

CHAPTER 17

NOISE

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ENVIRONMENTAL SETTING

Approach to Analysis

This section evaluates potential noise impacts associated with the construction and operation of the proposed PWRP 2025 Plan and EIR within the context of the City of Palmdale General Plan, Noise Element, as well as the noise standards of the County Code. This analysis uses typical construction equipment noise levels to estimate the noise levels generated by construction of the proposed project. Typical noise levels associated with operation of such plants to investigate the noise levels expected to be generated by operation of the PWRP are also used.

Noise Principles and Terminology

Sound is defined as any pressure variation detected by the human ear. Noise is defined as any unwanted sound. The preferred unit for measuring sound is the decibel (dB). The dB expresses the logarithmic ratio of the amount of energy radiating from a source in the form of an acoustic wave. Zero dB corresponds roughly to the threshold of human hearing and 120 to 140 dB corresponds to the threshold of pain.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts on people, an electronic filter is used that de-emphasizes certain frequencies in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). Frequency A-weighting follows an international standard method of frequency de-emphasis and is typically applied to community noise measurements. In practice, the level of a sound source is conveniently measured using a sound level meter that includes an electronic filter corresponding to the A-weighting curve. Some representative noise

sources and their corresponding noise levels are shown in Table 17-1 and Figure 17-1. All of the noise levels reported herein are A-weighted unless otherwise stated.

**Table 17-1
Effects of Noise on People**

NOISE SOURCE	SOUND LEVEL (dBA)	PUBLIC REACTION
Threshold of Hearing	0	Very Quiet
Quite Rural Nighttime	20	
Soft Whisper	30	
Quiet Urban Nighttime	40	
Dishwasher in Next Room	50	Complaints Rare Complaints Possible
Conversational Speech	60	
Vacuum Cleaner	70	Complaints Likely Hearing Damage (8 hours)
Very Noisy Restaurant	80	
Food Blender	90	
Garbage Truck	100	Limits Amplified Speech
Live Rock Music	130	
Jet Plane	140	Threshold of Pain
Rocket Launching Pad	180	

Sources: Salvato, Joseph A., 1992, *Environmental Engineering and Sanitation, Fourth Edition*; Plog, Barbara A., 1996, *Fundamentals of Industrial Hygiene, Fourth Edition*.

Community Noise Environment

Community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources that constitute a relatively stable background noise exposure. The background noise exposure changes over a typical day, but does so gradually, corresponding to the addition and subtraction of distant noise sources such as traffic and atmospheric conditions. This time varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

- The equivalent sound level (L_{eq}) is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The L_{eq}

is the constant sound level that would contain the same acoustic energy as the varying sound level during the same time period (i.e., the average noise exposure level for a given time period).

- The instantaneous maximum noise level (L_{max}) for a specified period of time.
- Day-Night Average Noise Levels adds a 10-dBA “penalty” between the hours of 10:00 p.m. and 7:00 a.m.
- Community Noise Equivalent Level (CNEL) adds a 5-dBA penalty for the evening hours between 7:00 p.m. and 10:00 p.m., in addition to a 10-dBA penalty between the hours of 10:00 p.m. and 7:00 a.m.

It is important to compare a new noise source to the existing environmental noise to which sensitive receptors have become accustomed. With regard to increases in A-weighted noise level, it is widely accepted that the average healthy ear can barely perceive sound level changes of 3 dBA. A 5-dBA change in sound level is a readily perceptible increase in sound. A 10-dBA change in sound level is recognized as twice as loud as the original sound.¹

These relationships occur in part due to the logarithmic nature of sound and the decibel system. Because the decibel scale is logarithmic, two sound sources do not combine in a simple linear fashion, i.e. doubling, but rather combine logarithmically. For example, if two identical sound sources produced sound levels of 80 dBA, the combined sound source level would be 83 dBA.

Noise Attenuation

For any given noise source, the noise level naturally decreases as one moves further away from the source.

¹ California Department of Transportation (Caltrans), *Traffic Noise Analysis Protocol for New Highway Construction and Highway Reconstruction Projects*, 1998.

This basic attenuation rate is referred to as the geometric spreading loss. The basic rate of attenuation from geometric spreading loss depends on whether a given noise source is a point source or a line source. A point source of noise, such as an idling truck or piece of construction equipment, decreases at a rate of 6 to 9 dBA as distance from the source doubles.

For a line source of noise, such as a heavily traveled road, or a widely distributed noise, such as a large industrial facility spread out over many acres, the noise level decreases at a rate of 3 to 4 dBA for each doubling of distance between the noise and the receptor. Atmospheric conditions, such as wind and temperature gradients, can also influence noise attenuation from both point and line sources of noise. Atmospheric effects are constantly changing and are difficult to predict.

REGULATORY BACKGROUND

Noise Regulations, Plans, and Policies

In most areas, automobile and truck traffic is the primary source of environmental noise, but air and rail traffic, along with commercial and industrial activities, also play a part in environmental noise pollution. Federal, state, and local governments regulate different aspects of environmental noise. Federal and state agencies set noise standards for mobile sources, such as aircraft and motor vehicles, while local governments set standards for stationary sources, such as industrial facilities. Local regulation of noise is achieved through general plans and local noise ordinances.

CCR Title 4 has guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The state land use compatibility guidelines are listed in Figure 17-2.

In California, local regulation of noise involves implementation of general plan policies and noise ordinance standards. General plans identify general principles intended to guide and influence development

plans. They recognize that different types of land uses have different sensitivities to noise, residential areas being the most sensitive type of land use and industrial/commercial areas the least sensitive. Noise ordinances set forth the specific standards and procedures for addressing particular noise sources and activities.

Los Angeles County

The County regulates noise through the County Code, Title 12, Chapter 12.08, Noise Control. The exterior noise standards set by Chapter 12.08.390 are shown in Table 17-2. In addition, Chapter 12.08.0440 (Construction Noise) states that no construction equipment may operate between the hours of 7:00 p.m. and 7:00 a.m., Monday through Saturday, or at any time on Sunday or holidays, if the noise disturbance crosses a residential or commercial real property line. In

addition, contractors must conduct construction activities in such a manner as to comply with the noise limits shown in Table 17-3.

City of Palmdale

The City of Palmdale regulates noise through its Noise Ordinance, general plan, and Municipal Code. The Noise Ordinance (Section 84.05 [Noise Standards] of the Zoning Ordinance) states that any existing or proposed use shall control the source of the noise and conform to acceptable noise levels as indicated by the General Plan shown in Table 17-4. In addition, Section 8.28 of the Municipal Code (Building Construction Hours of Operation and Noise Control) states that no construction equipment may operate between the hours of 8:00 p.m. and 6:30 a.m., Monday through Saturday, or at any time on Sunday, if the

Table 17-2
Los Angeles County Exterior Noise Standards

LAND USE (RECEPTOR PROPERTY)	TIME INTERVAL	EXTERIOR NOISE LEVEL
Noise-sensitive area	Anytime	45 dBA
Residential properties	10:00 p.m. to 7:00 a.m.	45 dBA
	7:00 a.m. to 10:00 p.m.	50 dBA
Commercial properties	10:00 p.m. to 7:00 a.m.	55 dBA
	7:00 a.m. to 10:00 p.m.	60 dBA
Industrial properties	Anytime	70 dBA

Source: County, County Code, Title 12 Environmental Protection, Chapter 12.08.08.90, Exterior noise standards, 2004.

Table 17-3
Los Angeles County Noise Regulations for Construction Noise

	SINGLE-FAMILY RESIDENTIAL	MULTI-FAMILY RESIDENTIAL	SEMI-RESIDENTIAL/COMMERCIAL
Mobile Equipment – nonscheduled, intermittent, short-term operation (fewer than 10 days)			
Monday through Saturday, 7:00 a.m. to 7:00 p.m.	75 dBA	80 dBA	85 dBA
Daily, 7:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	60 dBA	64 dBA	70 dBA
Stationary Equipment – repetitively scheduled and relatively long-term operation (periods of 10 days or more)			
Monday through Saturday, 7:00 a.m. to 7:00 p.m.	60 dBA	65 dBA	70 dBA
Daily, 7:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	50 dBA	55 dBA	60 dBA

Source: County, County Code, Title 12 Environmental Protection, Chapter 12.08.440, Construction noise, 2004.

**Table 17-4
Palmdale General Plan Noise Regulations**

LAND USE	EXTERIOR	INTERIOR
Residential	65 dBA CNEL	45 dBA CNEL
Commercial-including, but not limited to: retail, services, and office	A noise level that does not jeopardize health, safety, and welfare of visitors	55 dBA Leq
Institutional-including, but not limited to: schools, hospitals, and nursing homes	A noise level that does not jeopardize health, safety, and welfare of visitors	45 dBA Leq
Industrial – including, but not limited to: industrial park, business park, and quarry	A noise level that does not interfere with normal business activity Maximum 65 Leq at the interface with residentially designated land	65 dBA Leq

Source: City of Palmdale, General Plan, 2004a.

noise disturbs any persons occupying sleeping quarters in a dwelling, apartment, hotel, mobile home, or other place of residence.²

Sensitive Receptors

The PWRP is located in a rural setting near the City of Palmdale in the Antelope Valley. The PWRP is completely surrounded by property owned by LAWA. Surrounding land uses include rural residential, agricultural, and vacant land. The Initial Study Area encompasses sparsely inhabited desert landscape, rural residential, and agriculture. The closest residential area to the PWRP is 3,000 feet south in the City of Palmdale. The closest commercial facility is 1,800 feet from the PWRP. The closest school is located 3,900 feet south of the PWRP.³ Figure 9-1 identifies residential structures near the storage reservoir and agricultural study areas. Some residences are located directly across the street from Agricultural Study Area No. 5.

Existing Noise Sources

Existing noise sources in the area surrounding the project area include vehicle traffic along local roads and aircraft noise. Aircraft flying in this airspace often cause supersonic booms that can be heard throughout

the Antelope Valley. Air Force aircraft utilizing EAFB and USAF Plant 42 in Palmdale contribute to the ambient noise level within the area.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Thresholds of Significance

Appendix G of the CEQA Guidelines provides guidance that can be used in the development of significance criteria. Based on this guidance, a project would normally result in a significant noise impact if it would:

- Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Expose persons to or generate excessive groundborne vibration or groundborne noise;
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;

² City of Palmdale, Municipal Code, 1986.

³ County Sanitation Districts of Los Angeles County, Comprehensive Emissions Inventory Report (CEIR) for the Palmdale and Lancaster Water Reclamation Plants, letter report, July 8, 2004.

- For a project located within an airport land use plan area or within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels; or
- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.
- If the noise level resulting from project operations would be within the normally acceptable range for a given land use (Figure 17-1), a 10-dBA or greater increase due to the project is considered significant.

Project operations would also be deemed significant if they would cause noise levels to exceed the property line noise standards established in local general plans or noise ordinances.

With regard to increases in A-weighted noise levels, as noted earlier, it is widely accepted that the average person can barely perceive noise level changes of 3 dBA, while a change in noise levels of 5 dBA is a readily perceptible increase in noise levels and the minimum required increase for a change in community reaction. With respect to temporary construction noise impacts, identification of “substantial increases” depends upon the duration of the impact, the temporal daily nature of the impact, as well as the absolute change in dBA levels and the time of day in which the noise occurs.

Methodology

The evaluation of potential impacts to the noise environment during construction of components of the PWRP 2025 Plan, is based on a qualitative assessment of general impacts associated with those components that would generate some construction-related noise that could affect sensitive receptors. A qualitative, rather than a quantitative, analysis for construction noise impacts is warranted due to the brief period during which construction noise would be expected to affect the most sensitive land uses and given that the location of individual project elements and their proximity to sensitive receptors is unknown. For operational phase impacts, this analysis includes a qualitative discussion of potential noise impacts and establishes noise performance standards for potential operational noise impacts that are identified.

With respect to project operations, this document considers changes in ambient noise levels from sources directly attributed to the proposed project. A sliding scale is commonly used for this purpose, allowing greater increases at lower absolute sound levels than at higher levels. The significance criteria for changes in noise from project operations are as follows:

Impact 17-1: Construction of each stage would cause intermittent and short-term increases in ambient noise levels.

- If the noise level resulting from project operations would exceed the normally acceptable range for a given land use (Figure 17-1) where the existing noise level exceeds the normally acceptable range, a 3-dBA or greater increase due to the project is considered significant.
- If the noise level resulting from project operations would exceed the normally acceptable range for a given land use (Figure 17-1) where the existing noise level is within the normally acceptable range, a 5-dBA or greater increase due to the project is considered significant.

The project would result in temporary and intermittent noise increases due to construction. Construction-related noise levels and vibration at and near the PWRP would fluctuate depending on the particular type, number, and duration of use of various pieces of construction equipment. Elevated noise levels would be associated with the use of heavy-duty construction equipment such as dozers, graders, and loaders. In addition, construction-related material haul trips would raise ambient noise levels along haul routes, depending on the number of haul trips made and the types of

vehicles used. The effect of construction noise would depend upon how much noise would be generated by the equipment, the distance between construction activities and the nearest noise-sensitive uses, the existing noise levels at those uses, and the time of day in which construction activities would occur. Table 17-5 shows typical noise levels during different construction stages for public works type projects, while Table 17-6 lists typical noise levels associated with different pieces of equipment. The highest construction noise levels associated within the construction of treatment plant facilities are anticipated to be generated by large trucks which can produce up to 83 dBA at 50 feet when noise muffling equipment is employed. The closest residences to the PWRP are over 2,000 feet to the south. Construction noise would attenuate to levels lower than 65 dBA at this distance.

Agricultural conversion and storage tank and reservoir construction activities would be spread out across large areas in remote portions of the County with few local residences or other sensitive receptors. Construction along pipeline routes will proceed at approximately 100 feet per day, limiting the duration of noise exposure at any single location. Once storage reservoir berms are established, they would act as noise barriers for activities within the reservoirs, such as liner placement. Twelve residences exist within Agricultural Study Area No. 5. Several residences are located across

the street to the north of Agricultural Study Area No. 5. One residence exists within Agricultural Study Area No. 6 and within Storage Reservoir Area No. 2.

In addition, the temporary increase in local traffic due to construction worker commute and haul and concrete truck traffic to and from the site would not be expected to add substantially to existing traffic and traffic-related noise.

Mitigation Measures

Mitigation Measure 17-1: District No. 20 shall implement procedures to reduce noise generation from project construction activities. Typical noise control procedures include the following:

- a) Require construction contractors to comply with the construction hour and day limitations established in local noise ordinances. Night-time construction would require approval from local jurisdictions.
- b) Require all construction contractors to locate fixed construction equipment (e.g., compressors and generators) as far as possible from noise-sensitive receptors.
- c) Equipment used in the construction of individual projects and management actions shall be muffled and maintained in good operating

**Table 17-5
Typical Construction Noise Levels**

CONSTRUCTION PHASE	NOISE LEVEL AT 50 FEET (Leq) ^a	APPROXIMATE DISTANCE (IN FEET) TO REDUCE NOISE TO GIVEN LEVEL (Leq) ^b		
		60	65	70
Ground Clearing	84	790	450	250
Excavation	89	1,400	800	450
Foundations	78	400	220	130
Erection	87	1,120	630	200
Finishing	89	1,400	800	450

Source: Bolt, Beranek, and Newman, 1971, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, December 1971.

^a Average noise levels 50 feet from the noisiest source and 200 feet from the rest of the equipment associated with a given construction phase. Noise levels correspond to office building, hotel, hospital, school, and public works construction.

^b Calculations assume a 6-dBA reduction for each doubling of distance from the noise source and do not take into account other noise attenuating features such as topography, intervening barriers, and ground surfaces.

**Table 17-6
Demolition and Construction
Equipment Source Noise Levels**

EQUIPMENT TYPE	TYPICAL EQUIPMENT AT 50 FEET (in dBA)	QUIETED EQUIPMENT AT 50 FEET (in dBA) ^A
Air Compressor	81	71
Backhoe	85	75
Concrete Pump	82	75
Concrete Vibrator	76	75
Concrete Breaker	82	75
Dozer	80	75
Generator	78	75
Loader	79	75
Paver	88	80
Water Pump	76	75
Trucks	88	83
Pile Drivers	101	95

Source: Bolt, Beranek, and Newman, 1971, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, December 1971.

^A Quieted equipment can be designed with enclosures, mufflers, or other noise-reducing features.

condition. Internal combustion engine-driven equipment shall be fitted with intake and exhaust mufflers that are in good condition.

- d) Equipment used in the construction of individual projects and management actions shall be muffled and maintained in good operating condition. Internal combustion engine-driven equipment shall be fitted with intake and exhaust mufflers that are in good condition.
- e) If pile driving or sheetpiling is required for facility construction, the contract specifications for those projects shall incorporate the following requirements:
- i. Wherever possible, sonic or vibratory pile drivers will be used in lieu of impact pile drivers.
 - ii. Wherever feasible, pile holes will be pre-drilled to reduce potential noise and vibration impacts.

- f) Additional noise attenuating measures include changing the location of stationary construction equipment and/or staging areas; shutting off idling equipment; rescheduling construction activities; requiring on-going construction noise monitoring to assure adherence to city/county construction equipment standards; and/or installing temporary barriers around stationary construction noise sources.

Mitigation Measure 17-2: District No. 20 shall distribute information to residents and noise-sensitive receptors in the affected areas several weeks in advance of operations that would generate noise in excess of local standards. The information distributed should include a brief description of the operations, including the duration of the project.

Significance After Mitigation

Less than significant.

Impact 17-2: Project operation could cause an increase in noise levels.

Operation of the proposed project could result in long-term noise increases. While some of the project elements would generate noise, many of these increases would not have a significant impact on noise levels in the area. For example, noise associated with maintenance and inspection activities required with expansion of the PWRP would be temporary and would occur infrequently. Likewise, while farm operations would generate occasional noise from tractors, such noise would be compatible with existing agricultural land uses in the project area. Lastly, increases in operational traffic on local roads would be expected to be too low to increase noise levels appreciably. Treatment equipment would be designed to minimize fence-line noise levels.

Among the noise-generating equipment likely to be included as part of the expansion of the plant are

pumps.⁴ Pumps are rated at a noise level of 76 dBA at a distance of 50 feet without controls or enclosures.⁵ In addition, simultaneous operation of multiple pumps would incrementally and logarithmically add to this noise level. Therefore, since a doubling of pumps would increase the noise level by 3 dBA, the operation of two pumps operating at 76 dBA would generate a composite noise level of 79 dBA. Building enclosures would act to attenuate noise impacts.

District No. 20 would design pump enclosures if necessary to comply with ambient noise thresholds

identified in the city and County noise ordinances. This generally will restrict ambient noise levels at the closest receptors to a threshold of 65 dBA CNEL or lower. Compliance with local noise ordinances would ensure that operational noise would not result in impacts to neighboring land uses or cause nuisance conditions.

Mitigation Measure

No mitigation measures are required.

Significance After Mitigation

Less than significant.

⁴ *Equipment such as back-up generators would be expected to operate infrequently (only for routine testing and maintenance or during an actual interruption in power from the utility grid), and therefore would not contribute substantially to the overall average noise exposure outside the project property boundary.*

⁵ *U.S. Environmental Protection Agency, Noise from Construction Equipment and Building Operations, Building Equipment, and Home Appliances, December 1971. This rating is also generally consistent with field data collected by Environmental Science Associates at pump station sites throughout California.*