigation Measure #5

Noisy construction work shall be restricted to the period from 7 a.m. to 7 p.m. on weekdays, unless otherwise permitted in accordance with San Diego Code Section 36.410. In no event shall construction noise cause off-site, average noise levels to be above 75 dBA at the property line of any property upon which a legal dwelling unit is located.

Construction equipment shall have appropriate silencing features or equipment installed and maintained during the course of the construction phase. For example, haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. Stationary compressors and generators shall utilize noise-reduction enclosures or similar noise control features. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust braking shall be limited to emergencies.

6.12.6.6 Noise Mitigation Measure #7

Temporary silencers on air and steam discharge vents will be used during the Commissioning and Initial Start-up Phase. This will reduce noise from the few weeks of air and steam blow cleaning that only occurs during this part of the plant's life cycle.

6.12.6.7 Noise Mitigation Measure #8

A noise survey shall be performed within 90 days of the startup of commercial operations to confirm that the modeled noise levels are met. Any deficiencies shall be noted, and a schedule to correct them shall be developed. A copy of the report shall be provided to the Commission and the County of San Diego, which shall be kept apprised of progress made toward correcting any noise-related issues.

6.12.7 Involved Agencies and Agency Contacts

Agency contacts relative to noise issues are presented in Table 6.12-15.

Table 6.12-15 – Summary of Agency Contacts

AGENCY	AUTHORITY
Steve Baker California Energy Commission Staff 916-654-3915	Considerations for mitigation approaches where noise increases are between +5 dB and + 10 dB.
Emmet Aquino Department of Planning and Land Use County of San Diego 5201 Ruffin Road, Suite B San Diego, CA 858-694-8845	Compliance with County noise ordinances, in conjunction with issuance of Major Use Permit.

6.12.8 Noise-Related Permits and Permitting Schedule

There are no noise-related permits that are applicable to this project.

6.12.9 References

Barnes et al. 1976.

Baker, Steve. 1999, 2002, 2007 - Personal communication with CEC Noise Staff.

Beranek, Leo. Noise and Vibration Control. Revised Edition. Institute of Noise Control Engineering. Washington, D.C. 1988.

California Energy Commission. 2002. Final Staff Assessment. Potrero Power Plant Unit 7 Project. Noise. Testimony of Jim Buntin.

Harris, Cyril M.. Handbook of Acoustical Measurements and Noise Control, Third Edition. McGraw Hill, Inc. 1998.

Miller, L.N., E.W. Wood, R.M. Hoover, A.R. Thompson, S.L. Thompson, and S.L. Paterson. 1978. *Electric Power Plant Environmental Noise Guide*, Vol. 1. Bolt Beranek & Newman, Inc. Cambridge, MA. Prepared for the Edison Electric Institute, New York.

U.S. Environmental Protection Agency (USEPA). 1971. Noise from Construction Equipment and Operations, US Building Equipment, and Home Appliances. Prepared by Bolt Beranek and Newman for USEPA Office of Noise Abatement and Control, Washington, DC.

United States Environmental Protection Agency (EPA). Protective Noise Levels. Office of Noise Abatement and Control. Report number EPA 550/9-79-100. Washington, D.C. 20460. 1978.

6.12-A. B

APPENDIX 6.12-A – AMBIENT NOISE SURVEY DETAILS

[Please note that page numbers 6.12-A-2 to 6.12-A-4 are not used for this Appendix. There is no content missing from this Appendix]

1.0 Introduction

The area in the vicinity of the Project site consists of a sparsely populated, rural area. The closest commercial uses are the Zalinda Farms Nursery (represented by measurement location ST-1) and the more distant Pala Resort and Casino, both to the east of the site. No recreational uses were observed in the vicinity of the Project site. The nearest residential areas are along the ridgeline to the NE and north of the Project site, as well as some houses to the south, across SR-76 and on the far side of a former aggregate mine. There are no schools, houses of worship, and/or medical facilities located within approximately 1 mile of the Project site

2.0 Measurement Overview

Given the area reconnaissance and the dearth of sensitive receptors, three measurement locations were chosen to conduct ambient noise level monitoring as part of the existing conditions assessment. Noise level data were collected on April 18 and 19, 2007 at these locations, which are summarized in Table 6.12-16 and are depicted in Figure 6.12-6.

Table 6.12-16 – Summary of Ambient Measurement Locations and Relevance

LOCATION	DESCRIPTION	IMPORTANCE
LT-1	South of closest house northeast of the site, along ridgeline overlooking project site. Approximately 2,400 feet from the center of the planned turbine installation. Coordinates are: N33° 21.787' by W117° 06.385'	Closest regular single-family residential land use.
ST-1	At main entrance to Zalinda Farms Nursery at 10693 Hwy 76 (in small turn-out). This is near the care-taker residences to the nursery. Approximately 2,700 feet from the center of the planned turbine installation. Coordinates are: N33° 21.735 by W117° 06.191'	Nearby residential dwelling, although this is a special case as these are care-taker residences for the nursery.
ST-2	At edge of concrete driveway to the south of second closest house along ridgeline overlooking project site. Approximately 3,100 feet from the center of the planned turbine installation. Coordinates are: N33° 21.944' by W117° 06.371'	Second-closest regular single-family residential land use.
SP (Spectral)	At edge of roadway along Pala del Norte near approximate location of future secondary entrance to project site. Approximately 450 feet from the center of the planned turbine installation. Coordinates are: N33° 21.523' by W117° 06.774'	Typical and representative location for spectral environmental of site and surrounding area.

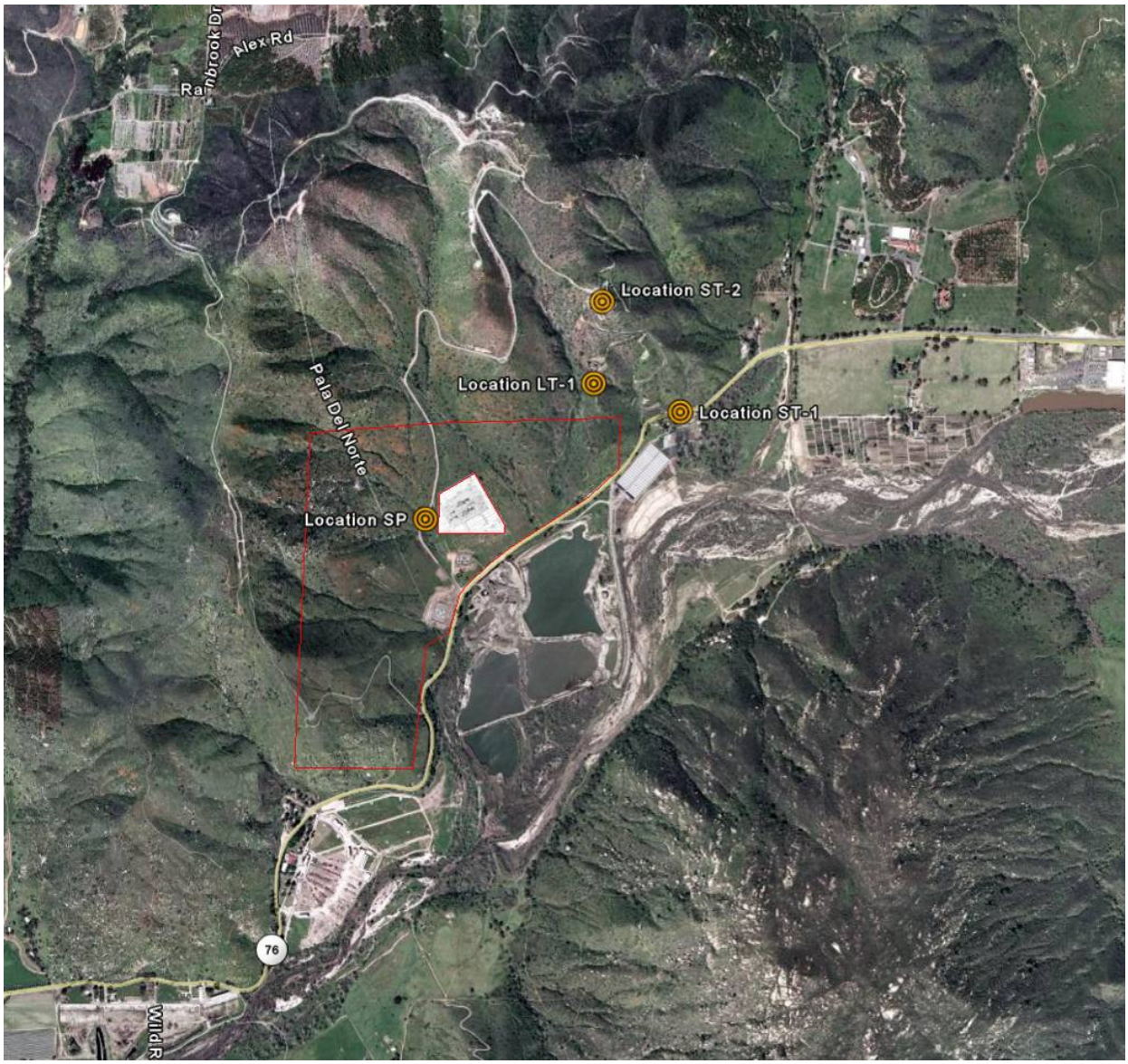
Source: Alliance Acoustical Consultants, Inc., 2007

Note: Another long-term measurement location (LT-2) was established at the NE corner of the fenced SDG&E storage yard; approximately 600 feet from the center of the planned turbine installation. Coordinates were: N33° 21.468' by W117° 06.665'. Sound level data was monitored here from 04/18/07 16:13 to 04/19/07 17:31. However, instrumentation failure yielded no useable noise data.

To document the ambient noise conditions, one location was monitored for at least 25 hours continuously (per CEC guidelines), while short-term samples (typically 10- to 15-minute durations) were also made at the other locations during at least mid-day, evening, and late-night

periods. An additional location, labeled SP, entailed the acquisition of frequency-band level data to obtain the tonal background conditions adjacent to the site.

Figure 6.12-6 – Ambient Measurement Location Map (April 2007)



TRC	**Orange Grove Project - SPPE Application**
	Data Source: Alliance Acoustics Consultants Inc., 2007 Map Source: Google Earth

Sources of environmental noise in the vicinity of the Project area are primarily transportation-related, dominated by vehicle flows on State Route 76. Some aircraft noise influences from commercial, military, and general-aviation aircraft (including helicopters) flying overhead were noted, but these were definitely secondary to the traffic sources on SR-76.

3.0 Measurement Methodology

As part of the application for certification analysis, measurements were collected on April 18 and 19, 2007 at four community locations around the proposed Project site. One location was monitored for over 25 hours continuously, using battery-operated, self-contained noise data acquisition equipment. The instrumentation was set to sample over 15-minute periods and acquired L_{max}, L_2, L_8, L_{25}, L_{50}, L_{90}, L_{99}, L_{min}, and L_{eq} noise metrics for each sampling period. From the L_{eq} data, CNEL and L_{dn} metrics were calculated.

In addition to this long-term monitoring location, ambient data were gathered by short-term monitoring, nominally conducted over 15-minute sampling periods, at two additional locations that were representative of other residential receptor locations. These short-term measurements and observations were conducted at three to four different times of day to assess the changing diurnal conditions. During the noise measurements, the field notes also included general observations of the prevailing weather conditions. Lastly, octave band spectral levels were measured at one location to establish the existing spectral conditions.

Noise level measurement instrumentation used during the April 2007 ambient survey included Sound Level Meter (SLM) systems made by Larson-Davis (LD), with support sub-systems (e.g. pre-amplifiers, microphones, and field calibrators) made by either LD or Brüel and Kjær (B & K). All instrumentation was within the standard laboratory calibration cycle[4] and all meters were operated according to the manufacturers' specifications. For all measurements, each SLM system was calibrated before the start of the measurement with a portable, field acoustic calibrator. After completion of the measurement program, a calibration check was performed on each SLM to determine if the instrument was operating properly and if there was calibration drift. All equipment experienced no more than 0.5 dB drift during the measurement program. The instruments used in the noise measurements are summarized as follows:

- LD model 814 Sound Level Meters, SN's 0152, 0153, & 0156
- LD model 904 Preamplifiers, SN's 0126, 0134, & 0139
- LD model 2559 ½" Microphone, SN 1782
- B & K model 4133 ½" Microphone, SN 640034
- B & K model 4144 1" Microphone, SN 841536
- B & K model 4230 Acoustic Calibrator, SN 565917

Generally speaking, weather conditions during the survey sessions were noted to be typical for the area in mid-spring. Daytime temperatures (°F) ranged from the mid-60's to the mid-70's. Evening and nighttime temperatures (°F) were typically in the mid-40's to mid-50's. The relative humidity averaged between 47 and 62% and had a high reading of 87%. Mild winds were observed intermittently during the measurement period, particularly on the late morning and early afternoon of the second day. Winds were generally from the west to NW during the majority of the measurements with a period of winds from the NE for approximately seven hours in the early morning hours of 4/19/07. The wind speeds were usually from 0 to 5 mph

[4] calibration records are available upon request

throughout the survey period, with occasional gusts in the range of 5 to 13 mph, typically between noon and 8 p.m.[5]. These speeds are below the limits specified in industry standards for conducting outdoor measurements. Each measurement microphone included a windscreen, as is standard industry practice for outdoor measurements. However, the last few hours of monitoring on the second day may have been influenced to some degree by wind noise at the ridgeline locations (LT-1 and ST-2) as they were particularly prone to wind flowing over the ridgeline and causing rustling of vegetation near the microphones. Daytime skies were sunny and clear and nighttime skies were also clear. There was no precipitation during the survey.

4.0 General Results

Long-term, A-weighted Noise Levels. Long-term noise level data were acquired at Location LT-1. This location is the closest residential receptor and is on a ridgeline overlooking the Project site. Selected photographs showing this location and its view of the site were acquired (for example, see Figure 6.12-7).

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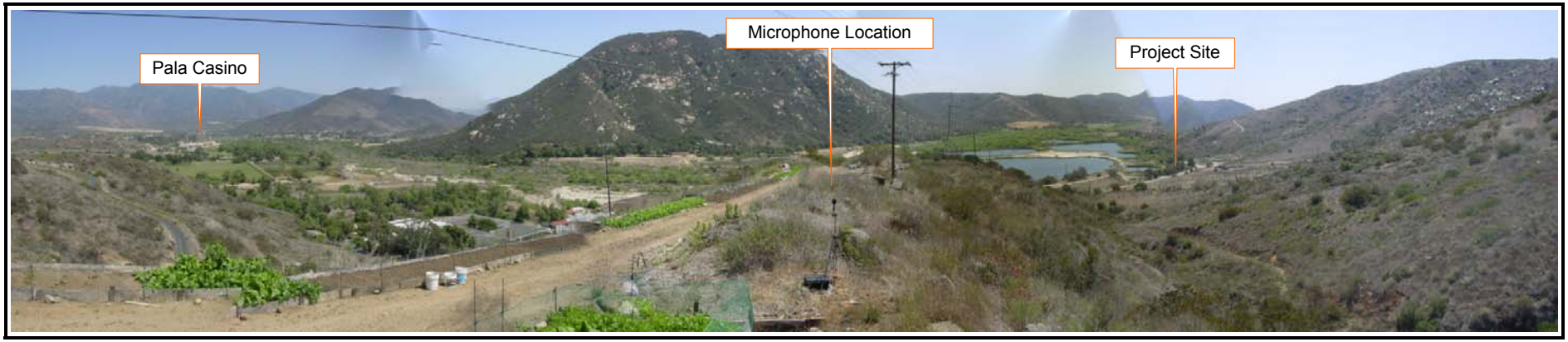
[5] Note that these meteorological data are from a weather station in Temecula Creek, approximately nine miles from the Project site. As such, they may not be exactly the same as the actual weather conditions in the measurement area, but are considered to be reasonably representative of them.

Figure 6.12-7 – Photographic views of Ambient Location LT-1

Figure 6.12-8 – Photographic views of Ambient Location LT-1



TRC	Project: **Orange Grove Project - SPPE Application**
	Source: Alliance Acoustical Consultants, Inc., 2007

Measurement results for the 25-hour, long-term ambient sound level monitoring during the April 2007 survey are summarized in Table 6.12-17. This table provides the measurement period at each location, as well as the key noise metrics in terms of the L_{90} (residual) sound level, the L_8 (intrusive) sound level[6], and the one-hour L_{eq} (energy-equivalent) sound level. The latter metric is important since the County of San Diego Noise Ordinance is built around this averaged sound level type.

Table 6.12-17 – Summary of Long-term Ambient Measurement Results

Location	Brief Description	Long-term Monitoring Period [date with hr:min]	Long-term Monitoring Data Ranges*		
			15-min. L_{90} (min ,max times) [hr:min]	1-hour L_{eq} (min, max times) [hr:min]	15-min. $L_8 \approx L_{10}$ (min, max times) [hr:min]
LT-1	South of closest house.	04/18/07 15:35 to 04/19/07 17:04	26.8 – 40.3 dBA 03:30, 15:30	30.6 – 47.0 dBA 03:00+, 15:00+	31.5 – 51.1 dBA 03:30, 15:00

Source: Alliance Acoustical Consultants, Inc., 2007

* Data acquisition used 15-minute sampling periods which are reported for L_{90} and L_8 metrics, while the 15-minute L_{eq} data were post-processed to arrive at the reported one-hour L_{eq} value (for use with respect to the County of San Diego Noise Ordinance).

The time-history record of sound levels over the 25-hour survey period for Location LT-1 is shown in Figure 6.12-9. This chart presents the pertinent sound levels over time at the nearest 'regular' residential land use. This Location LT-1 record indicates that the noise environment can be described as quiet most of the time. The noise levels are fairly stable throughout the day, and exhibit a slight, but steady decline into the evening and nighttime hours due to decreasing traffic flows on SR-76. The daytime levels were typically in the range of 34 to 38 dBA L_{eq} and 28 to 33 dBA L_{90}. The overnight noise levels 'bottomed-out' between approximately 2 a.m. and 5 a.m., after which there was a pronounced increase back up to the daytime levels (most probably due the new day's onset of daytime traffic flows). The overnight lows were 27 dBA for the L_{90} metric and 31 for the L_{eq} metric. Maximum noise levels, due to pass-bys of particularly noisy vehicles, could be in the mid-50's (or higher) during the daytime and in the mid-40's at night. There appear to be more maximum excursions in the morning rush hours, most likely due to a preponderance of morning delivery trucks going to the Pala Casino. During the second daytime period, some interference from winds (and rustling vegetation) was noted for Locations LT-1 and ST-2.

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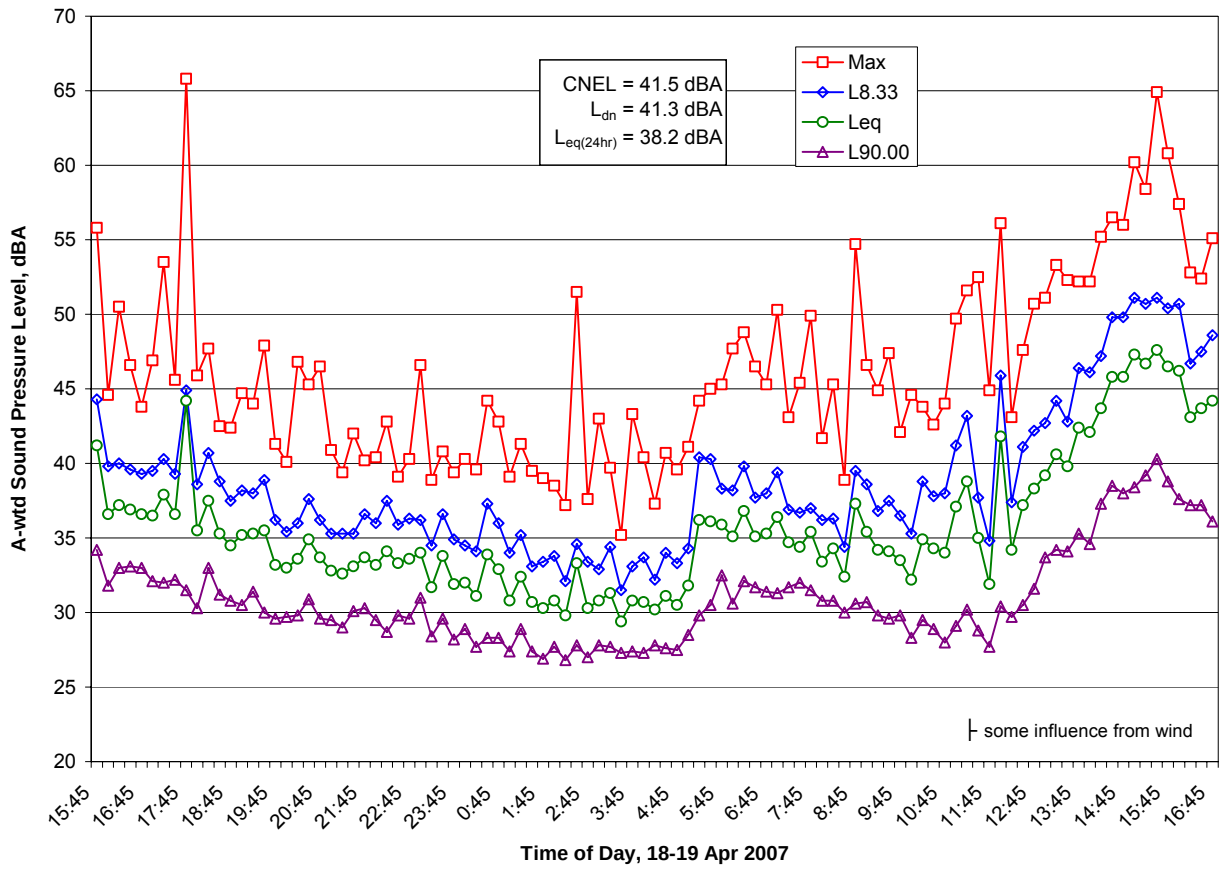
[6] Note that the L_8 was the actual noise metric sampled during the survey, but it is considered to be effectively equivalent to the L_{10} (intrusive) sound level for community noise assessments. These two metrics will, therefore, be used interchangeably in this document.

Figure 6.12-9 – Ambient Measurement Time History for Location LT-1



Project: **Orange Grove Project - SPPE Application**

Source: Alliance Acoustical Consultants, Inc., 2007

The 24-hour metrics, L_{dn} and CNEL[7], were calculated from the sampled energy-average, L_{eq}, values, starting at the sample period nearest the first whole hour. The results of these calculations are given below.

[7] **Ldn** or DNL is the Day-Night Noise Level, a metric that was developed to account for an increased human sensitivity to nighttime noise levels and for the greater potential annoyance of noise during the nighttime hours. The actual nighttime noise levels are adjusted, based on the premise that both exterior and interior noise levels are generally lower than daytime levels and, therefore, nighttime noise can be more noticeable (than daytime conditions at the same location). Also, since most people sleep at night, there is often an increased sensitivity to intrusive noises. The day-night noise level, abbreviate Ldn, is the energy-average A-weighted sound level over a 24-hour period with an added 10 dB adjustment (penalty) for sounds that occur between 10 p.m. and 7 a.m. **CNEL**, or Community Noise Equivalent Level was developed in California for evaluating noise levels in residential communities. The CNEL is similar to the Ldn, but differs in that a 5 dB evening penalty is also added to sounds that occur between 7 p.m. and 10 p.m. (as well as the Ldn penalty of +10 dB for nighttime sounds). In a large percentage of cases for general community noise, the Ldn and CNEL can be considered as equivalent.

Table 6.12-18 –Summary of 24-hour Ambient Noise Level Metrics, A-wtd Sound Pressure Level

LOCATION	BRIEF DESCRIPTION	24-HOUR LEQ, DBA	LDN, DBA	CNEL, DBA
LT-1	South of closest house.	38.2	41.3	41.5

Source: Alliance Acoustical Consultants, Inc., 2007

Generally speaking, these long-term noise metrics indicate a fairly quiet environment as would be expected for a sparsely populated, rural area with few significant noise sources. As previously mentioned, the major consistent noise source in the area is from traffic flows on SR-76. These flows were observed to be considerable during the daytime and evening hours. The flow of cars and trucks was reduced during the late-night hours, but was still noteworthy in terms of overall noise level contributions around the project site and adjoining areas.

Short-term Noise Levels. In addition to the long-term, A-weighted monitoring efforts, additional locations were studied in terms of short-term (i.e. approximately 15 minute) sampling to investigate the noise characteristics of other nearby sensitive receptors. These short-term measurements are summarized in Table 6.12-19.

Table 6.12-19 –Summary of Short-term Ambient Noise Level Measurements

LOCATION	BRIEF DESCRIPTION	SHORT-TERM MONITORING PERIODS [DATE WITH START TIME AND DURATION IN HR:MIN:SEC] AND ASSOCIATION A-WTD L_{EQ} SOUND LEVELS		
		Mid-day	Evening	Nighttime
ST-1	At main entrance to Zalinda Farms Nursery (in turn-out).	4/19/07 (Thur) 15:14:47 0:16:14 53.6 dBA	4/18/07 (Wed) 20:32:45 0:12:14 63.6 dBA/	4/19/07 (Thur) 2:00:00 0:14:58 58.9 dBA
ST-2	At driveway of second closest house (currently vacant).	4/19/07 (Thur) 14:45:00 no data due to strong winds	4/18/07 (Wed) 21:15:00 0:15:00 45.6 dBA	4/19/07 (Thur) 1:29:00 no data due to meter problem

Source: Alliance Acoustical Consultants, Inc., 2007

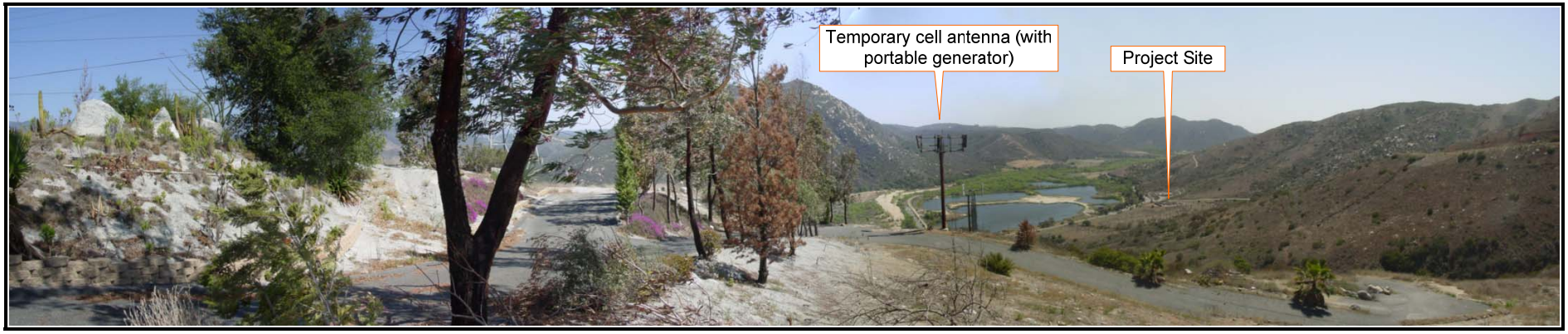
Note that Location ST-1, by the nursery entrance and close to the on-site caretakers' houses, is completely shielded from the Project site by a large hillside that would effectively block most noise emissions from the plant equipment. Location ST-2 is further northward up the ridgeline from Location LT-1. Being farther away from both SR-76 and the Project site, it would be expected to experience lower noise levels from both these sources. Noise measurements at Location ST-2 were somewhat hampered by the operations of a portable electricity generator powering a temporary cellular antenna installation that was approximately 100 feet down the hill from the ST-2 location. Selected photographs for Locations ST-1 and ST-2 are given in Figures 6.12-10 and 6.12–11.

Figure 6.12-10 – Photographic views of Ambient Location ST-1

TRC	Project: **Orange Grove Project - SPPE Application**
	Source: Alliance Acoustical Consultants, Inc., 2007

Figure 6.12-11 – Photographic views of Ambient Location ST-1

Figure 6.12-12 – Photographic Views associated with Ambient Location ST-2



TRC	Project: **Orange Grove Project - SPPE Application**
	Source: Alliance Acoustical Consultants, Inc., 2007

Figure 6.12-13 – Photographic Views associated with Ambient Location ST-2

TRC	Project: **Orange Grove Project - SPPE Application**
	Source: Alliance Acoustical Consultants, Inc., 2007

Figure 6.12-14 – Photographic Views associated with Ambient Location ST-2

Project: **Orange Grove Project - SPPE Application**

Source: Alliance Acoustical Consultants, Inc., 2007

Spectral Noise Levels. To establish the existing spectral characteristics near the Project site, a representative location was chosen to make frequency-band measurements at different times of the day. These octave-band measurements are summarized in Table 6.12-20.

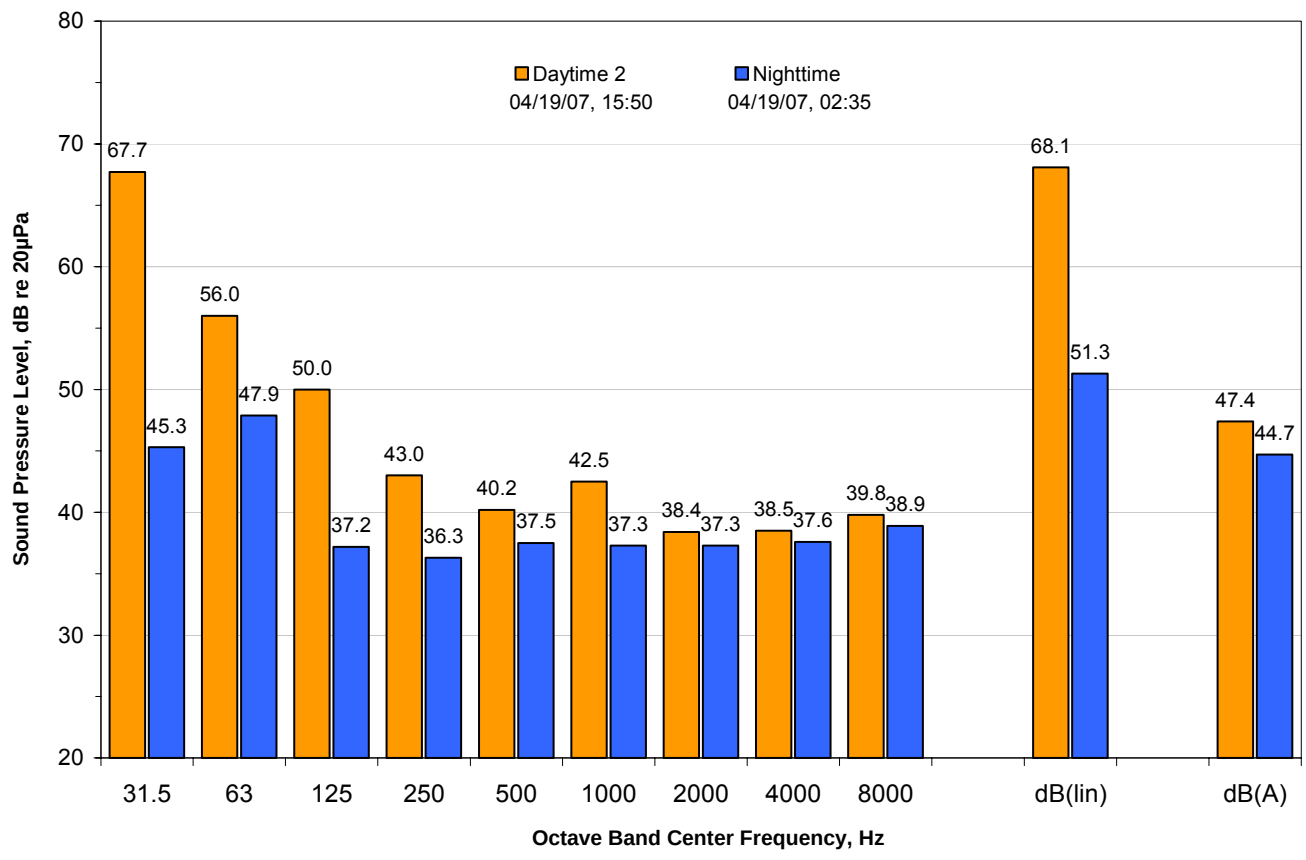
Table 6.12-20 – Summary of Spectral (Octave Band) Noise Level Measurements

Location	Brief Description	Short-term Monitoring Periods [date with start time and duration in hr:min:sec] and association A-wtd L_{eq} Sound Levels		
		Mid-day	Evening	Nighttime
SP	Pala del Norte Road, west of Project Site.	4/19/07 (Thur) 15:48:22 0:11:26 47.4 dBA	no sample	4/19/07 (Thur) 2:33:41 0:10:17 44.7 dBA

Source: Alliance Acoustical Consultants, Inc., 2007

The frequency-band record of sound levels for different times of the day and night at the Project Site is shown in Figure 6.12-15. This chart presents the pertinent sound levels in industry-standard octave bands at Location SP during the discrete sampling periods given above. These samples are representative of the Project Site during the indicated time periods.

Figure 6.12-15 – Ambient Noise Measurement Frequency-Band Record for Location SP



TRC

Project: **Orange Grove Project - SPPE Application**

Source: Alliance Acoustical Consultants, Inc., 2007

This Location SP spectral record is indicative of an environment that is primarily controlled by roadway noise sources. The daytime curve shape, in particular, is typical of traffic noise. Note how the A-weighted levels, separated by roughly 12 hours, are within 3 dB of each other. Given this result and the similar shapes of the curves in the bands that control the A-weighting function, the only significant parameter that is changing over the course of a typical 24-hour period is the amount of cars traversing the adjacent roadway.

Selected photographs for Location SP are shown in Figures 6.12-16 and 6.12-17.

Figure 6.12-16 – View of Location SP, looking toward Project Site (SE)

Figure 6.12-17 – View of Location SP, looking toward SR-76 (SW)

Project: **Orange Grove Project - SPPE Application**

Source: Alliance Acoustical Consultants, Inc., 2007

In summary, the general ambient noise environments around the Pala Project Site, as measured and observed in April of 2007, are condensed in Table 6.12-21.

Table 6.12-21 – Summary of Orange Grove Project Ambient Noise Environments

Location	Brief Description	General Noise Environment
LT-1	South side of closest house.	Traffic noise on Hwy 76 is dominant during the daytime. In the evening, traffic noise is still significant, but not as pronounced as during the daytime. Frogs and crickets are secondary contributors during the evening hours. Late-night levels are very quiet with sporadic traffic in the distance and no frogs/crickets. As this location is on a ridgeline, winds can be of note by blowing through the trees and rustling the vegetation on the property.
ST-1	At main entrance to Zalinda Farms Nursery (in turn-out).	As this location is just off the travel lanes for Hwy 76, traffic flow noise is the dominant noise source at all hours of the day and night. Only during lulls in traffic can other sources be heard (such as distant dogs barking, frogs, or crickets). Traffic flows were observed to be approximately 650 vehicles per hour during the daytime, 430 per hour during the evening, and 130 per hour late at night.
ST-2	At driveway of second closest house (currently vacant).	This location was subject to noise from a nearby 20 kW portable generator that appeared to be powering a temporary cellular antenna installation slightly down the hill from the house lot. Vehicles on the distant SR-76 were audible during most periods of the day and night, but did not dominate the noise environment. In the absence of the temporary generator, it is believed that this site would have noise levels that would be consistent with location LT-1. As this location is near the peak of a ridgeline, winds can be of note by blowing through the trees and rustling the vegetation on the property.
SP	Pala del Norte Road, near future secondary entrance to Project Site.	Traffic noise on Hwy 76 is dominant during the daytime and evening hours. Distant frogs, crickets, and dogs are secondary contributors during the evening hours. Reduced late-night levels are from the sporadic traffic with some contributions from frogs, crickets, and dogs.

Source: Alliance Acoustical Consultants, Inc., 2007

6.12-B. B

APPENDIX 6.12-B – CONSTRUCTION NOISE ANALYSIS

1.0 Introduction

Noise impacts from construction activities on any given industrial project site are a function of the noise generated by individual construction equipment items, the equipment location, and the timing and duration of the noise-generating activities. For this project, there will be several phases of construction activities. These phases include Site Preparation, Excavation, Foundation Placement, Plant and Building Construction, and Exterior Finish and Cleanup. In general, the number, type, distribution, and usage of construction equipment will differ from phase to phase. That is, not all the equipment associated with a particular project is used in each phase of construction. Further, the equipment that will be used is not generally operated continuously, nor is the equipment necessarily operated simultaneously. All these level-weighting and time-weighting factors must be accounted for to calculate an aggregate noise emission level for each phase.

The Orange Grove Project construction process will be centered around the power block of the new plant, a relatively small area on the Project site. Since the construction zone is relatively small, a single centroid was used to define the aggregate equipment noise for the construction noise evaluations. The total construction period is envisioned to be over approximately 6 months.

2.0 Methodology

The noise levels from demolition and construction activities will vary during the different activity periods, depending upon the activity location(s) and the number and types of equipment being used. Given the complexity, both spatially and in timing, of the future construction and demolition noise emissions for the Project, the currently-planned, preliminary construction equipment lists, plus the envisioned schedules[8] were used to establish the number and type of each equipment item and their respective locations on the industrial site.

Both the U.S. EPA Office of Noise Abatement and Control and the Empire State Electric Energy Research Company have extensively studied noise from individual pieces of construction equipment as well as from construction sites of power plants and other types of facilities (U.S. EPA, 1971; Barnes et al., 1976). Although these studies were done several years ago, they remain the industry standards for the estimated base noise emissions from construction/demolition equipment and the associated noise impact analysis. Further, use of this data is considered to be conservative since the evolution of construction equipment has been toward quieter designs to protect both operators from exposure to high noise levels and the community from undue noise intrusion. Table 6.12-22 presents noise levels from common construction equipment at various distances per these industry references[9]. Note that these typical noise levels at distances away from the equipment item (beyond 50 feet) are conservative since the only attenuating mechanism considered was divergence of the sound waves in open air.

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8 Information provided by TRC and Sega (an engineering and construction company retained by J Power USA).

9 At typical operations loading and in terms of energy-average sound levels at standardized distance of 50 feet from the source.

Attenuation from air absorption, ground effects, and shielding from intervening topography or structures are not included in these tabled calculations.

Table 6.12-22 – Noise Levels from Common Construction Equipment at Various Distances

CONSTRUCTION EQUIPMENT	TYPICAL SOUND PRESSURE LEVEL AT 50 FEET (DBA)	TYPICAL SOUND PRESSURE LEVEL AT 500 FEET (DBA)	TYPICAL SOUND PRESSURE LEVEL AT 1,500 FEET (DBA)
Dozer (250-700 hp)	88	68	58
Front End Loader (6-15 cu. yards.)	88	68	58
Trucks (200-400 hp)	86	66	56
Grader (13 to 16 ft. blade)	85	65	55
Shovels (2-5 cu. yards.)	84	64	54
Portable Generators (50-200 kW)	84	64	54
Derrick Crane (11-20 tons)	83	63	53
Mobile Crane (11-20 tons)	83	63	53
Concrete Pumps (30-150 cu. yards.)	81	61	51
Tractor (3/4 to 2 cu. yards.)	80	60	50
Un-quieted Paving Breaker	80	60	50
Quieted Paving Breaker	73	53	43

Source: USEPA, 1971; Barnes et al., 1976.

After finding the appropriate listing of equipment items for each activity timeframe, the methodology outlined by the Construction Engineering Research Laboratory (CERL) and reported in Construction-Site Noise Control Cost-Benefit Estimating Procedures (published in 1978), was used to aggregate the total average noise level, by phase or operation. The CERL aggregation methodology considers the type and number of construction/demolition equipment items used, individual equipment noise emissions, and per-item, time-usage factors to estimate the noise levels during each phase of construction/demolition.

Using these calculated worst-case aggregate noise emission factors, the propagation of construction/ demolition noise sources from the primary activity zone to each receptor of concern was analyzed. The first aspect in the propagation analysis was incorporating a 6 dB per doubling-of-distance attenuation rate for spherical spreading loss. For example, a noise source of 90 dBA at 50 feet from the source would generate a noise level of 84 dBA at 100 feet from the source, 78 dBA at 200 feet from the source, and so forth. Then, a nominal reduction term for barrier attenuation and/or ground effects attenuation was applied. For example, intervening hillside and ridgelines to the north and east of the Project site will afford some sound barrier benefit to on-site construction noise energy propagating toward receptor ST-1. These spreading loss and barrier/ground effect attenuation terms were applied to each phase's aggregate noise level contribution, with respect to the individual receptors.

The noise levels from construction activities will vary during the different activity periods, depending upon the activity location(s) and the number and types of equipment being used.

Typical types of construction equipment are expected for this project, including trucks, cranes, dozers, backhoes, and compressors. The mix of equipment that is expected to be used during the construction program was provided by Sega. These equipment mixes were consistent with the CERL methodology, so the noise level summations, by phase, were used for further construction impact assessment. These aggregate noise levels by phase are summarized in Table 6.12-23.

Table 6.12-23 – Standard Construction Equipment Aggregate Noise Emissions Values

CONSTRUCTION PHASE	AGGREGATE EQUIPMENT NOISE LEVEL, SOUND PRESSURE LEVEL AT 50 FEET (DBA)
Site Clearing	84
Excavation	89
Foundations	77
Building Construction	84
Finishing	89

Source: USEPA (BBN), 1971

The highest site-average sound levels (89 dBA) are associated with the excavation and finish phases of construction. It is important to bear in mind that these noise estimates are adjusted for time-usage factors, varying power settings, and would not be continuous noise emissions. Construction noise would vary throughout the build-out of the project according to specific activities, location, orientation of the activities, and changing equipment operations.

For the construction noise impact analyses, the worst-case periods of activity were investigated to calculate their respective noise emissions into the surrounding community. The analyses used the same receptor locations as were used for the ambient survey, as well as additional locations, mostly to the north and south of the industrial site. These receptor locations for the construction analysis are shown on Figure 6.12-18.

Using the worst-case periods of activity, along with spreading loss factors and topographical barrier effects, the predicted noise levels at the pertinent receptor locations in the surrounding community were calculated. The results of this worst-case analysis are given in Table 6.12-24, which compares the predicted construction noise levels at each receptor location to the existing ambient noise environment.

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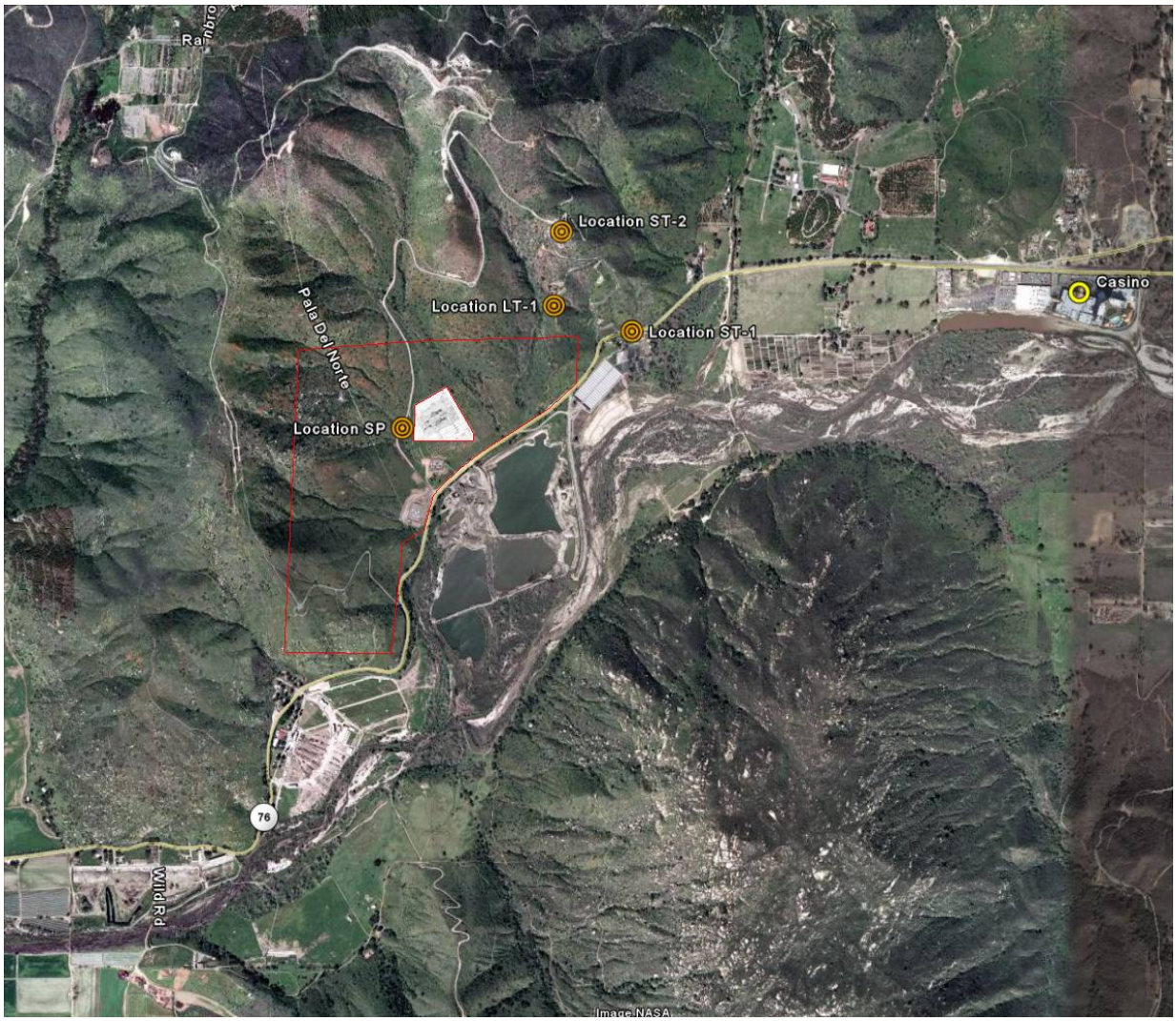
Figure 6.12-18 – Map of Construction Noise Analysis Locations



TRC	Project: **Orange Grove Project - SPPE Application**
	Data Source: Alliance Acoustical Consultants, Inc. Map Source: Google Earth – Coordinates NAD27

Table 6.12-24 – Predicted Project Construction Noise Levels Compared to Existing Ambient Sound Levels

RECEPTOR LABEL	RECEPTOR DESCRIPTION	HIGHEST PREDICTED CONSTRUC-TION A-WTD SOUND LEVEL, DBA	MEASURED EXISTING DAYTIME L_{EQ} NOISE LEVELA, DBA	DIFFERENCE BETWEEN CONSTRUCTI ON NOISE AND AMBIENT, DB
Community Receptor Locations (inhabited)				
LT-1	South side of closest house.	48	35	+13
ST-1	At main entrance to Zalinda Farms Nursery (in turn-out).	27	54	-27
ST-2	At driveway of second closest house (currently vacant).	44	~35[b]	+9
House B	Third house up ridgeline from LT-1 and ST-2 houses.	41	~35[b]	+6
House C	South of Project site near base of large hill.	28	~35[b]	+7
Casino	Pala Casino and Spa Resort.	<25	~45 (estimate)	-20

Source: Alliance Acoustical Consultants, Inc., 2007
Notes: [a]. nominal Leq value across the daytime hours.
[b]. estimated value from similar locations and conditions.

As shown in this table, the majority of inhabited (community) receptor locations may be expected to have construction-related noise levels that would be from 6 to 13 dB above the general existing ambient level. For these locations, construction noise would be expected to be clearly audible during most of the daytime hours, depending on the actual, on-site construction activities, as well as the actual, moment-to-moment traffic conditions on SR-76. These periods of perceptibility are not considered significant, however, based on the temporary nature of the construction phases and the intermittent duration of the worst-case activities.

Other locations, that are behind hillsides (such as ST-1) or are large distances from the project site (such as the Casino), would have construction-related noise levels well below current daytime ambient levels and on-site activities would be inaudible at these community locations.

In summary, the worst-case construction noise levels are expected to be clearly audible at the closest receptors, as compared to the current ambient conditions. However, due to the small number of inhabitants, the short-term nature of these activities, and their limitation to daytime hours (per the County Code), these construction noise levels will be less than significant.

6.12-C. B

APPENDIX 6.12-C – POWER PLANT PREDICTIVE NOISE MODELING AND ANALYSIS

1.0 Introduction

To analyze the proposed project and the possible noise mitigation options, a PC-based noise prediction program was used to simulate and model the noise propagation from the proposed Orange Grove Project. This proprietary, in-house model uses industry-accepted propagation algorithms based on standards written by CONCAWE[10]. The calculations account for classical sound wave divergence (spherical spreading loss with adjustments for source directivity from point sources) plus attenuation factors due to air absorption[11], basic ground effects, and barrier/shielding. This model has been validated over the years via noise measurements at several operating plants that had been previously modeled during the engineering design phases.

2.0 Future Orange Grove Project Noise Environment Analysis

The modeling study for the proposed Project used plant layout configurations and equipment information as supplied by J-Power USA and Sega (an Engineering and Construction company retained by J Power USA)). All continuous-operation equipment items that were deemed to be significant noise sources at the proposed Project were included in the noise model. Specifically, the study focused on the potential noise generated by the proposed two trains of gas-fired combustion turbines (General Electric LM 6000's), inlet chiller/cooling tower, fin/fan oil-to-air coolers, water pumps, power transformers, and other associated process and support equipment. Items that were considered insignificant sources, such as pumps less than 20 horsepower, were excluded from the analysis. The pertinent project drawings[12] were used to establish the overall noise analysis area and the position of the noise sources, respectively.

Per the permit application, the plant was assumed to operate 24 hours per day at maximum loads, which means its noise output would be constant, regardless of time-of-day. This scenario is conservative because electricity demand normally ramps downward at night when commercial activities decline and when residential usage decreases (as people turn off lights, televisions, and appliances before going to sleep). Further, as a peaking plant, operations past 10 p.m. would only be in very rare instances wherein the CAISO would call for peak-demand power. These very rare instances are estimated to be on the order of 40 hours per year over a 20 to 40 day period in the hottest months. The operation of this plant beyond midnight would connote that there is a serious problem on the power grid and such late-night operations could be categorized as ‘exceedingly rare’ (to the point of ‘almost never’ occurring). Nevertheless, the modeling was

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10 CONCAWE is the oil companies' European organization for environment, health, and safety and is headquartered in Brussels, Belgium. The noise propagation standard was originally published in 1981 under the title "The propagation of noise from petroleum and petrochemical complexes to neighboring communities". Parts of this method are also included in the ISO 9613, ISO 1913 (Part 1), ANSI 12.6, or ISO 3891 standards.

11 Atmospheric absorption assumed "standard-day" conditions of 59° F and 70 percent relative humidity. More advanced effects due to wind, inversion, and gradient conditions are discussed later in this section.

12 "Orange Grove Project, Site Layout Plan”, Sega drawing number 07-098-C100, rev. D, of 4/13/07. “Existing Manmade Features and Sensitive Receptors”, TRC drawing Figure 6.9-3, undated. USGS quad map 33117-C1-TF-024, Pala, California, photorevised 1988.

performed assuming 24 hours of maximum loads to assess the potential noise environment at all hours of the day and night.

The new plant was modeled as an open-air plant. That is, potential barrier effects from the small service building and the water storage tanks were neglected. Some of the support systems, however, such as the fuel gas compressors and the chillers, are currently planned to be inside buildings and/or enclosures. These structures will provide acoustical benefits in substantially containing the equipment noise emissions from these systems. Topographical features are important to this site and the ridgelines around the Site were included in the noise prediction model. A reasonable attenuation factor for vegetation (e.g. trees and ground cover, both existing and future) was considered. Lastly, as is standard practice in the description of environmental noise, stable atmospheric conditions were assumed (suitable for reproducible measurements and that are favorable for noise to travel greater distances). These inherent conservative factors and assumptions result in a noise model that tends be biased to higher predicted values than would be expected in the actual environment around the Project.

The source and receptor locations/elevations were translated into x, y, z input coordinates for the noise modeling program. Calculations in the model are performed using octave band sound power levels (abbreviated PWL or Lw) as inputs from each noise source. Rather than use estimated source inputs levels that can be calculated from accepted industry references[13], the modeling inputs used noise emission values that were obtained from equipment vendors on several recent design efforts on similar peaker plants, most notably from the Miramar Energy Facility (MEF I) project in San Diego, California. This use of vendor-supplied noise level information for the specific equipment that is planned for the Orange Grove Project means that the modeling has a higher level of accuracy, as compared to modeling done with generic type and size information for the power plant equipment.

The inputs to the noise prediction model are given in Table 6.12-25 on the following page.

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[13] Such as the Edison Electric Institute Technical Report, "Electric Power Plant Environmental Noise Guide"

Table 6.12-25 – Predictive Noise Model Inputs

Input file name: OGP_nc5a Units: English

Receptors

Name	X	Y	Z
Loc LT-1	4665	4983	563
Loc ST-1	5726	4636	346
Loc ST-2	4743	5926	867
Loc SP	2644	3368	390
SDGE Yard	3113	2933	365
House B	4294	7076	1220
House C	6253	1958	410
Casino	11411	5207	370

Sources

			Coordinates			Octave Band Sound Power Level, PWL, dB							
Number	Name	Dir'y	X	Y	Z	63	125	250	500	1k	2k	4k	8k
1	GTG1AirInlet	0	3068	3586	443	104	99	97	85	80	79	87	87
2	GTG1Turbine	3	3044	3573	424	97	101	100	97	89	87	87	83
3	GTG1TrbVent	3	3049	3549	426	98	93	92	84	82	76	77	72
4	GTG1Generator	3	3021	3559	424	100	107	100	94	88	85	88	76
5	GTG1GenVent	3	3007	3569	426	101	101	90	77	73	70	67	64
6	GTG1ExhSurface	3	3070	3587	420	98	108	100	84	84	86	78	71
7	GTG1TmpFan1	3	3093	3577	414	100	95	94	86	84	78	79	74
8	GTG1TmpFan2	3	3089	3566	414	100	95	94	86	84	78	79	74
9	GTG1FinFan	3	3006	3531	420	104	101	99	94	90	92	90	89
10	GTG1Xfrmr	3	2963	3471	422	103	97	97	92	86	83	80	80
11	SCR1ExpJoint	3	3076	3591	420	110	102	96	89	86	83	85	88
12	SCR1Case_N	3	3100	3615	435	110	103	100	90	76	72	70	59
13	SCR1Case_S	3	3110	3599	435	110	103	100	90	76	72	70	59
14	SCR1StkExh	0	3136	3625	465	118	105	94	83	78	75	75	77
15	GTG2AirInlet	0	3131	3482	443	104	99	97	85	80	79	87	87
16	GTG2Turbine	3	3106	3468	424	97	101	100	97	89	87	87	83
17	GTG2TrbVent	3	3110	3444	426	98	93	92	84	82	76	77	72
18	GTG2Generator	3	3082	3454	424	100	107	100	94	88	85	88	76

19	GTG2GenVent	3	3070	3462	426	101	101	90	77	73	70	67	64
20	GTG2ExhSurface	3	3132	3483	420	98	108	100	84	84	86	78	71
21	GTG2TmpFan1	3	3123	3511	414	100	95	94	86	84	78	79	74
22	GTG2TmpFan2	3	3134	3506	414	100	95	94	86	84	78	79	74
23	GTG1FinFan	3	3067	3427	420	104	101	99	94	90	92	90	89
24	GTG2Xfrmr	3	2996	3415	422	103	97	97	92	86	83	80	80
25	SCR2ExpJoint	3	3137	3486	420	110	102	96	89	86	83	85	88
26	SCR2Case_N	3	3160	3511	435	110	103	100	90	76	72	70	59
27	SCR2Case_S	3	3172	3492	435	110	103	100	90	76	72	70	59
28	SCR2StkExh	0	3197	3520	465	118	105	94	83	78	75	75	77
29	ChillerModule	3	3112	3537	418	80	79	85	85	86	90	89	75
30	Cooling Tower	3	3131	3548	420	95	96	94	88	80	76	74	73
31	DeminWtrSkid	3	3310	3727	413	79	82	82	86	84	84	80	77
32	Aux Xfrmr1	3	2860	3494	416	96	88	84	80	78	74	74	69
33	Aux Xfrmr2	3	2876	3504	416	96	88	84	80	78	74	74	69
34	Aux Xfrmr3	3	2893	3513	416	96	88	84	80	78	74	74	69
35	Aux Xfrmr4	3	2908	3522	416	96	88	84	80	78	74	74	69
36	GasMeteringStation	3	3406	3584	413	82	85	87	89	90	88	83	76
37	FuelGasCompressor	3	3345	3541	415	80	76	81	76	73	74	67	62
38	GasCmprsrFinFan	3	3317	3563	420	104	101	99	94	90	92	90	89

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3.0 Future Orange Grove Project Noise Environment Results

The computer outputs are in terms of octave band and overall A-weighted sound pressure levels (abbreviated SPL or Lp) at specific receptor positions or at grid map nodes (in preparation for computing a contour map). The output listing is ranked by relative noise contribution from each noise source, as is calculated at each receptor location. The modeling effort used the same receptors for the future conditions analysis as were used during the April 2007 ambient survey.

Many modeling runs were made over the course of the project's development, in response to changes in layout, planned equipment, and operations conditions. For each modeling scenario, the ranked listing of noise contributors at each receptor location was studied to evaluate which set of equipment should have noise control options applied. This iterative analysis approach enabled the use of a balanced and reasonable set of noise control treatments could be employed to achieve compliance with both the County's and the Commission's significant impact thresholds.

The compliant noise levels were achieved using the following extensive array of design features:

- Implementation of substantial silencing in the exhaust path within the SCR (pre-catalyst bed, post-catalyst bed, or in the stack);
- Low-noise sound level specifications for the combustion turbine air inlets, filters, and compartments (including compartment vent silencers);
- Low-noise sound level specifications for the chiller/cooling tower system (and secondary/support equipment items);
- Low-noise sound level specifications for the fin/fan oil-to-air coolers (including low-speed fans);
- Low-noise package and/or enclosures around process equipment skids (e.g. ammonia injection and water injection skids);
- Low-noise sound level specifications for the major pumps (possibly using enclosures and/or casing blanket packages);
- Enclosures around the tempering/dilution air fan systems;
- Housing the fuel gas compressors inside an acoustically treated building;
- Noise mitigation strategies for the heating, ventilation, and air conditioning (HVAC) systems; and
- Low-noise sound level specifications for the transformers.

These design features are viewed as pushing the bounds of technical feasibility for this type of plant and its complement of equipment. Further analyses during the detailed design phase of the Project may be able to refine the details of these mitigation features, but are not expected to substantially increase the overall noise reduction benefits.

The results of the predictive modeling efforts are summarized in Tables 6.12-26 and 6.12-27 for the San Diego County regulations during the daytime and nighttime periods, respectively. Table 6.12-28 summarizes the results with respect to the CEC guideline for late-night L_{90} plus 5 dB.

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Table 6.12-26 – Comparison of Predicted Noise Levels from Project On-Going Operations to County of San Diego DAYTIME Noise Level Limits

Receptor Label	Receptor Descriptions	County of San Diego Land Use Type	NOMINAL County of San Diego DAYTIME Noise Level Limit, Hourly Leq, dBAb	Measured Existing Ambient DAYTIME Leq Noise Level, dBA	EFFECTIVE County of San Diego DAYTIME Noise Level Limit, Hourly Leq, dBAc	Predicted Project Operations Noise Contributions, dBA	Difference between total future environment and San Diego Effective Limit, dB
Existing Community Locations subject to County of San Diego Municipal Code							
LT-1	South of closest house.	Rural Res. (RR)	50	35-38	50	35	12 dB under limit
ST-1	At main entrance to Zalinda Farms Nursery (in turn-out)	Rural Res. (RR)	50	54	54	19	No change to existing ambient conditions
ST-2	At driveway of second closest house (currently vacant)	Rural Res. (RR)	50	46d	50	30	No change to existing ambient conditions
SP	Pala del Norte Road, near future secondary entrance to Project Site	Border of Ind. and Open Space	62.5	48	62.5	58	>4 dB under limit
House B	Further up ridgeline, north of LT-1 and ST-2	Rural Res. (RR)	50	<35e	50	30	>14 dB under limit
House C	South of nursery, near base of large hill	Rural Res. (RR)	50	<35e	50	31	>14 dB under limit
Casino	Pala Resort and Casino	Recreation Residential (RRO)	55	Not avail.	55f	24	No change to existing ambient conditions

Source: Alliance Acoustical Consultants, Inc., 2007

Notes:
a. April 2007 Ambient Survey Locations that are not residential areas (and, therefore, not relevant to this comparison) are not listed.
b. San Diego noise level limits as written into the Municipal Code.
c. Allowance in the San Diego Municipal Code for situations wherein the existing ambient noise is higher than the as-written limit.
d. Using evening time period data (which is artificially influenced by operations of nearby portable generator).
e. Estimated, using measurement data from similar locations.
f. Effective limit is assumed to be the same as the nominal limit with no modification by the existing ambient.
g. Project noise levels will have zero contributions to the existing conditions and are expected to be inaudible.

As this table indicates, the San Diego Noise Standards will be met at surrounding sensitive land uses, given the existing ambient noise environments, which are sometimes higher than the nominal noise level limits. Therefore, the Project will comply with the San Diego Noise Daytime Standards.

Table 6.12-27 – Comparison of Predicted Noise Levels from Project On-Going Operations to County of San Diego NIGHTTIME Noise Level Limits

Receptor Label	Receptor Descriptions	County of San Diego Land Use Type	NOMINAL County of San Diego Nighttime Noise Level Limit, Hourly Leq, dBAb	Measured Existing Ambient Nighttime Leq Noise Level, dBA	EFFECTIVE County of San Diego Nighttime Noise Level Limit, Hourly Leq, dBAc	Predicted Project Operations Noise Contri-butions, dBA	Difference between total future environment and San Diego Effective Limit, dB
Existing Community Locations subject to County of San Diego Municipal Code							
LT-1	South side of closest house.	Rural Res. (RR)	45	30-33	45	35	9 dB under limit
ST-1	At main entrance to Zalinda Farms Nursery (in turn-out)	Rural Res. (RR)	45	59	59	19	No change to existing ambient conditions
ST-2	At driveway of second closest house (currently vacant)	Rural Res. (RR)	45	46d	45f	30	No change to existing ambient conditions
SP	Pala del Norte Road, near future secondary entrance to Project Site	Border of Ind. and Open Space	60	45	60	58	2 dB under limit
House B	Further up ridgeline, north of LT-1 and ST-2	Rural Res. (RR)	45	<30e	45	30	12 dB under limit
House C	South of nursery, near base of large hill	Rural Res. (RR)	45	<30e	45	31	11 dB under limit
Casino	Pala Resort and Casino	Recreation Residential (RRO)	50	Not avail.	50g	24	No change to existing ambient conditions

Source: Alliance Acoustical Consultants, Inc., 2007

Notes:
a. April 2007 Ambient Survey Locations that are not residential areas (and, therefore, not relevant to this comparison) are not listed.
b. San Diego noise level limits as written into the Municipal Code.
c. Allowance in the San Diego Municipal Code for situations wherein the existing ambient noise is higher than the as-written limit.
d. Using evening time period data (which is artificially influenced by operations of nearby portable generator).

e. Estimated, using measurement data from similar locations.
f. Under normal circumstances (w/o temporary, portable generator running), this house would be expected to have a nighttime ambient below 30 dBA.
g. Effective limit is assumed to be the same as the nominal limit with no modification by the existing ambient level.
h. Project noise levels will have zero contributions to the existing conditions and are expected to be inaudible.

As this table indicates, the San Diego Noise Standards will be met at surrounding sensitive land uses, typically with no change to the existing ambient noise environment. Therefore, the Project will comply with the San Diego Noise Nighttime Standards.

Table 6.12-28 – Comparison of Predicted Noise Levels from Project Operations to Existing Ambient Sound Levels, with respect to the CEC's +5 dB criterion.

Receptor Label	Receptor Description [a]	Measured Existing Ambient Nighttime L_{90} Noise Level, dBA	CEC Effective Plant Allowance (column 3 Levels + 5 dB)	Predicted Project Operations Noise Contributions, dBA	Total Future Noise Environment (Project plus existing L_{90}), dBA	Difference between total future environment and CEC criterion, dB
LT-1	South side of closest house.	27	32	35	36 (27 + 35 = 36)	4 dB over L_{90}+5 guideline
ST-1	At main entrance to Zalinda Farms Nursery (in turn-out)	33	38	19	33 (33 + 17 = 33)	5 dB under L_{90}+5 guideline and no change to existing conditions
ST-2	At driveway of second closest house (currently vacant)	34[b]	~39	30	~35 (34 + 30 = 35)	~4 dB under L_{90}+5 guideline
House B	Further up ridgeline, north of LT-1 and ST-2	~27-30[c]	~32-35	30	~32-33 (27 + 30 = 32) (30 + 30 = 33)	at guideline to ~2 dB under L_{90}+5 guideline
House C	South of nursery, near base of large hill	~27-30[c]	~32-35	31	~32-34 (27 + 31 = 32) (30 + 31 = 34)	at guideline to~1 dB under L_{90}+5 guideline

Source: Alliance Acoustical Consultants, Inc., 2007
Notes: a. April 2007 Ambient Survey Locations that are not residential areas (and, therefore, not relevant to this comparison) are not listed.
b. Using evening time period data (which is artificially influenced by operations of nearby portable generator.
c. Estimated, using measurement data from similar locations.

Table 6.12-28 shows that noise increases due to the Project will be less than 5 dB at all of the surrounding residential locations with respect to the lowest, late-night residual (L_{90}) noise metric, with the sole exception of Location LT-1. At this house, the closest to the project site, the predicted increase is predicted to be 9 dB above the measured late-night L_{90} level, due to this locations inherently low nighttime ambient noise levels. These low, late-night ambient levels are driven by the sporadic traffic flows on SR-76. While these intermittent vehicle pass-bys could be seen as being more intrusive or attention-getting than the steady-state noise output of a power plant, a 9 dB increase in the L_{90} (or equivalently in this case, a 5 dB increase in the hourly L_{eq} metric) is a considerable noise level increment.

While the project is envisioned to 'almost never' operate past midnight (since this would indicated a serious problem with the overall power grid), the 24/7 permit application enables at least the possibility of late-night operations that could impact the residents of this household.

For such circumstances (i.e., very low ambient levels and very few impacted households), the CEC has typically mandated secondary treatment of the receiving property; in addition to the primary mitigation strategy of noise control treatments to the project itself (Baker, 2007). These treatments to the receiving property could include one or more of the following potential remedies:

- upgrading the windows to acoustically-rated double- or triple-paned glazing systems;
- upgrading all exterior doors to acoustically-rated, solid-core doors;
- upgrading the ventilation/air-conditioning system to allow for interior climate control with all windows closed; and/or
- upgrading or installing suitable acoustical insulation in attic areas and crawlspaces.

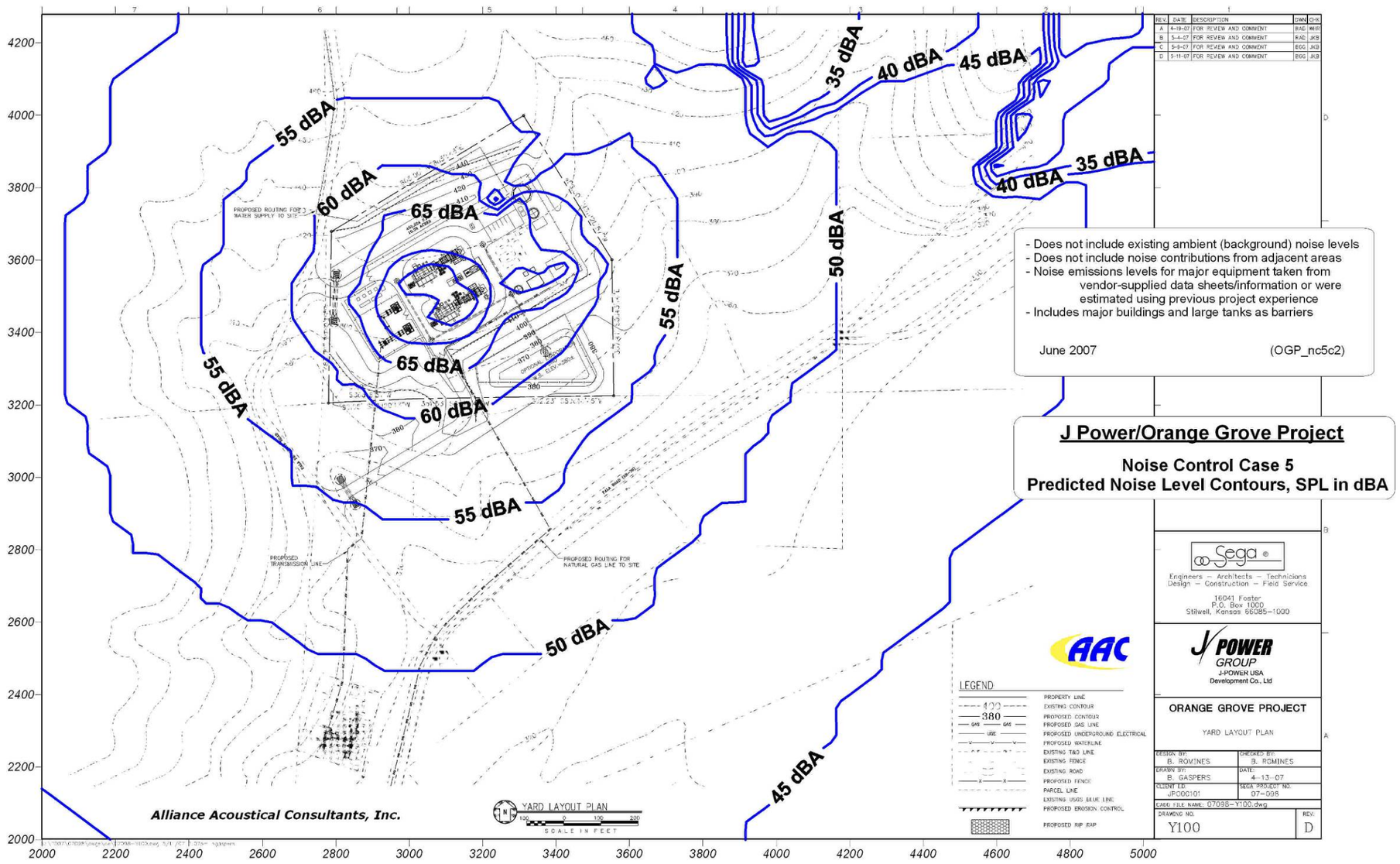
With these receptor-property upgrades, the Project would be considered to be in provisional compliance of the CEC's noise impact criterion.

4.0 Summary

Since the Project complies with the pertinent San Diego Standards as well as provisionally with the CEC's guidelines, it can be concluded that there are no residences, hospitals, libraries, schools, places of worship or other facilities where quiet is an important attribute of the environment where there is a potential significant impact from noise levels resulting from the Project's operations.

These compliance conditions are graphically given in Figure 6.12-19, which shows the predicted noise level contours for the Project contribution into the surrounding areas.

Figure 6.12-19 – Noise Contour Map of Predicted Project Contributions



TRC	Project: **Orange Grove Project - SPPE Application**
	Source: Alliance Acoustical Consultants, Inc., 2007