3.9 NOISE

This section describes the existing noise environment and evaluates the potential noise and vibration impacts that could result from the proposed Avila Ranch Development Project (Project). This analysis addresses both short-term construction impacts and long-term operational noise impacts. Potential direct and indirect impacts resulting from construction and operational activities of the proposed Project are identified, and potential mitigation measures that could avoid or reduce impacts are recommended, where feasible. The information in this section is provided by the 2014 Land Use and Circulation Elements Update EIR (LUCE Update EIR), the City of San Luis Obispo General Plan Noise Element, and the Sound Level Assessment for Avila Ranch Project (Appendix O).

3.9.1 LUCE Update EIR

The 2014 LUCE Update EIR analyzed noise impacts for the City of San Luis Obispo (City) related to the adoption of the 2014 Land Use and Circulation Elements (LUCE), but did not provide a site-specific analysis of potential site-specific noise impacts for the Project site. The LUCE Update EIR identified unavoidable and significant short-term construction noise impacts due to construction of development projects such as the Project. The LUCE EIR included overall analyses of the impact of constructing up to 700 new housing units and 25,000 square feet (sf) of commercial space on the Project site, but did not address the details of such noise impacts at the Project site. Such development could generate short-term construction noise through the use of heavy construction equipment that exceeds the City's Noise Control Ordinance. The LUCE Update EIR also found that increased traffic volumes, noise from operation of new development, and construction of new noise-sensitive uses within airport noise contours could also create potentially significant impacts. However for these three issues, the EIR concluded that implementation of the proposed LUCE Update policies, and amendments to existing City policies, would reduce impacts to a less than significant level (City of San Luis Obispo 2014b).

3.9.2 Environmental Setting

3.9.2.1 Fundamentals of Sound and Environmental Noise

Noise

Sound is technically described in terms of the loudness (amplitude) and frequency (pitch) of the sound. Noise is typically defined as unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. Prolonged exposure to

high levels of noise is known to have several adverse effects on people, including hearing loss, communication interference, sleep interference, physiological responses, and annoyance. The noise environment typically includes background noise generated from both near and distant noise sources as well as the sound from individual local sources. These can vary from an occasional aircraft or train passing by to continuous noise from sources such as traffic on a major road.

The standard unit of measurement of the loudness of sound is the decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear. Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more useable range of numbers in a manner similar to the way that the Richter scale is used to measure earthquakes. In terms of human response to noise, studies have indicated that a noise level increase of 3 dBA is barely perceptible to most people, a 5 dBA increase is readily noticeable, and a difference of 10 dBA would be perceived as a doubling of loudness. Everyday sounds normally range from 30 to 100 dBA. Examples of various sound levels in different environments are shown in Table 3.9-1.

Several rating scales have been developed to analyze the adverse effect of community noise on people. Since environmental noise fluctuates over time, these scales consider the total acoustical energy content of the noise, as well as the time of day when the noise occurs. Each noise metric applicable to this analysis is defined as follows:

- L_{eq} (equivalent energy noise level) is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
- CNEL (Community Noise Equivalent Level) is a 24-hour average L_{eq} with a 5 dBA "weighting" during the hours of 7:00 PM to 10:00 PM and a 10 dBA "weighting" added to noise during the hours of 10:00 PM to 7:00 AM to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 CNEL.
- L_{dn} (day-night average noise level) is a 24-hour average L_{eq} with a 10 dBA "weighting" added to noise during the hours of 10:00 PM to 7:00 AM to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 L_{dn}.

Table 3.9-1. Representative Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Power Saw	—110—	Rock Band
Jet Fly-over at 100 feet		Crying Baby
Subway	—100—	
Gas Lawnmower at 3 feet		
Rail Transit Horn/ Tractor	—90—	
Jack Hammer		Food Blender at 3 feet
Rail Transit At-grade (50 mph)	—80—	Garbage Disposal at 3 feet
Noisy Urban Area during Daytime		
Gas Lawnmower at 100 feet	—70—	Vacuum Cleaner at 10 feet
Rail Transit in Station/ Commercial Area		Normal Speech at 3 feet
Heavy Traffic at 300 feet	—60—	Sewing Machine
Air Conditioner		Large Business Office
Quiet Urban Area during Daytime	—50—	Dishwasher in Next Room
		Refrigerator
Quiet Urban Area during Nighttime	—40—	Theater, Large Conference Room (background)
Quiet Suburban Area during Nighttime		
	—30—	Library
Quiet Rural Area during Nighttime		Bedroom at Night, Concert Hall (background)
	—20—	
		Broadcast/Recording Studio
	—10—	
Lowest Threshold of Human Hearing	—0—	Lowest Threshold of Human Hearing

Source: Caltrans 1998.

- L_{min} (minimum instantaneous noise level) is the minimum instantaneous noise level experienced during a given period of time.

  L_{max} (maximum instantaneous noise level) is the maximum instantaneous noise level experienced during a given period of time.

Noise levels from a particular source decline (attenuate) as distance to the receptor increases. Other factors, such as the weather and reflecting or shielding by buildings or

other structures, intensify or reduce the noise level at a location. A common method for estimating roadway noise is that for every doubling of distance from the source, the noise level is reduced by about 3 dBA at acoustically "hard" locations (i.e., mostly asphalt, concrete, hard-packed soil, or other solid materials) and 4.5 dBA at acoustically "soft" locations (i.e., contains natural earth or vegetation, such as grass).

Noise from stationary or point sources (including construction noise) is reduced by about 6 to 7.5 dBA for every doubling of distance at acoustically hard and soft locations, respectively. Noise levels may also be reduced by intervening structures. Generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm can reduce noise levels by up to 5 to 10 dBA. The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior noise reduction of newer residential units is generally 30 dBA or more.

Groundborne Vibration

Vibration is sound radiated through the ground. The vibration of floors and walls may cause perceptible vibration, rattling of items such as windows or dishes on shelves, or a rumble noise. The rumble is the noise radiated from the motion of the room surfaces. In essence, the room surfaces act like a giant loudspeaker causing what is called groundborne noise. Groundborne vibration is almost never annoying to people who are outdoors. Although the motion of the ground may be perceived, without the effects associated with the shaking of a building, the motion does not provoke the same adverse human reaction. In addition, the rumble noise that usually accompanies the building vibration is perceptible only inside buildings. The ground motion caused by vibration is measured as particle velocity in inches per second; in the U.S., this is referenced as vibration decibels (VdB) (Harris Miller Miller & Hanson Inc. 2006).

Roads surrounding the Project site experience limited vehicle traffic and associated vehicular noise.

The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. Most perceptible indoor vibration is caused by sources within buildings, such as operation of mechanical equipment, movement of people, or the slamming of doors. Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the groundborne vibration from traffic is rarely perceptible. The range of interest for groundborne vibration is from approximately 50 VdB, which is the typical background vibration velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings (Harris Miller Miller & Hanson Inc. 2006). General human response to different levels of groundborne vibration velocity levels are described in Table 3.9-2.

Table 3.9-2. Human Response to Different Levels of Groundborne Vibration

Vibration Velocity Level	Human Response
65 VdB	Approximate threshold of perception for many humans.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level annoying.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

Source: Harris Miller Miller & Hanson Inc. 2006.

3.9.2.2 Project Site

The Project site is located at the edge of a rural area bordered by light industrial uses and undeveloped land to the north, a mix of undeveloped land and commercial and residential uses to the west, Buckley Road and rural agriculture land to the south, and undeveloped land and rural residential uses to the east. The San Luis Obispo County Regional Airport (Airport) lies approximately 3,240 feet to the east. Thus, Project site noise levels are characterized by exposure to roadway noise in areas proximate to Buckley Road along the southern perimeter of the site, exposure to aircraft noise from the Airport, and periodic operational noise from light industrial uses to the north. With the exception of periodic aircraft overflights, the interior areas of the Project site have limited exposure to these noise

sources. The LUCE Update EIR included measurements of noise levels along major roadway segments in the City. The closest measurement location to the Project site is on the segment of South Higuera Street from Los Osos Valley Road to south of City Limits, with a CNEL of 66 dBA (City of San Luis Obispo 2014b).

In order to provide a more detailed characterization of Project site noise levels, a Sound Level Assessment for the Project was conducted by David Lord, Acoustics Consulting, focusing on noise generated by traffic on roads bordering the Project site, including Vachell Lane and Buckley Road (see Appendix O), and on the source and level of aircraft noise on the Project site. Six noise monitoring stations were placed throughout the Project site and existing sound levels were measured continuously at 10-second intervals over a 24-hour period on Friday and Saturday, January 23-24, 2015, and on Monday and Tuesday, January 26-27, 2015. An acoustic model with sound level contours was generated for the site based on topography, noise sources, and measured sound level values. According to the Sound Level Assessment, the major exterior noise sources in the vicinity of the Project site originate from vehicular traffic, air traffic from San Luis Obispo County Regional Airport, and stationary noise sources from nearby commercial activities (Figure 3.9-1).

The Sound Level Assessment found that the interior areas of the site generally fall within the 60 dBA CNEL noise contour. Sound levels were measured within the Project site where residential buildings would be constructed. Station One, located at the southwestern corner of the site approximately 300 feet from the intersection of Buckley Road and Vachell Lane had a L_{dn} /CNEL of 59 dBA; Station Two, located in the quiet interior of the site, had a L_{dn} /CNEL of 52 dBA; Station Three, also located in the quiet interior of the site, had a L_{dn} /CNEL of 51 dBA; Station Four, located adjacent to the northwest boundary of the Project site, had a L_{dn} /CNEL of 56 dBA; Station Five, located in the middle of the southern boundary of the Project site, had a L_{dn} /CNEL of 59/60 dBA; and Station Six, located in the northeast corner of the site and the closest station to the Airport, had a L_{dn} /CNEL of 51 dBA. The noise measured on the Project site primarily originates from Buckley Road, located adjacent to the southern border of the Project site.

Station 6 in the northeastern portion of the site, nearest to the Airport, was 51 dBA, which represents the 24-hour average sound level at the location nearest the airport, with a minimum of surface transportation noise. This existing sound level value is lower than the 55 dBA CNEL noise contour indicated by the Airport Land Use Plan (ALUP) and Airport Area Specific Plan (AASP). Noise from industrial properties along the northern and western borders of the Project site do not make up a notable amount of the recorded CNEL,

especially when compared to the Buckley Road and Airport sources. Peak sound levels measured at Station 1, located 75 feet west of the nearest traffic lane, reached up to 70 dBA and were generally associated with passing motorcycles or trucks. Peak sound levels measured at Station 2 and 3, located in the interior of the site, reached up to 70 dBA and were generally associated with aircraft overflights. Peak sound levels measured at Station 4, located at the AirVol Block shared boundary, reached up to 75 dBA and were generally associated with industrial operations, as well as arriving and departing forklifts and delivery vehicles. Peak sound levels measured at Station 5, located in the southern portion of the site, reached up to 70 dBA and were generally associated with motorcycles and trucks. Peak sound levels measured at Station 6, located in the northeastern corner of the site, reached up to 70 dBA and were generally associated with airplane and helicopter flyovers (Acoustics Consulting 2015).

3.9.2.3 Land Use Compatibility

The northern and western portions of the Project site are bordered by areas zoned for services and manufacturing, which support both a range of existing businesses and undeveloped open lands (City of San Luis Obispo 2014a). Types of buildings and businesses along this edge include warehouses, outdoor storage of construction materials and heavy equipment, and office buildings, none of which consist of noise-sensitive land uses. These businesses obtain vehicular access off of Suburban Road, South Higuera Street, and Vachell Lane, and noise from vehicle movement to and from these businesses is generally not audible within the Project site. However, noise from heavy equipment operation (e.g., back up warning signals), automobile maintenance activities and other typical light industrial noise sources are occasionally audible in the northern and western reaches of the Project site. In addition to these uses, the undeveloped Chevron Tank Farm property borders approximately 800 feet of the northern boundary of the Project site. The Chevron Tank Farm property is buffered from the Project site by a 15 to 20-foot-high earthen berm, and while undeveloped, the portion of the site adjacent to the Project is approved to undergo major site remediation and habitat restoration. A portion of the Chevron site is also approved for construction of a business/industrial park, but that portion is located more than 0.75 mile north of Tank Farm Road, so noise conflicts are not anticipated.

Directly east of the Project site lie seven large rural residential properties. The closest residence is located approximately 120 feet from the eastern boundary of the Project site. To the south across Buckley Road lies agricultural land with at least one rural business, the

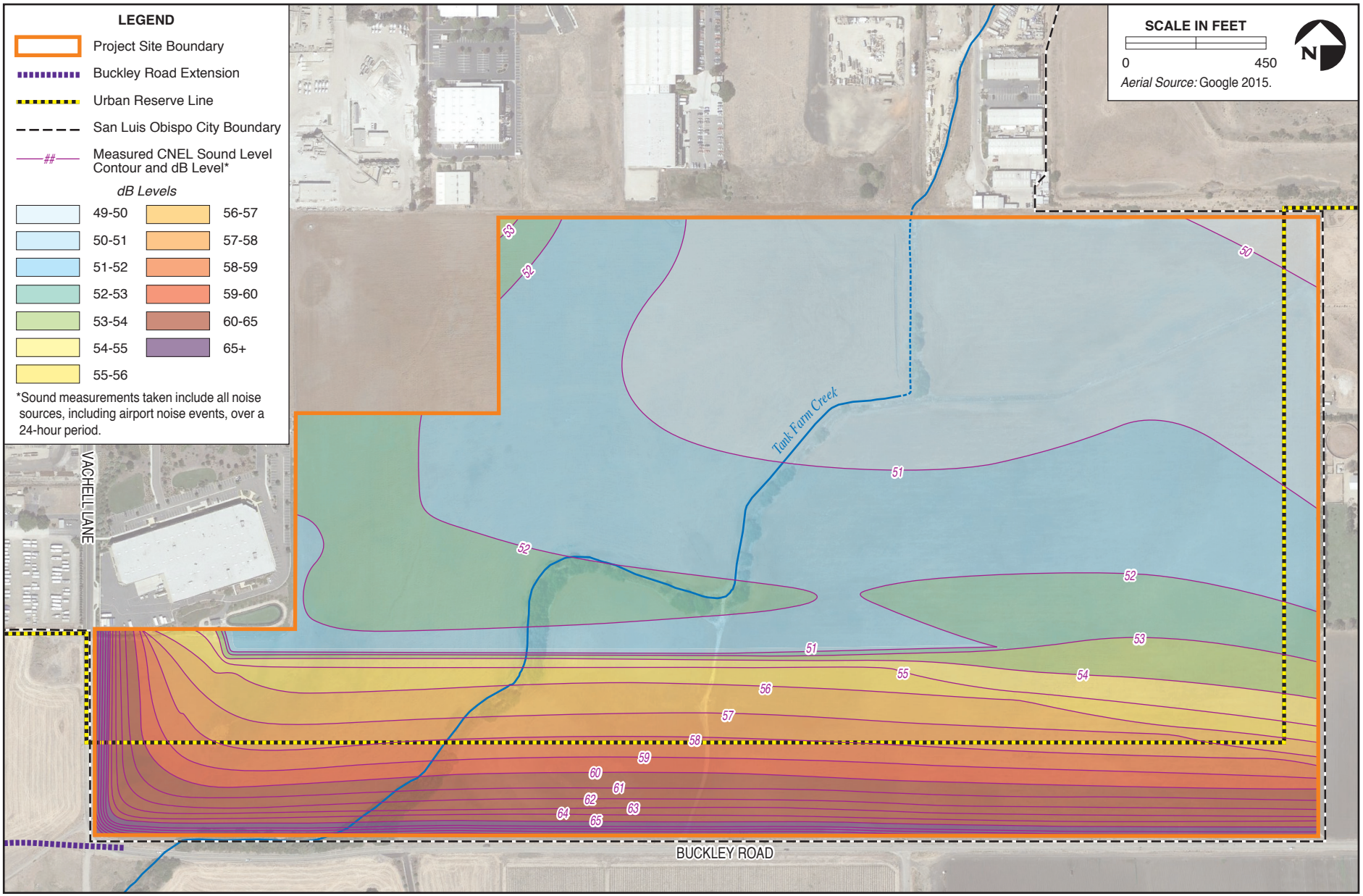
Thousand Hills Pet Resort, located approximately 300 feet from the southern Project boundary.

The Airport is located approximately 0.6 mile east of the Project site. The Airport is a major source of noise within the area. The northeastern corner of the site lies between the 55 and 60 dB CNEL airport noise contours designated in the ALUP. These contour lines indicate noise levels created by incoming and departing aircraft from Airport Runway 11-29 (Figure 3.9-2). Because of the relatively low volume, frequency and aircraft equipment associated with Runway 7-25, there are no mapped noise contours, according to the Airport Master Plan EIR. In addition, a small portion of the site (less than 1 acre) is within the 65 dB single event noise contour. The Noise Element of the General Plan depicts the Airport's noise contours; however, none of these contours overlay the Project site (City of San Luis Obispo 1996). The ALUC recently commissioned an airport noise study by RS&H in preparation for the update of the ALUP. That study is presently being used for ALUC noise compatibility determinations and it shows that all of its scenarios except one conform to the parameters agreed upon by the ALUC and the City (RS&H 2015). Nevertheless, the contours published in the current ALUP are used for compatibility analysis in this EIR.

3.9.2.4 Sensitive Receptors

Noise sensitive uses, or receptors, generally include single- and multi-family residences, schools, libraries, medical facilities, retirement/assisted living homes, health care facilities, and places of worship. Such uses can be sensitive to increases in both short-term and long-term noise due to a range of issues, such as sleep disturbance and disruption of conversations, lectures or sermons, or decreased attractiveness of exterior use areas, such as patios, backyards, or parks. Of particular concern is exposure of sensitive receptors to long-term elevated interior noise levels and sleep disturbance, which can be associated with health concerns.

No sensitive land uses are currently within the Project site. Sensitive land uses in the Project vicinity include residences approximately 120 to 800 feet to the east, Calvary SLO Church approximately 900 feet to the northwest, and a residential community approximately 1,300 feet to the northwest. Although it is not a sensitive receptor, an office building is located approximately 70 feet to the west of the Project site.



amec foster wheeler

Existing Measured Sound Level Contours within the Project Site

FIGURE 3.9-1

3.9.3 Regulatory Setting

3.9.3.1 Federal

Federal Transit Administration Criteria

The Federal Transit Administration (FTA) developed methodology and significance criteria to evaluate vibration impacts from surface transportation modes (i.e., passenger cars, trucks, buses, and rail) in the Transit Noise Impact and Vibration Assessment (Harris Miller Miller & Hanson Inc. 2006). For residential buildings (Category 2), the threshold applicable to these projects is 80 VdB.

Federal Noise Control Act (1972)

Public Law 92-574 regulates noise emissions from operation of all construction equipment and facilities; establishes noise emission standards for construction equipment and other categories of equipment; and provides standards for the testing, inspection, and monitoring of such equipment. This Act gives states and municipalities primary responsibility for noise control.

3.9.3.2 State

State of California's Guidelines for the Preparation and Content of Noise Element of the General Plan (1987)

These guidelines reference land use compatibility standards for community noise environments as developed by the California Department of Health Services, Office of Noise Control. Sound levels up to 65 L_{dn} or CNEL are determined to be normally acceptable for multi-family residential land uses. Sound levels up to 70 CNEL are normally acceptable for buildings containing professional offices or defined as business commercial. However, a detailed analysis of noise reduction requirements is recommended when new residential development is proposed in areas where existing sound levels approach 70 CNEL.

The California Administrative Code (CAC), Title 24, Noise Insulation Standards.

These standards regulate interior noise levels for all new multi-family residences to 45 L_{dn} or below. If exterior sound levels exceed 60 L_{dn}, CAC Title 24 requires the preparation of an acoustical analysis showing that the proposed design would limit the sound level to, or below the 45 L_{dn} requirement.

3.9.3.3 Local

County of San Luis Obispo Noise Ordinance, Section 23.06.040-050

Given the Project site's location adjacent to County lands, noise standards for San Luis Obispo County apply to fixed sources or from a "use", are measured from the property line, and are 50 dB(A) CNEL during daytime and evening hours (7:00 AM to 10:00 PM). There are a number of exceptions to the County noise regulations, as indicated in Section 23.06.042. For instance, noise from construction is included as an exception as detailed in Table 3.9-3.

Table 3.9-3. County Construction Exception to Noise Standards

Days	Allowable times for noise sources associated with construction
Monday – Friday	7:00 AM – 9:00 PM
Saturday – Sunday	8:00 AM – 5:00 PM

City of San Luis Obispo General Plan, Noise Element and Noise Guidebook (1996)

According to state law, a Noise Element is required in all city and county general plans. The City slightly modified land use compatibility standards recommended by the California Department of Health Services. The City's maximum noise exposure standards for noise-sensitive land use (specific to transportation noise sources) are shown in Table 3.9-4. Since residential land uses are considered noise-sensitive, there are recommended maximum noise exposure guidelines.

Policy 1.3 New Development Design and Transportation Noise Sources. New noise-sensitive development shall be located and designed to meet the maximum outdoor and indoor noise exposure levels of Table 3.9-4.

Policy 1.4. New Transportation Noise Sources. Noise created by new transportation noise sources, including road, railroad, and airport expansion projects, shall be mitigated to not exceed the levels specified in [Table 3.9-4] for outdoor activity areas and indoor spaces of noise-sensitive land uses which were established before the new transportation noise source.

Policy 1.6. New Development and Stationary Noise Sources. New development of noise-sensitive land uses may be permitted only where location or design allow the development to meet the standards of Table 3.9-4, for existing stationary noise sources.

Table 3.9-4. City Maximum Noise Exposure for Noise-Sensitive Land Use Areas Due To Transportation Noise Sources

Land Use	Outdoor Activity Areas[1]	Interior Spaces		
	L_{dn}[2] or CNEL	L_{dn}[2] or CNEL	L_{eq}[3]	L_{max}
Residences, hotels, motels, hospitals, nursing homes	60	45	--	60
Theaters, auditoriums, music halls	--	--	35	60
Churches, meeting halls, office building, mortuaries	60	--	45	
Schools, libraries, museums	--	--	45	60
Neighborhood parks	65	--	--	
Playgrounds	70	--	--	

[1] If the location of outdoor activity areas is not shown, the outdoor noise standard shall apply at the property line of the receiving land use.
[2] L_{dn} (day-night average sound level) is the is the energy-averaged sound level measured over a 24-hour period, with a 10-dB penalty assigned to noise events occurring between 10:00 PM and 7:00 AM and a 5-dB penalty assigned to noise events occurring between 7:00 PM and 10 PM.
[3] L_{eq} (equivalent sound level) is the constant or single sound level containing the same total energy as a time-varying sound, over a certain time. If the location of outdoor activity areas is not shown, the outdoor noise standard shall apply at the property line of the receiving land use.
Source: City of San Luis Obispo 1996.

Noise generated by new stationary sources shall be mitigated so as not to exceed the exposure standards for noise-sensitive uses, as measured at the property line of the receiver. The City's *Noise Element* lists mitigation strategies in a descending order of desirability. If preferred strategies are not implemented, it is the responsibility of the Applicant to demonstrate through a detailed noise study that the more desirable approaches are either not effective or not practical, before considering other design criteria contained in the General Plan. The City would consider the following mitigation measures appropriate where existing sound levels significantly impact noise-sensitive land uses, or where cumulative increases in sound levels resulting from new development significantly impact existing noise-sensitive land uses:

A. Rerouting traffic onto streets that can maintain desired levels of service, consistent with the *Circulation Element*, and which do not adjoin noise-sensitive land uses.

B. Rerouting trucks onto streets that do not adjoin noise-sensitive land uses.

C. Constructing noise barriers.

D. Reducing traffic speeds through street or intersection design methods.

E. Retrofitting buildings with noise-reducing features.

F. Establishing financial programs, such as low-cost loans to owners of a noise-impacted property, or developer fees to fund noise-mitigation or trip-reduction programs.

New development of noise-sensitive land uses may only be permitted where standards are met via location or design, as outlined in Table 3.9-5.

Table 3.9-5. City Maximum Noise Exposure for Noise-Sensitive Land Use Areas Due to Stationary Noise Sources

	Daytime (7:00 AM to 10:00 PM)	Nighttime[2] (10:00 PM to 7:00 AM)
Hourly L_{eq} in dB[1, 2]	50	45
Maximum level in dB[1, 2]	70	65
Maximum impulsive noise in dB[1, 3]	65	60

[1] As determined at the property line of the receiver. When determining effectiveness of noise mitigation measures, the standards may be applied on the receptor side of noise barriers or other property-line noise mitigation measures.
[2] Sound level measurements shall be made with slow meter response.
[3] Sound level measurements shall be made with fast meter response.
Source: City of San Luis Obispo 1996.

City of San Luis Obispo Municipal Code, Title 9, Chapter 9.12 (Noise Control)

The City's Municipal Code (§9.12.060) specifies noise standards for various categories of land use. These limits, shown in Table 3.9-5, would apply to long-term operation of the site, and are not applicable during construction.

Prohibitions applied to creating noise for maximum time periods from any source within the City are shown in Table 3.9-6.

Where technically and economically feasible, construction activities shall be conducted so that maximum sound levels at affected properties would not exceed 75 dBA for single-family residential, 80 dBA for multi-family residential, and 85 dBA for mixed residential/commercial land uses, as shown in Table 3.9-8 and Table 3.9-9 (Municipal Code 9.12.050). Except for emergency repair of public service utilities, or where an exception is issued by the City Community Development Department, no operation of tools or equipment used in construction, drilling, repair, alteration, or demolition work shall occur daily between the hours of 7:00 PM and 7:00 AM, or any time on Sundays or holidays, such that the sound creates a noise disturbance across a residential or commercial property line.

Table 3.9-6. City of San Luis Obispo Exterior Noise Limits

Zoning Designation[1]	Time Period	Maximum Acceptable Noise Level (dBA[2])[3]
Low- and Medium-Density Residential (R-1 and R-2); Conservation/Open Space (C/OS)	10:00 PM – 7:00 AM	50
	7:00 AM – 10:00 PM	55
Medium- and High-Density Residential (R-3 and R-4)	10:00 PM – 7:00 AM	50
	7:00 AM – 10:00 PM	55
Office and Public Facility (O and PF)	10:00 PM – 7:00 AM	55
	7:00 AM – 10:00 PM	60
Neighborhood, Retail, Community, Downtown and Tourist Commercial (C-N, C-R, C-C, C-D, C-T)	10:00 PM – 7:00 AM	60
	7:00 AM – 10:00 PM	65
Service Commercial (C-S)	Any Time	70
Manufacturing (M)	Any Time	75

[1] The classification of different areas of the community in terms of environmental noise zones shall be determined by the Noise Control Office(r) based upon community noise survey data. Additional area classifications should be used as appropriate to reflect both lower and higher existing ambient levels than those shown. Industrial noise limits are intended primarily for use at the boundary of industrial zones rather than for noise reduction within the zone (Ord. 1032 § 2 [part] 1985)
[2] dBA (A-weighted decibel scale) emphasizes the range of sound frequencies that are most audible to the human ear (between 1,000 and 8,000 Hertz).
[3] Levels not to be exceeded more than 30 minutes in any hour.
Source: (City of San Luis Obispo 2008).

Table 3.9-7. Maximum Time Periods for Increased Noise Levels

Noise Standard for Existing Land Use	Maximum Time Period Allowed
+0 dB	30 minutes/hr
+5 dB	15 minutes/hr
+10 dB	5 minutes/hr
+15 dB	1 minute/hr
+20 dB	Any time

Source: City of San Luis Obispo 1996.

Table 3.9-8. Maximum Noise Levels for Nonscheduled, Intermittent, Short-Term Operation (Less than 10 Days) of Mobile Equipment at Residential Properties

Zoning Category	Time Period	Noise Level (dBA)
Single-Family Residential	Daily 7:00 AM to 7:00 PM, except Sundays and legal holidays	75 dBA
Multi-Family Residential		80 dBA
Mixed Residential/Commercial		85 dBA
Single-Family Residential	7:00 PM to 7:00 AM, all day Sunday and legal holidays	50 dBA
Multi-Family Residential		55 dBA
Mixed Residential/Commercial		60 dBA

Source: City of San Luis Obispo 2008a.

Table 3.9-9. Maximum Noise Levels for Repetitively Scheduled, Relatively Long-Term Operation (10 Days or More) of Stationary Equipment at Residential Properties

Zoning Category	Time Period	Noise Level (dBA)
Single-Family Residential	Daily 7:00 AM to 7:00 PM, except Sundays and legal holidays	60 dBA
Multi-Family Residential		65 dBA
Mixed Residential/Commercial		70 dBA
Single-Family Residential	Daily 7:00 PM to 7:00 AM, including all day Sunday and legal holidays	50 dBA
Multi-Family Residential		55 dBA
Mixed Residential/Commercial		60 dBA

Source: City of San Luis Obispo 2008a.

Airport Land Use Plan for the San Luis Obispo County Regional Airport

The ALUP details restrictions on development within the Airport vicinity. According to the ALUP, residential land uses, restaurants, and public assembly areas, among other land uses, exist as Extremely Noise Sensitive Land Uses. Policies that may impact the Project include the following items: Policies N-1 through N-4 of the ALUP detail the noise conditions that potentially affect the Project site. These conditions are described below and summarized in Table 3.9-10.

Table 3.9-10. Summary of Compatibility of Land Uses with CNEL Contours

Noise Environment	Extremely Noise Sensitive Land Uses	Moderately Noise Sensitive Land Uses
Inside 60 dB CNEL contour	Prohibited	With mitigation[1]
Between 55 and 60 dB CNEL contours	Allowable only within a Designated Residential Infill Area (with appropriate noise mitigation) or as a Small-Scale Residential Project	With mitigation[2]
Outside 55 CNEL dB contour	Allowable	Allowable

[1] Specific criteria defined by the ALUP for designation as infill development must be met.
[2] Mitigation requirements specified by the ALUP must be met.
Source: ALUC 2014.

Policy N-1. Would permit or fail to sufficiently prohibit establishment within the projected 60 dB CNEL contour of any extremely noise-sensitive land use.

Policy N-2. Would permit or fail to sufficiently prohibit any extremely noise-sensitive land use within the projected 55 dB CNEL contour, with the exception of developments which meet the criteria delineated in Section 4.3.2.3 for designation as infill.

Policy N-3. Would permit or fail to sufficiently prohibit any moderately noise-sensitive land use within the projected 55 dB CNEL contour, with the exception of developments which meet the requirements for mitigation of interior noise levels specified in Table 4 and in Section 4.3.3 of the ALUP.

Policy N-4. Would permit or fail to sufficiently prohibit, in any location which is within or adjacent to an area of demonstrated noise incompatibility or in an acoustic environment substantially similar to an area of demonstrated noise incompatibility:

a. Any new residential or other extremely noise-sensitive development

b. Any new moderately noise-sensitive development, unless adequate, specific, and detailed provisions are set forth to mitigate noise incompatibility between allowable or proposed noise-sensitive uses (including foreseeable outdoor activities) and airport operations.

Outdoor activity area sound levels should not exceed 60 CNEL at the property line of noise-sensitive land uses (City of San Luis Obispo 1996). In addition, the ALUP contains guidelines for land uses overlying ALUP single-event noise contours (see Table 3.9-11).

Table 3.9-11. Guidelines for Single Noise Events

Noise Environment	Sound Level dB L_{max}	Equivalent Exterior Sound Level dB L_{max}
Outdoor façade of living areas (night)	60	60
Bedrooms	45	57 – 60
Hospitals, patient rooms (night)	40	52 – 55
Music through earphones	110	N/A
Ceremonies and entertainment	110	N/A

Note: Exterior sound level is not applicable, as the listed use is anticipated to be the primary source of noise exposure.
Source: ALUC 2005.

3.9.4 Environmental Impact Analysis

3.9.4.1 Thresholds of Significance

Sound levels for the Project must comply with relevant noise policies, standards, and ordinances. Appendix G of the California Environmental Quality Act (CEQA) Guidelines provides a set of screening questions that address impacts related to noise. Specifically, the Guidelines state that a proposed project may have a significant adverse impact related to noise if:

a) The project would result in exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies;

b) The project would result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;

c) The project would result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

d) The project would result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;

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

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

3.9.4.2 Impact Assessment Methodology

Construction Noise

The proposed Project would entail substantial construction activities stretching over approximately 10 years. In particular, large-scale mass grading of the site would entail extensive use of heavy earth-moving equipment, followed by construction activities over six project phases. Anticipated construction sound levels were estimated and analyzed based on projected construction vehicle requirements, distance between sensitive receptors and construction activities, and proposed daytime operational levels. Standard noise generation levels for typical construction equipment were used to estimate construction sound levels.

Noise levels were estimated using data published by the Federal Highway Administration (FHWA) regarding the noise-generating characteristics of typical construction activities (see Table 3.9-12). These noise levels would diminish rapidly with distance from the construction site, at a rate of approximately 6 dBA per doubling of distance as equipment is generally stationary or confined to specific areas during construction. For example, a noise level of 86 dBA measured at 50 feet from the noise source to the receptor would

reduce to 80 dBA at 100 feet from the source to the receptor, and reduce by another 6 dBA to 74 dBA at 200 feet from the source to the receptor. The noise levels from construction at the offsite sensitive uses can be determined with the following equation from the High-Speed Ground Noise and Vibration Impact Assessment, Final Report:

$$L_{max} \text{ at sensitive use} = L_{max} \text{ at 50 feet} - 20 \text{ Log}(D/50)$$

L_{max} = noise level of noise source, D = distance from the noise source to the receiver, and L_{max} at 50 feet = noise level of source at 50 feet (U.S. Department of Transportation 2012).

Table 3.9-12. Noise Ranges of Typical Construction Equipment

Construction Equipment	Noise Levels in dBA L_{eq} at 50 Feet
Pile Driver	95-101
Auger Drill Rig	80-85
Front Loader	73–86
Trucks	82–95
Cranes (moveable)	75–88
Cranes (derrick)	86–89
Vibrator	68–82
Saws	72–82
Pneumatic Impact Equipment	83–88
Jackhammers	81–98
Pumps	68–72
Generators	71–83
Compressors	75–87
Concrete Mixers	75–88
Concrete Pumps	81–85
Back Hoe	73–95
Tractor	77–98
Scraper/Grader	80–93
Paver	85–88

Note: Machinery equipped with noise control devices or other noise-reducing design features does not generate the same level of noise emissions as that shown in this table.
Source: U.S. Department of Transportation 2013.

Vibration Levels Associated with Construction Equipment

Groundborne vibration levels resulting from construction activities occurring within the City were estimated using the 2013 California Department of Transportation's (Caltrans')

Transportation and Construction Vibration Guidance Manual. Potential vibration levels are identified for onsite and offsite locations that are sensitive to vibration, including nearby residences. Caltrans provides thresholds of significance for vibration and methodology for calculating vibration levels at distances from generation. Table 3.9-13 indicates vibration levels at which humans would be affected by vibration levels. Table 3.9-14 identifies anticipated vibration velocity levels in inches per second (in/sec) for standard types of construction equipment based on distance from the receptor. Vibration impacts are assessed by estimating the vibration levels of Project construction equipment and the distance of sensitive receptors to the site boundary.

Vibration levels at the offsite sensitive uses, including the residences to the east, were determined with the following equation:

$$PPV_{Projected} = PPV_{Ref} (25/D)^n$$

Where: PPV_{Ref} = reference PPV at 25 feet; D = distance from equipment to the receiver in feet; n = 1.1 (a recommended conservative value pertaining to attenuation rate of vibration through ground).

Table 3.9-13. Caltrans Vibration Annoyance Potential Criteria

Human Response Condition	Maximum Vibration Level (in/sec) for Transient Sources	Maximum Vibration Level (in/sec) for Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

Source: Caltrans 2013.

Table 3.9-14. Vibration Source Levels for Construction Equipment

Construction Equipment	Vibration Level (in/sec) at 25 feet	Vibration Level (in/sec) at 50 feet	Vibration Level (in/sec) at 100 feet
Large Bulldozer	0.089	0.031	0.011
Loaded Trucks	0.076	0.035	0.017
Jackhammer	0.035	0.016	0.008
Small Bulldozer	0.003	0.001	0.0004

Source: Caltrans 2013.

Operational & Traffic Noise

Operational noise associated with Project implementation would include the effects of changes in roadway noise levels associated with Project generated vehicular traffic on sensitive receptors, exposure of future Project residents to noise generated by the Airport, adjacent roadways, and industrial uses, and operation noise created by new residential, commercial, and park uses. The City's Municipal Code (Section 9.12.060) specifies noise exposure standards for future uses in the Project site (Table 3.9-6 above).

The Project's Sound Level Assessment provides results of the noise survey, as well as future noise level projections (Appendix O). Because traffic is the primary component of the noise environment in the vicinity of the Project site, these measurements are indicative of local roadway noise. Policy 1.4 of the City's General Plan sets maximum noise exposure standards for noise-sensitive land use specific to transportation noise sources (Table 3.9-4 above). Project-generated increases in roadway noise levels was considered in terms of increases in traffic volumes above existing conditions due to Project operation. Noise projections for streets affected by Project generated traffic are derived based on percentage change in traffic conditions. Noise generated from proposed Project stationary sources is estimated based on the typical dBA levels generated from urban uses, such as heating, ventilation, and air conditioning (HVAC) equipment, delivery trucks, and other common uses. Assessment of potential impacts to future residents from roadway and airport noise accounts for existing measured and mapped noise levels, as well as Project design features intended to minimize impacts to future residents such as constructing one-story structures along the urban reserve line (URL), the planted berms along the URL, and inclusion of special interior noise standards and features.

3.9.4.3 Project Impacts and Mitigation Measures

Short-term and long-term impacts were analyzed for the existing and future noise environment, and appropriate noise-control mitigation measures are recommended below (Table 3.9-15).

Table 3.9-15. Summary of Project Impacts

Noise Impacts	Mitigation Measures	Residual Significance
NO-1. Short-term construction activities would generate noise levels that would exceed thresholds established in the City's General Plan Noise Element and Noise Guidebook, with potential impacts to sensitive receptors.	MM NO-1a MM NO-1b MM NO-1c	Significant and Unavoidable
NO-2. Short-term noise construction activities could result in exposure of persons to or generation of excessive groundborne vibration.	None required	Less than Significant
NO-3. Long-term operational noise impacts would include higher roadway noise levels from increased vehicle traffic generated by the Project, Project operational noise, and exposure of future residents to high noise levels that could result in the exceedance of thresholds in the City's General Plan Noise Element and Noise Guidebook.	MM NO-3a MM NO-3b	Significant but Mitigable
NO-4. Development within the ALUP noise contours could cause persons within the Project site to be exposed to unacceptable noise levels.	None required	Less than Significant

Impact NO-1 Short-term construction activities would generate noise levels that would exceed thresholds established in the City's General Plan Noise Element and Noise Guidebook, with potential impacts to sensitive receptors (Significant and Unavoidable).

Implementation of the Project would involve construction that could generate noise levels that exceed applicable standards for mobile construction equipment in the City's Noise Standards and result in temporary substantial increases in noise levels primarily from the use of heavy-duty construction equipment. Construction activities would also involve the use of smaller power tools, generators, and other equipment that are sources of noise. Haul trucks using the local roadways would generate noise as they move along the road. Each stage of construction would involve various combinations of operating equipment, and noise levels would vary based on the amount and types of equipment and the location of the activity. Further, not all construction equipment would be operated simultaneously and peak sound levels associated with construction equipment would occur sporadically throughout the workday. As discussed in detail below, because estimated sound levels associated with construction activities would exceed the City's threshold for noise

exposure during construction, onsite and offsite short-term noise impacts would be potentially significant.

Onsite Construction Activities

Site preparation and grading would extend over at least 100 acres with substantial alteration of existing site topography through the leveling of low hills, filling of low lying areas, and realignment of Tank Farm Creek. Such activities would involve the onsite use of multiple scrapers, larger bulldozers, excavators, haul trucks, and water trucks operating onsite at any given time.

The grading and site preparation phases of the Project would generate the highest construction sound levels because of the operation of heavy equipment; specifically, work associated with the construction of the proposed roadways, building pads, and installation of onsite utilities would potentially generate the greatest noise levels for the nearby noise-sensitive receptors. Peak sound levels associated with heavy equipment typically range between 75 and 95 dBA at 50 feet from the source (USEPA 1971; refer to Table 3.9-11). Nuisance noise would also occur related to sources such as back-up warning devices, which would be clearly audible offsite. Project construction would occur over six phases, which may extend over a decade.

The Project involves rough grading of 607,100 cubic yards (cy). Rough grading for adjacent phases would be combined to balance long-term cut and fill for the entire Project site, although grading would not be balanced within each phase. It is likely that rough grading would combine different areas of the site as fill is excavated from higher elevation areas and moved to lower lying areas. Each phase would be subject to permit review to ensure conformity with the approved Project and consistency with applicable regulations.

Given that the noise-sensitive residences adjacent to the eastern Project site boundary (near Esperanza Lane) are located at a distance of approximately 100 feet from proposed construction activities of R-3 medium-high density residential units during Phases 4 and 5, sound levels at these locations associated with construction activity have the potential to exceed the estimated sound level ranges of construction equipment. Equipment would include heavy haul trucks (82-95 dBA) and graders (80-93 dBA) shown in Table 3.9-12 (exact noise levels of construction equipment is dependent on year, make, model, condition, and presence or absence of noise mufflers), and would exceed maximum sound level criteria (refer to Tables 3.9-7 and 3.9-8). Similarly, as the Project develops, future residents of each completed Project phases could be exposed to short-term high noise levels

similar to those described above. Project construction activities would potentially generate noise that would exceed City and County noise standards for residential use and cause periodic annoyance to nearby sensitive receptors (Table 3.9-16). However, under County Noise Ordinance Section 23.06.042, noise sources associated with construction of the Buckley Road Extension are exempt from County noise regulations, provided construction does not take place before 7:00 AM or after 9:00 PM on any day except Saturday or Sunday, or before 8:00 AM or after 5:00 PM on Saturday or Sunday. Therefore, any noise impacts on County properties, associated with grading and construction for the Buckley Road Extension would not exceed County standards. However, the rest of the Project site is on City land, and City noise standards are applicable to assess noise impacts.

Maximum noise levels anticipated to be experienced by these nearby sensitive uses due to Project construction activities are shown in Table 3.9-16. All distances are a conservative estimate and do not account for potential noise barriers due to vegetation or topography. Exposure of residents of completed phases of the Project to noise generated by construction of yet to be completed phases would be similar to the range of noise levels shown in Table 3.9-16, dependent upon the distance of homes in each completed phase from planned construction activity.

Table 3.9-16. Estimated Outdoor Construction Peak Noise Levels at Sensitive Receptors (Unmitigated)

	Residences to the East	Residences to the Northwest	Calvary SLO Church
Distance from construction	100 feet	1,300 feet	900 feet
Construction Noise (dBA L_{max})	69-89	47-67	50-70

Note: Noise levels at sensitive uses were determined with the following equation from the High-Speed Ground Noise and Vibration Impact Assessment, Final Report: $L_{max} = L_{max}$ at distance (feet). – 20 Log(D/50), where L_{max} = noise level of noise source, D = distance from the noise source to the receiver, L_{max} at 50 feet = noise level of source at 50 feet. Noise levels have been rounded up to the nearest whole number.
Source: U.S. Department of Transportation 2012.

Offsite Construction Activities

Operation of haul trucks and other construction vehicles along vicinity roads would exceed maximum noise level criteria for mobile equipment (refer to Table 3.9-4). Sound levels associated with large haul trucks would have an approximate range of 75 to 95 dBA at 50 feet from the noise source. Given that there are noise-sensitive residences within the Los Verdes Drive neighborhood located at a distance of approximately 100 feet west from construction vehicle routes on Suburban Road and Vachell Lane, sound levels at these locations associated with offsite construction activity have the potential to exceed the

estimated sound level ranges of construction equipment such as large haul trucks. Implementation of the Construction Transportation Management Plan (MM TRANS-1) would mitigate noise impacts associated with construction traffic by routing truck haul routes away from residential areas to the maximum extent feasible.

The LUCE Update EIR identified a significant impact to noise due to unavoidable short-term construction noise levels. As described above, the Project could generate short-term construction noise levels through the use of heavy-duty construction equipment that exceed the City's Noise Control Ordinance. The Project also has a long construction timeline lasting for 10 years or more. Construction noise levels would peak during the grading and site preparation stages of each phase, but would be steadily present over at least 10 years with overlapping phases. The Project has the potential to generate construction-related noise that would exceed applicable thresholds for sensitive receptors in the Project vicinity and for completed phases of the Project. Therefore, construction noise impacts would be ***significant and unavoidable.***

Mitigation Measures

MM NO-1a *Except for emergency repair of public service utilities, or where an exception is issued by the Community Development Department, no operation of tools or equipment used in construction, drilling, repair, alteration, or demolition work shall occur daily between the hours of 7:00 PM and 7:00 AM, or any time on Sundays, holidays, or after sunset, such that the sound creates a noise disturbance that exceeds 75 dBA for single-family residential, 80 dBA for multi-family residential, and 85 dBA for mixed residential/commercial land uses, as shown in Table 3.9-8 and Table 3.9-9, across a residential or commercial property line.*

Plan Requirements and Timing. Construction plans shall note construction hours and shall be submitted to the City for approval prior to grading and building permit issuance for each Project phase. At the pre-construction meeting all construction workers shall be briefed on restricted construction hour limitations. A workday schedule will be adhered to for the duration of construction for all phases.

Monitoring. Permit compliance monitoring staff shall perform periodic site inspections to verify compliance with activity schedules and respond to complaints.

MM NO-1b *For all construction activity at the Project site, noise attenuation techniques shall be employed to ensure that noise levels are maintained within levels allowed by the City of San Luis Obispo Municipal Code, Title 9, Chapter 9.12 (Noise Control). Such techniques shall include:*

- *Sound blankets on noise-generating equipment.*
- *Stationary construction equipment that generates noise levels above 65 dBA at the Project boundaries shall be shielded with a barrier that meets a sound transmission class (a rating of how well noise barriers attenuate sound) of 25.*
- *All diesel equipment shall be operated with closed engine doors and shall be equipped with factory-recommended mufflers.*
- *The movement of construction-related vehicles, with the exception of passenger vehicles, along roadways adjacent to sensitive receptors shall be limited to the hours between 7:00 AM and 7:00 PM, Monday through Saturday. No movement of heavy equipment shall occur on Sundays or official holidays (e.g., Thanksgiving, Labor Day).*
- *Temporary sound barriers shall be constructed between construction sites and affected uses.*

Plan Requirements and Timing. The Applicant shall designate the equipment area with appropriate acoustic shielding on building and grading plans. Equipment and shielding shall be installed prior to construction and remain in the designated location throughout construction activities. Construction plans shall identify Best Management Practices (BMPs) to be implemented during construction. All construction workers shall be briefed at a pre-construction meeting on how, why, and where BMP measures are to be implemented. BMPs shall be identified and described for submittal to the City for review and approval prior to building or grading permit issuance. BMPs shall be adhered to for the duration of the Project. Construction plans shall include truck routes and shall be submitted to the City prior to grading and building permit issuance for each Project phase.

Monitoring. City staff shall ensure compliance throughout all construction phases. Permit compliance monitoring staff shall perform periodic site inspections to verify compliance with activity schedules.

MM NO-1c *The contractor shall inform residents and business operators at properties within 300 feet of the Project site of proposed construction timelines and noise complaint procedures to minimize potential annoyance related to*

construction noise. Noise-related complaints shall be directed to the City's Community Development Department.

Plan Requirements and Timing. The Applicant shall provide and post signs stating these restrictions at construction site entries. Signs shall be posted prior to commencement of construction and maintained throughout construction. Schedule and mailing list shall be submitted 10 days prior to initiation of any earth movement.

Monitoring. City staff shall ensure compliance throughout all construction phases. Permit compliance monitoring staff shall perform periodic site inspections to verify compliance with activity schedules and respond to complaints.

Residual Impact

Noise from construction activities associated with Impact NO-1 would occur despite implementation of mitigation measures. These residual noise impacts would occur periodically over the course of Project construction. While construction activities would avoid impacts to sensitive receptors to the maximum extent feasible, noise levels would continue to exceed City noise thresholds periodically over the 10-year Project construction period and have the potential to be adverse. Therefore, residual impacts to Impact NO-1 would be significant and unavoidable.

Impact NO-2 Short-term noise construction activities could result in exposure of persons to or generation of excessive groundborne vibration (Less than Significant).

Project construction could increase exposure to vibration levels. Based on Caltrans vibration criteria in Table 3.9-12 and Table 3.9-13, sensitive receptors within 100 feet of the Project site would be subject to vibrations from construction equipment. Sensitive receptors within 100 feet of the Project site boundary would include one of the residences adjacent to the east, as well as future residents of completed phases. Such sensitive receptors could experience periodic vibrations up to 0.017 in/sec. This would be not be perceptible. In addition, vibrations would be temporary and intermittent due to the nature of construction, and would only occur during the hours of construction. Therefore, vibration impacts from construction would be ***less than significant***.

Impact NO-3 Long-term operational noise impacts would include higher roadway noise levels from increased vehicle traffic generated by the Project, Project operational noise, and exposure of future residents to high noise levels that could result in the exceedance of thresholds in the City's General Plan Noise Element and Noise Guidebook (Significant but Mitigable).

Increased Roadway Noise

The proposed Project would substantially increase traffic on area roads, contributing to increases in roadway noise levels. Under typical circumstances, and where roadway conditions are constant (i.e., size, configuration, and speed limit), projected traffic volumes generally need to double over existing volumes in order for associated noise levels to increase by approximately 3 dBA – the increase in noise level that is generally perceptible to the human ear. As depicted in Table 3.9-17, projected average daily trips (ADT) is expected to increase significantly along Earthwood Lane and Horizon Lane, with an associated increase of 13 dBA and above. Projected ADT is not expected to double along Vachell Lane and Buckley Road. Consequently, projected transportation noise levels are not expected to increase by 3 dBA or more. Because there are no sensitive receptors in the immediate vicinity of these roadways, increase in roadway noise would not be perceptible and would not impact sensitive receptors. In addition, all of these changes in noise levels would occur over a 10-year period, further decreasing the potential for sensitive receptors to perceive incremental increases in noise levels.

Table 3.9-17. Projected Traffic and Noise Level Increases along Adjacent Roadways

Roadway Segment	Existing ADT	Projected ADT (% increase)	Projected Noise Level Increase (dBA)
Earthwood Lane	0	4,000 (N/A)	N/A
Horizon Lane	200	4,000 (1,900%)	13
Vachell Lane	4,000	7,000 (75%)	2.4
Buckley Road	4,189	8,000 (91%)	2.8

Notes: Projected noise level increases were estimated from projected increases in ADT based on the following formula: $dBA=10Log_{10}$ (Projected ADT/Existing ADT).
Source: Acoustics Consulting 2015; Central Coast Transportation Consulting 2016.

Exposure of Future Project Residents to High Noise Levels

Project construction would potentially expose future residents to sound levels above the City regulations. There are some areas on the Project site in the planned R-1 low density residential zone (Phase 5 of development) and R-2 medium density residential zone (Phase

1 of development) within approximately 300 feet of Buckley Road that could be exposed to noise levels of 60 dBA or above at buildout due to the increased traffic on Buckley Road as well as traffic volumes on proposed Project collectors. As these are noise-sensitive land uses, noise levels in outdoor activity areas and interior spaces of some of these residential uses could potentially exceed the City's 60 dBA and 45 dBA thresholds, respectively. However, these R-1 units would be constructed north of a landscaped berm averaging 7 feet in height and 2,650 feet in length, which would reduce noise from Buckley Road. In addition, R-1 units within 300 feet of Buckley Road would be single-story, enhancing the noise attenuating features of the landscaped berm between the R-1 units and Buckley Road. This row of units closest to the roadway would also act as noise attenuation for the residential units behind them. Additionally, the Avila Ranch Development Plan contains design standards (3.4, 3.6, 7.3.4) which would further reduce potential for noise exposure. Finally, modern construction techniques typically reduce interior noise levels by 25 dBA to 30 dBA, avoiding potential for interior noise effects.

In addition, R-4 units in the northwest corner of the site may be exposed to periodic higher noise levels from industrial activity which could also exceed City standards. The sleeping and living portions of the R-4 units would be oriented away from the eastern and northern Project boundaries, and carports, garages, and drives would be located along these boundaries to act as noise buffers to adjacent non-residential land uses.

The LUCE Update EIR concluded that implementation of the proposed LUCE Update policies, and amendments to existing City policies, would reduce noise impacts from increased traffic volumes to a less than significant level. With implementation of mitigation measures below, noise impacts related to operational vehicle traffic resulting from the Project would be ***significant but mitigable.***

Operational Activities

Under the Project, long-term operational noise impacts would include noise from operation of heating, ventilation, and air conditioning (HVAC) systems, landscaping and maintenance activities, and typical residential and park noise-generating uses.

Noise levels from commercial HVAC equipment can reach 100 dBA at a distance of three feet (EPA 1971); however, these units are typically fitted with noise shielding cabinets, placed on the roof or in mechanical equipment rooms to reduce noise levels. Noise from mechanical equipment associated with operation of the Project is required to comply with the California Building Standards Code requirements pertaining to noise attenuation.

Therefore, with the application of these noise reduction techniques, noise from these pieces of equipment does not typically exceed 55 dBA at 50 feet, and would not exceed 45 dBA CNEL in any habitable room as required by Title 24 of the California Building Standards Code. As such, noise levels from HVAC systems would be below the interior and exterior ambient noise thresholds.

Landscaping and maintenance activities may include the use of equipment such as noise-compliant leaf blowers or hedge trimmers, which would reach levels of 65 dBA at 50 feet. Landscaping and maintenance personnel perform maintenance and landscaping activities within daytime hours between 8:00 AM and 5:00 PM. This noise level would be reduced due to the fact that the nearest noise-sensitive receptor is located 120 feet away. The surrounding land uses also include occasional agricultural operations that make take place in the area, which produce similar operational noise levels.

The noise impacts from landscaping and maintenance activities would not constitute a substantial increase in ambient noise levels at offsite locations and therefore would not exceed interior or exterior ambient noise thresholds at offsite locations. The LUCE Update EIR concluded that implementation of the proposed LUCE Update policies, and amendments to existing City policies, would reduce noise impacts from new sources of noise from development to a less than significant level. Therefore, impacts related to the operation of stationary equipment and site maintenance activities resulting from the Project would be ***significant but mitigable***.

Mitigation Measures

MM NO-3a *R-1 and R-2 residential units planned in the area of the Project site within 300 feet of Buckley Road and R-4 units in the northwest corner of the Project site shall include noise mitigation for any potential indoor space and outdoor activity areas that are confirmed to be above 60 dBA as indicated in the Project's Sound Level Assessment. The following shall be implemented for residential units with noise levels exceeding 60 dBA:*

- *Outdoor Activity Area Noise Mitigation. Where exterior sound levels exceed CNEL = 60 dBA, noise reduction measures shall be implemented, including but not limited to:*
  - *Exterior living spaces of residential units such as yards and patios shall be oriented away from Project boundaries that are adjacent to noise-producing uses that exceed exterior*

noise levels of CNEL = 60 dBA, such as roadways and industrial/commercial activities.

- *Construction of additional sound barriers/berms with noise-reducing features for affected residences.*

- *Exterior Glazing. Exterior window glazing for residential units exposed to potential noise above L_{dn}=60 dBA shall achieve a minimum Outdoor-Indoor Transmission Class (OITC) 24 / Sound Transmission Class (STC) 30. Glazing systems with dissimilar thickness panes shall be used.*

- *Exterior Doors Facing Noise Source. According to Section 1207.7 of the California Building Code, residential unit entry doors from interior spaces shall have a combined STC 28 rating for any door and frame assemblies. Any balcony and ground floor entry doors located at bedrooms shall have an STC 30 rating.*

- *Exterior Walls. Construction of exterior walls shall consist of a stucco or engineered building skin system over sheathing, with 4-inch to 6-inch deep metal or wood studs, fiberglass batt insulation in the stud cavity, and one or two layers of 5/8-inch gypsum board on the interior face of the wall. If possible, electrical outlets shall not be installed in exterior walls exposed to noise. If not possible, outlet box pads shall be applied to all electrical boxes and sealed with non-hardening acoustical sealant.*

- *Supplemental Ventilation. According to the California Building Code, supplemental ventilation adhering to OITC/STC recommendations shall be provided for residential units with habitable spaces facing noise levels exceeding L_{dn}=60 dBA, so that the opening of windows is not necessary to meet ventilation requirements. Supplemental ventilation can also be provided by passive or by fan-powered, ducted air inlets that extend from the building's rooftop into the units. If installed, ducted air inlets shall be acoustically lined through the top-most 6 feet in length and incorporate one or more 90-degree bends between openings, so as*

not to compromise the noise insulating performance of the residential unit's exterior envelope.

Plan Requirements and Timing. The Applicant shall demonstrate compliance with the above mitigation on Project engineering and architectural plans for residential areas within Phase 1 and Phase 5 of development prior to the issuance of grading and building permits for Phases 1 and 5.

Monitoring. City staff shall ensure compliance on Project engineering and architectural drawings prior to the issuance of Phase 1 and Phase 5 grading and building permits.

MM NO-3b Buckley Road widening improvements shall include the use of rubberized asphalts or alternative paving technology to reduce noise levels for sensitive receptors near the roadway.

Plan Requirements and Timing. The Applicant shall demonstrate compliance with the above mitigation on Project engineering and architectural plans for Buckley Road development prior to construction of the roadway.

Monitoring. City staff shall ensure compliance on Project engineering and architectural drawings prior to construction of the Buckley Road Extension.

Residual Impact

The mitigation above would ensure that lower indoor space noise levels would not exceed the threshold of 45 dBA, as required by Policy 1.4 of the City's General Plan Noise Element. Further, as the proposed residential land uses at risk of noise levels exceeding these thresholds would be established at the same time as the increased traffic noise and not before, these new noise-sensitive land uses would be consistent with Policy 1.4 of the City's General Plan Noise Element. Therefore, residual impacts would be less than significant.

Impact NO-4 Development within the ALUP noise contours could cause persons within the Project site to be exposed to unacceptable noise levels (Less than Significant).

The ALUP details restrictions on development within the Airport vicinity, and as shown in Figure 3.9-2, the majority of the Project site lies within the 50 dB CNEL airport noise contour. Within the 50 dB CNEL airport noise contour, land uses proposed are allowable by the ALUP; these include residential, commercial, park and open space uses.

The 55 dB CNEL airport noise contour line and the 65 dBA single-event airport noise contour line both extend into the northeast corner of the Project site where open space land uses are proposed. While the mapped 2005 ALUP dB CNEL and single-event noise contour lines in relation to the Project are approximate, no residential units are planned within these noise contours. ALUC review of the ALUP noise contour maps, confirmed these contours do not conflict with the proposed Project site uses (see Appendix N) (ALUC 2014). Although the northwest corner of the Project site is within the 55 dB CNEL airport noise contour, the Sound Level Assessment determined that maximum existing CNEL noise levels within this portion are 50 to 51 dB CNEL, and that the existing measured 55 dB noise contour is located outside of the Project site. Further, the final EIR for the Airport Master Plan demonstrates that existing airport noise levels on the Project site do not exceed City standards. Impacts would be ***less than significant***.

3.9.4.4 Cumulative Impacts

The Project, in combination with any approved, pending, and proposed development within the City, would further contribute to the increase in vehicle trips and associated traffic noise, as well as operational noise from the proposed new development. Implementation of the LUCE Update would increase traffic volumes and associated noise levels along major transportation routes. The Project would also increase traffic volumes with approximately 5,904 ADT and associated noise levels along surrounding streets, including Buckley Road, Horizon Lane, Vachell Lane, Suburban Road, and South Higuera Street (see Section 3.12, *Transportation and Traffic*). Other cumulative projects that would contribute towards increased traffic and associated noise within vicinity roads include the near term projects shown in Table 3.0-1 in Section 3.0, *Environmental Impact Analysis and Mitigation Measures*, and the full buildout of the LUCE.. However, cumulative projects in the area would increase traffic levels and subsequent noise levels mainly on arterials and major roadways, and the noise-related impacts to residential and local streets would be nominal. Implementation of the LUCE Update could cumulatively increase stationary source noise levels from new development, but because the City's Noise Element contains policies and programs that would address and mitigate potential site-specific impacts for individual projects in the future, and because the Project would contribute a marginal

increase in stationary source noise, this cumulative impact would be considered less than significant. Therefore, if the recommended Project-specific mitigation measures are implemented, and all other projects within the City are consistent with the City's Noise Element requirements and conditions and the LUCE Update EIR, the Project's contribution to cumulative noise impacts would be less than significant.

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