Section 3.10
Noise

The purpose of this section is to evaluate the proposed project's potential noise impacts. This section evaluates short-term construction-related impacts and long-term operational conditions. It also presents relevant regulatory guidelines and County policies related to noise. The analysis in this section is based on the technical *Noise Study*, prepared by Ldn Consulting, Inc. (2020c; see Appendix N) and the *Vehicle Operations and Queuing Analysis*, prepared by Chen Ryan and Associates (2020b; see Appendix O-2). Analysis in this section also draws upon data in the *City of Encinitas General Plan* (1991) and the *City of Encinitas 2013-2021 Housing Element Update Environmental Assessment* (2018a). Third-party technical reports were peer-reviewed by Michael Baker International and the City of Encinitas.

ENVIRONMENTAL SETTING

Fundamentals of Noise and Vibration

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as airborne sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. A typical noise environment consists of a base of steady background noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These sources can vary from an occasional aircraft or train passing by to virtually continuous noise from, for example, traffic on a major highway. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a large and awkward range of numbers. To avoid this, sound levels are described in decibel (dB) units. The decibel scale uses the hearing threshold (20 micropascals) as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The impacts of noise are not a function of loudness alone. The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

Addition of Decibels

The decibel scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70 dBA sound is half as loud as an 80 dBA sound and twice as loud as a 60 dBA sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions (FTA 2006). Under the decibel scale, three sources of equal loudness together would produce an increase of 5 dB (Caltrans 2013).

Sound Propagation and Attenuation

Generally, sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern, often referred to as cylindrical spreading (FHWA 2011). Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics (FHWA 2011). Similarly, a halving of the energy of a noise source would result in a 3 dB decrease. No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed (FHWA 2011).

Noise levels may also be reduced by intervening structures or landforms; 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 reduces noise levels by 5 to 10 dBA (FHWA 2006). 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 reduction of newer residential units is generally 30 dBA or more.

Noise Descriptors

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The L_{eq} is a measure of ambient noise, while the L_{dn} and CNEL are measures of community noise. Each is applicable to this analysis and defined in Table 3.10-1, Definitions of Acoustical Terms.

The A-weighted decibel sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends on the distance between the receptor and the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Table 3.10-1: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micropascals (or 20 micronewtons per square meter), where 1 pascal is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micropascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and ultrasonic sounds are above 20,000 Hz.

Table 3.10-1, continued

Term	Definitions
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	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. For example, $L_{eq(1)}$ is the equivalent noise level over a one-hour period and $L_{eq(8)}$ corresponds to an eight-hour period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	A 24-hour average L_{eq} with a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. 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 dBA L_{dn}.
Community Noise Equivalent Level, CNEL	A 24-hour average L_{eq} with a 5 dBA "weighting" during the hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. 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 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with

noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in A-weighted noise levels, the following relationships should be noted in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived by humans.
- Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference.
- A change in level of at least 5 dBA is required before any noticeable change in community response would be expected. An increase of 5 dBA is typically considered substantial.
- A 10 dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Effects of Noise on People

Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise, but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise.

The Occupational Safety and Health Administration has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over 8 hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues

to be disagreement about the relative annoyance of these different sources. For ground vehicles, a noise level of about 55 dBA L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance.

Sensitive Receptors

Noise-sensitive land uses are those that may be subject to stress and/or interference from excessive noise. Typically, residential uses are considered noise-sensitive receptors. Other noise-sensitive land uses include schools, hospitals, and institutional uses such as churches and museums. Industrial and commercial land uses are generally not considered sensitive to noise.

Short-term noise measurements were conducted at two locations in the project vicinity, as shown in Table 3.10-2, Measured Ambient Noise Levels, and on Figure 3.10-1, Ambient Noise Monitoring Locations. The nearest noise-sensitive land uses to the proposed project site are residences along Sidonia Street and Leucadia Boulevard. Monitoring location 1 (M1) is located approximately 40 feet from the centerline of Sidonia Street. Monitoring location 2 (M2) is located approximately 60 feet from the centerline of Leucadia Boulevard. The monitoring locations were chosen based on project site access and potential noise exposure from existing traffic, as well as community activities. As can be seen by the results, noise levels drop as the distance increases from the main roadway (Appendix N).

Table 3.10-2: Measured Ambient Noise Levels

Measurement Identification	Description	Time	Noise Levels (dBA)					
			L_{eq}	L_{max}	L_{min}	L_{10}	L_{50}	L_{90}
M1	Sidonia Street	7 :00 a.m. to 4:00 p.m.	51.8	76.4	39.0	54.5	44.5	40.5
M2	Leucadia Boulevard	7:00 a.m. to 4:00 p.m.	66.0	91.2	43.2	69.5	63.5	53.5

Source: Ldn Consulting, 2020c (Appendix N)

Existing Conditions

Ambient noise in the project area is primarily generated by traffic along Leucadia Boulevard and Quail Gardens Drive, as well as distant traffic noise from Interstate 5 (I-5). The existing agriculture operations on-site also contribute to the ambient noise in the area from the use of heavy equipment and trucks. Other ambient noise sources are typically from the surrounding residential land uses, such as lawnmowers and barking dogs. Ambient noise levels in the vicinity of the project site during the afternoon hours ranged from 51.8 to 66.0 dBA L_{eq}.

FOX POINT FARMS
ENVIRONMENTAL IMPACT REPORT

Ambient Noise Monitoring Locations

Figure 3.10-1

Michael Baker INTERNATIONAL

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Not to Scale

Source: Ldn Consulting Inc., 2020

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REGULATORY FRAMEWORK

Federal

US Environmental Protection Agency

The US Environmental Protection Agency offers guidelines for community noise exposure in the *Noise Effects Handbook – A Desk Reference to Health and Welfare Effects of Noise* (EPA 1981). These guidelines consider occupational noise exposure as well as noise exposure in homes. The EPA recognizes an exterior noise level of 55 decibels day-night level (dB L_{dn}) as a general goal to protect the public from hearing loss, activity interference, sleep disturbance, and annoyance. The EPA and other federal agencies have adopted suggested land use compatibility guidelines which indicate that residential noise exposures of 55 to 65 dB L_{dn} are acceptable. However, the EPA notes that these levels are not regulatory goals, but are levels defined by a negotiated scientific consensus, without concern for economic and technological feasibility or the needs and desires of any particular community.

State

The California Governor's Office of Planning and Research's (OPRs) noise element guidelines include recommended exterior and interior noise level standards for local jurisdictions to identify and prevent the creation of incompatible land uses due to noise. The guidelines contain a land use compatibility table that describes the compatibility of various land uses with a range of environmental noise levels in terms of the CNEL. Table 3.10-3, Land Use Compatibility for Community Noise Environments, presents guidelines for determining acceptable and unacceptable community noise exposure limits for various land use categories. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

Table 3.10-1: Land Use Compatibility for Community Noise Environments

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dBA)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential – Low Density, Single-Family, Duplex, Mobile Homes	50–60	55–70	70–75	75–85
Residential – Multiple Family	50–65	60–70	70–75	70–85
Transient Lodging – Motel, Hotels	50–65	60–70	70–80	80–85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50–70	60–70	70–80	80–85
Auditoriums, Concert Halls, Amphitheaters	NA	50–70	NA	65–85
Sports Arenas, Outdoor Spectator Sports	NA	50–75	NA	70–85
Playgrounds, Neighborhood Parks	50–70	NA	67.5–75	72.5–85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50–70	NA	70–80	80–85
Office Buildings, Business Commercial and Professional	50–70	67.5–77.5	75–85	NA
Industrial, Manufacturing, Utilities, Agriculture	50–75	70–80	75–85	NA

Source: OPR 2017

Notes: NA: not applicable; L_{dn}: average day/night sound level; CNEL: community noise equivalent level

Normally Acceptable – Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable – New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

Normally Unacceptable – New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Clearly Unacceptable – New construction or development should generally not be undertaken.

Local

City of Encinitas General Plan

The *City of Encinitas General Plan* (1991) is the primary source of long-range planning and policy direction used to guide growth and preserve the quality of life in Encinitas. The Encinitas General Plan states that a goal of the City is to analyze proposed land uses to ensure that the designations would contribute to a proper balance of land uses within the community. The relevant goals and policies for the project include:

GOAL 1: **Provide an acceptable noise environment for existing and future residents of the City of Encinitas.**

Policy 1.7: Apply Title 24 of the California Administrative Code, associated with noise insulation standards, to single-family dwellings.

GOAL 2: **Require that new development be designed to provide acceptable indoor and outdoor noise environments.**

Policy 2.1: The Noise and Land Use Compatibility Guidelines and the accompanying discussion set forth the criteria for siting new development in the City of Encinitas. Any project which would be located in a normally unacceptable noise exposure area, based on the Land Use Compatibility Guidelines, shall require an acoustical analysis. Noise mitigation in the future shall be incorporated in the project as needed. As a condition of approval of a project, the City may require post-construction noise monitoring and sign off by an acoustician to ensure that City requirements have been met.

GOAL 3: **Ensure that residents are protected from harmful and irritating noise sources to the greatest extent possible.**

Policy 3.1: The City will adopt and enforce a quantitative noise ordinance to resolve neighborhood conflicts and to control unnecessary noise in the City of Encinitas. Examples of the types of noise sources that can be controlled through the use of a quantitative noise ordinance are barking dogs, noisy mechanical equipment such as swimming pool and hot tub pumps, amplified music in commercial establishments, etc.

GOAL 4: **Provide for measures to reduce noise impacts from stationary noise sources.**

Policy 4.1: Ensure inclusion of noise mitigation measures in the design and operation of new and existing development.

City of Encinitas Municipal Code

The City's Municipal Code establishes noise criteria to prevent noise and vibration that may jeopardize the health or welfare of the City's citizens or degrade their quality of life. Chapter 9.32, Noise Abatement and Control, and Chapter 30.40, Performance Standards, establish property line noise level limits. These limits apply to existing uses, but will also apply to future uses and are used for evaluating potential impacts of future on-site generated noise levels. Chapter 9.32.410 states that it shall be "unlawful for any person, including the City, to operate construction equipment at any construction site on Sundays, and days appointed by the President, Governor or the City Council for a public fast, thanksgiving, or holiday. Notwithstanding the above, a person may operate construction equipment on the above-specified days between the hours of 10:00 a.m. and 5:00 p.m. No such equipment, or combination of equipment regardless of age or date of acquisition, shall be operated so as to

cause noise at a level in excess of 75 decibels for more than eight hours during any 24-hour period when measured at or within the property lines of any property which is developed and used either in part or in whole for residential purposes."

The property line noise limits are summarized in Table 3.10-4, City of Encinitas Exterior Noise Limits. As stated in Section 30.40.10, "Every use shall be so operated that the noise generated does not exceed the following levels at or beyond the lot line and does not exceed the limits of any adjacent zone."

Table 3.10-4: City of Encinitas Exterior Noise Limits

Adjacent Zone	Noise Level [dB(A)]	
	7:00 a.m. to 10:00 p.m.	10:00 p.m. to 7:00 a.m.
Rural Residential (RR), Rural Residential-1 RR-1), Rural Residential-2 (RR-2), Residential-3 (R-3), Residential-5 (R-5), Residential-8 (R-8)	50	45
Residential-11 (R-11), Residential Single Family-11 (RS-11), Residential-15 (R-15), Residential-20 (R-20), Residential-25 (R-25), Mobile Home Park (MHP)	55	50
Office Professional (OP), Limited Local Commercial (LLC), Local Commercial (LC), General Commercial (GC), Limited Visitor Serving Commercial (L-VSC), Visitor Serving Commercial (VSC)	60	55
Light Industrial (L-I), Business Park (BP)	60	55

Source: City of Encinitas Municipal Code 30.40.010(A)

The property line ground vibration limits are summarized in Table 3.10-5, City of Encinitas Ground Vibration Limits. As stated in Section 30.40.10 (B), "Every use shall be so operated that the ground vibration generated at any time and measured at any point along the lot line of the lot on which the use is located shall not be perceptible and shall not exceed the limits of any adjacent zone."

Table 3.10-5: City of Encinitas Ground Vibration Limits

	Vibration in Inches per Second	
Adjacent Zone	Impact	Steady-State
Residential	.006	0.03
Commercial	.010	0.05
Light Industrial	.040	0.020
Public/Semi-Public	.010	0.05

Source: City of Encinitas Municipal Code 30.40.010(B)

STANDARDS OF SIGNIFICANCE

Thresholds of Significance

The following thresholds of significance are based on CEQA Guidelines Appendix G. For purposes of this EIR, the proposed project may have a significant adverse impact related to noise and vibration if it would result in:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- Generation of excessive groundborne vibration or groundborne noise levels.
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels.

PROJECT IMPACTS AND MITIGATION

EXCEED NOISE STANDARDS

Impact 3.10-1	**The project would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. Impacts would be less than significant.**

Noise-sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, schools, hospitals, guest lodging, libraries, and some passive recreation areas would each be considered noise sensitive and may warrant unique measures for protection from intruding noise. The nearest sensitive receptors to the project site are the predominantly single-family residences located along Sidonia Street and Leucadia Boulevard (see Figure 3.10-1).

Project Construction

Temporary construction noise levels are expected to be at their highest during grading operations, when the heaviest and most energy-intensive equipment would be utilized on-site. The City of Encinitas requires that noise levels from construction activities do not exceed a

sustained noise level of 75 dBA for more than 8 hours at residential property lines, and that construction activity be limited to the hours of 7:00 a.m. to 7:00 p.m. Monday through Saturday.

As detailed in Table 3.10-6, Construction Noise Levels, noise levels from construction equipment during grading activities are expected to range from 73 to 79 dBA at 50 feet from the equipment.

Table 3.10-6: Construction Noise Levels

Construction Equipment	Quantity	Source Level @ 50 Feet (dBA)*	Cumulative Noise Level @ 50 Feet (dBA)
Tractor/Backhoe	3	72	76.8
Dozer	1	74	74.0
Loader/Grader	1	73	73.0
Excavator	1	79	79.0

Notes: *EPA 1971 and Empirical Data
Source: Ldn Consulting 2020c (Appendix N)

Throughout the grading process, construction equipment would operate within 50 feet of a sensitive receptor for a short duration, after which it would move to another part of the project site, further from existing sensitive receptors. Based on the data shown in Table 3.10-6, construction noise levels are only expected to be 75 dBA or greater when construction activities occur within 50 feet of the property line; such conditions would only occur for brief periods of time over a given day. However, construction activities that occur on other portions of the project site are anticipated to be less than 75 dBA due to the large area of the site and the constraint of operating multiple heavy construction equipment simultaneously.

Since all grading activities would occur in the first phase of development and grading near the property lines would occur intermittently throughout the day, noise levels would not result in a sustained noise level of 75 dBA for more than 8 hours at any residential property lines. Therefore, with compliance with the City's Municipal Code (i.e., limiting construction activities to hours between 7:00 a.m. and 7:00 p.m.), project construction noise would not generate a substantial temporary increase in ambient noise levels in the project vicinity in excess of standards established in the General Plan or noise ordinance. Impacts would be **less than significant**.

Transportation-Related Noise Levels

Noise levels are calculated on a logarithmic scale where a doubling of traffic noise, without changing the vehicle speeds or mix ratio, would result in a noise level increase of 3 dBA. Noise level changes greater than 3 dBA are often identifiable as audibly louder by the average resident, while changes less than 1 dBA will not be discernible. As such, increases greater than 3 dBA are considered potentially significant.

The primary sources of transportation noise are from traffic on Leucadia Boulevard and Quail Gardens Drive. Based on traffic data from the *Vehicle Operations and Queuing Analysis* (Appendix O-2), existing transportation noise levels were estimated, then compared to the anticipated future transportation noise level from implementation of the proposed project. Table 3.10-7, Existing vs. Existing + Project Noise Levels, compares the existing conditions and existing conditions plus the proposed project.

Table 3.10-7: Existing vs. Existing + Project Noise Levels

Roadway Segment	Existing Noise Level @ 50 feet (dBA L_{dn})	Existing + Project Noise Level @ 50 feet (dBA L_{dn})	Difference (dBA L_{dn})
Leucadia Boulevard			
I-5 Northbound Ramps to Urania Ave	72.3	72.4	0.1
Urania Ave to Saxony Rd	72.3	72.4	0.1
Saxony Rd to Sidonia St	72.6	72.7	0.1
Sidonia St to Quail Gardens Dr	72.6	72.7	0.1
Quail Gardens Dr to Garden View Rd	73.0	73.0	0.1
Garden View Rd to Town Center Pl	71.7	71.8	0.1
Town Center Pl to El Camino Real	71.9	72.0	0.1
Quail Gardens Drive			
Ranch Rd to Project Driveway	58.6	58.6	0.0
Project Driveway to Leucadia Blvd	58.6	60.2	1.6

Source: Ldn Consulting, 2020c (Appendix N)
Notes: The values do not take into account the effect of any noise barriers, structures, or topography that may further reduce roadway noise levels.

With implementation of the proposed project, overall transportation noise levels would increase between 0.1 dBA L_{dn} and 1.6 dBA L_{dn}, which is below the noticeable audible increase of 3 dBA. It is noted that along the segment of Quail Gardens Road between Project Driveway and Leucadia Boulevard, there are no existing sensitive receptors – this segment is surrounded by existing agricultural operations on the west and the Encinitas Ranch Golf Course on the east. The proposed project's direct contributions to off-site roadway noise increases would therefore not cause a significant impact to any existing or future noise-sensitive land uses. Therefore, the increase in traffic from the proposed project would not generate a substantial permanent increase in ambient transportation noise levels in the project vicinity in excess of standards established in the General Plan or noise ordinance. Impacts would be **less than significant**.

Sidonia Street Secondary Access Option

As described in Chapter 2.0, Project Description, access to the project would be provided via an entrance on Quail Gardens Drive (Project Driveway). However, the option of adding a secondary

access drive on Sidonia Street was also considered. Under this Sidonia Street Secondary Access Option, and at full project occupancy, approximately 622 vehicle trips (to and from the project site) would access the development from Sidonia Street. This total is based on the SANDAG Series 13 trip distribution (Appendix O-2). Utilizing the same methodology as for the Quail Gardens Drive access only scenario above, overall roadway segment noise levels on Sidonia Street would increase by approximately 2.6 dBA Ldn with development of the proposed project (refer to Table 3.10-8, Existing vs. Existing + Project Noise Levels (Sidonia Street Secondary Access Option).

Table 3.10-8: Existing vs. Existing + Project Noise Levels (Sidonia Street Secondary Access Option)

Roadway Segment	Existing Noise Level @ 50 feet (dBA Ldn)	Existing + Project Noise Level @ 50 feet (dBA Ldn)	Difference (dBA Ldn)
Sidonia Street			
Project Driveway (Secondary Access Option) to Leucadia Blvd	53.9	56.5	2.6

Source: Ldn Consulting, 2020c (Appendix N)

The resulting increase would not generate a substantial permanent increase in ambient transportation noise levels in the project vicinity in excess of standards established in the General Plan or noise ordinance. Impacts would be **less than significant**.

Operation

According to Section 30.40 of the City's Municipal Code, properties zoned R-30 have a noise limit of 55 dBA between the hours of 7:00 a.m. and 10:00 p.m., and 50 dBA between the hours of 10:00 p.m. and 7:00 a.m.[1] The most sensitive uses to operational noise sources in the project vicinity would be the existing single-family homes west of Sidonia Street that are zoned R-3. As such, the proposed project must meet the more restrictive R-3 noise standards (50 dBA daytime level and 45 dBA evening standards) at the property line. The following section analyzes the potential worst-case stationary noise levels associated with the occupancy and operation of the proposed project.

HVAC

Noise from the proposed mechanical ventilation systems (heating, ventilation, and air conditioning, or HVAC) would be a potential source of stationary noise. Each residential unit would have a HVAC unit for temperature control installed on the side yard. To predict the worst-

[1] Per Municipal Code Section 30.08.010: "R-30 OL: Residential 30 Overlay is intended to provide for compatible high-density multiple family residential development including apartments, condominiums, and senior housing, with a maximum density of 30 units per net acre and a minimum density of 25 units per net acre. The purpose of the R-30 Overlay Zone is to diversify the housing options available in the community, and expand opportunities for creating affordable housing."

case noise generation, a continuous reference noise level of 74 dBA at 3 feet was used to represent the ground-mounted mechanical ventilation system for each unit even though the HVAC would likely operate intermittently throughout a given day. Additionally, building parapets that would shield the HVAC units on the residential apartment buildings were considered in modeling potential noise levels.

As shown in Table 3.10-9, Project HVAC Noise Levels (Western Property Line), operational noise levels from the HVACs would be approximately 44 dBA at the western property line, which is in compliance with the City's daytime 50 dBA standard for the R-3 zone. Additionally, operation of the HVAC units would also meet the most restrictive nighttime standard of 45 dBA. Therefore, the project's HVAC would not result in any established standard exceedances at the neighboring sensitive receptors and **no impact** would occur.

Table 3.10-9: Project HVAC Noise Levels (Western Property Line)

Description	Value
Distance to Nearest Observer Location (Feet)	75
Hourly Reference Noise Level (dBA)	74.0
Noise Source Reference Distance (Feet)	3.0
Noise Reduction Due to Distance (dBA)	-28.0
Reduction Due to Buildings (dBA)	-5.0
Noise Level at Property Line (dBA)	41.1
Quantity	2
Property Line Cumulative Noise Level (dBA)*	44.1

*Complies with the nighttime noise standard of 45 dBA.
Source: Ldn Consulting, 2020c (Appendix N)

Agriculture Operations

The proposed project would include an organic farm on the northern portion of the property. The farm will be equipped with a tractor for the occasional soil preparation and hauling of agricultural goods. The limited activity of the tractor would not result in noise impacts at the nearest residences located to the west.

The chicken coops would be located in the northeastern corner of the proposed project site and would be located approximately 850 feet from the nearest residences to the west across Sidonia Street. Noise associated with chicken coops comes from roosters. Roosters are capable of producing a noise level of 90 dBA at a distance of 1 foot. Two roosters would result in a cumulative noise level of 93 dBA at 1 foot. At the nearest residences, 850 feet away, the noise level would drop 58 decibels, resulting in a noise level of 35 dBA. As a design feature to further

reduce noise from the roosters, the proposed project would install solid walls along the western and southern portions of the rooster area within the coop and install light reductions to limit the crowing. Impacts would be **less than significant**.

Outdoor Event Noise

Dining/Entertainment is defined typically as any dining use that includes live entertainment. Uses within the shared public/private agricultural amenity area include a farm-to-table restaurant, farm stand, event lawns, discovery garden, greenhouse and community event space, and an outdoor education patio. The event lawns would be used for various types of events, including but not limited to, movie nights on the green, collaborative educational events with the local school district, parties, yoga events, and weddings. These uses would be located in the southern portion of the agricultural amenity area (see Figure 2.0-5, Conceptual Site Plan).

Movie nights would occur approximately once a month and during the evening time (after 7:00 p.m.). Educational events with the local school district would occur approximately once a month, midweek, between the hours of 9:00 a.m. and 3:00 p.m. Parties and weddings would occur with varied frequency depending on demand. These uses would occur during regular hours of operation, with the limitation that any outdoor amplified music or other entertainment would not occur past 10:00 p.m. and would be controlled by the project owner and/or homeowners association (HOA).

Noise sources from the outdoor events would typically be from low amplification/acoustical music or electronic noise amplifier such as a public address (PA) system or speakers. Based on similar area venues hosting outdoor events, noise levels from a low amplification speaker system are anticipated to be approximately 64 dBA at 25 feet, while noise measurements from an electronic noise amplifier would be approximately 75 dBA at a distance of 25 feet. However, it should be noted that electronic speakers can be adjusted to lower noise levels if desired or needed and noise levels on the sides and behind the disc jockey (DJ) stage drop 10 decibels due to the directional characteristics of the speakers. Noise from a fixed or point source (i.e., speaker system) drops off at a rate of 6 dBA for each doubling of distance.

Off-Site Sensitive Receptors

The nearest residential uses to the proposed dining/entertainment use area are located across Leucadia Boulevard and to the west across Sidonia Street. The nearest sensitive use is 670 feet to the west of the dining/entertainment use area. As shown in Table 3.10-10, Outdoor Event Noise Levels, noise levels would be below the exterior noise threshold of 50 dBA for the R-3 zone (with no reductions for shielding from the proposed on-site structures). The proposed residential

apartment buildings on-site (along with speaker orientation) would further reduce the noise level by 5 to 15 decibels. Therefore, impacts from outdoor event noise would be **less than significant**.

Table 3.10-10: Outdoor Event Noise Levels

Source	Reference Noise Level at 25 feet (dBA)	Distance (Feet)	Noise Reduction Due to Distance (dBA)	Resultant Noise Level (dBA)	Allowable Exterior Noise Level (dBA)*
Low Amplification or Acoustical Music	64.4	670	-28.6	35.8	50
Music from a DJ	75.2	670	-28.6	46.6	50

*Complies with the City's 50 dBA exterior threshold
Source: Ldn Consulting, 2020c (Appendix N)

On-site Sensitive Receptors

According to the City's Noise Compatibility Guidelines, interior noise levels in residential structures must not exceed 45 dBA L_{dn}. As on-site residential structures are located immediately adjacent to the outdoor event space, noise levels at the building facades of the proposed on-site residential units were analyzed to ensure that interior noise levels would be reduced to an acceptable level of 45 dBA.

The methodology used to determine the resultant interior noise levels is based upon the exterior noise level minus the sound transmission loss from building materials. Acoustical modeling of the proposed project dwelling units was performed in the project's noise study included combining the transmission loss for each of the building components such as windows, exterior doors, and exterior walls, that would reduce interior noise levels. The total noise reduction is dependent upon multiple factors such as building component, surface area, and quality of the building/construction material. Based on standard building practices, it is assumed that standard building construction would provide a noise reduction of approximately 12-15 dBA with a window open and 20 dBA noise reduction with the windows closed.

The sound transmission class (STC) is a method of rating how well wall partitions, such as doors and windows, reduce sound transmission. A higher number indicates better sound than a lower number. Based on numerous studies and efficiency standards in current residential Title 24 standards, standard assembly windows have a STC of 28. Based on information from the project applicant's architects, the STC for the proposed project would be approximately 30. The STC and transmission losses for all glass assemblies are provided in Table 3.10-11, Sound Transmission Class Ratings.

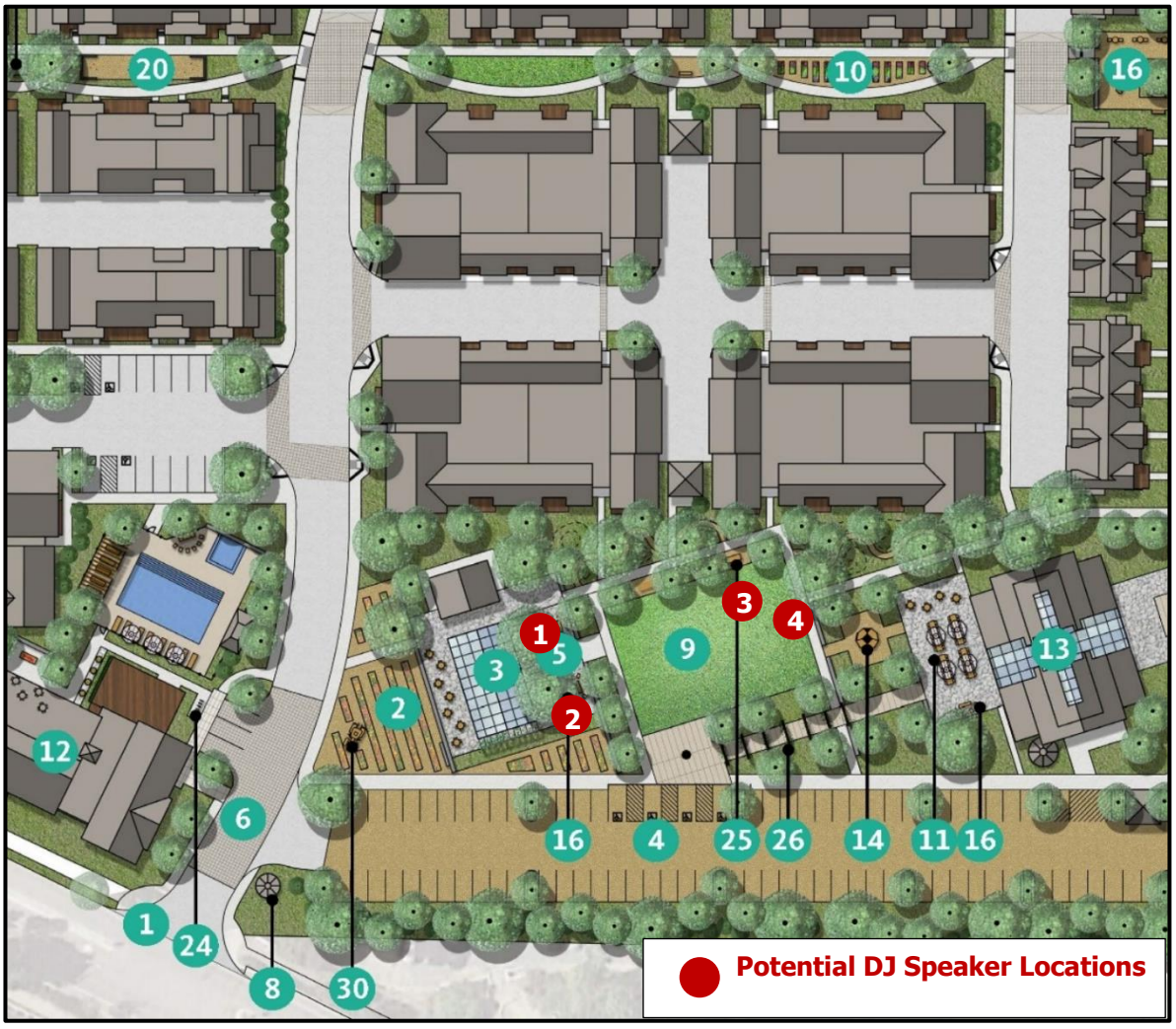
Table 3.10-11: Sound Transmission Class Ratings

Assembly	STC Rating[1]	Octave Band Transmission Loss (Hz)1					
		125	250	500	1000	2000	4000
Operable Windows	30	20	20	26	35	39	37
Fixed Window	30	20	21	26	34	38	29
Glass Doors	30	22	20	29	33	39	30

[1] STC and octave ratings used in modeling (Ldn Consulting 2020c).

Outdoor events would be held in the Outdoor Education and Event Patio (Number 5) and Event Lawn (Number 9); refer to Figure 2.0-5, Conceptual Site Plan. To be conservative in the noise analysis, it was assumed that the DJ stage could be placed in four different locations on-site; refer to Figure 3.10-2, Anticipated DJ Speakers Locations. Although speakers may be set in several locations, the speakers would never directly face the residential units on-site given the layout of the venue as well as internal rules set by the project management.

Figure 3.10-2: Anticipated DJ Speaker Locations



According to the noise study, residential structures constructed in compliance with Title 24 standards provides a noise reduction of approximately 15 decibels with the windows open and 25 decibels of reduction with the windows closed. This reduction assumes a minimum STC of 28 on the glass assemblies, which is a standard assembly. As stated above, the STC for the proposed project would be approximately 30. Therefore, to maintain a 45 dBA noise level within the residential structures, the building façade noise would need to be 70 dBA or less.

As can be seen in Figure 3.10-2, the nearest proposed residential units are located 40 feet from DJ location Number 3. Locations Number 1 and 4 are located approximately 50 feet from a sensitive receptor while location Number 2 is located approximately 100 feet from the nearest receptor. The anticipated noise levels from each speaker location are presented in Table 3.10-12, On-site Entertainment Noise Levels.

Table 3.10-12: On-site Entertainment Noise Levels

Speaker Location[1]	Reference Noise Level (dBA)	Distance to Nearest On-site Receptor (Feet)	Noise Reduction Due to Distance (dBA)	Resultant Noise Level (dBA)[2]
1	75.2	60	-7.6	67.6
2		110	-12.0	63.2
3		40	-1.6	73.6
4		60	-6.0	69.2

[1] Refer to Figure 3.10-2, On-site Dining/Entertainment Location and Distances, for the referenced DJ speaker locations.

[2] All noise levels presented do not account for any reductions in speaker orientation.

According to Table 3.10-12, On-site Entertainment Noise Levels, noise levels at the nearest building façade ranges from 63.2 to 73.6 dBA. As the speakers would not directly face the building façades, it is anticipated that noise levels would be reduced approximately 10 dBA due to the direction the speakers. Interior noise levels would be further reduced by approximately 25 dBA based on building materials and a minimum sound transmission rating of 28 on the glass assemblies which is consistent with Title 24 standards. With these noise reductions accounted for, the worst-case noise level (73.6 dBA) would be reduced to approximately 38.6 dBA (73.6-10-25=38.6 dBA) which is below the City's interior noise threshold of 45 dBA. Therefore, impacts would be **less than significant**.

On-site Pedestrian Pathway/Edible Paseo

An edible paseo, consisting of a pedestrian pathway with fruit trees and other edible landscaping, is proposed within a 50-foot setback buffer on the western boundary of the project site. The edible paseo would continue as a trail along the northern edge of the project site and would

include active fitness nodes at various locations. Connections would be made to existing pedestrian facilities, including sidewalks along Leucadia Boulevard and Quail Garden Drive.

It is assumed that people using the pedestrian pathway would generate some level of noise. The noise would be infrequent and typically consist of normal conversations that range from 60 dBA to 65 dBA at 3 feet. The closest sensitive receptors are the residential uses across Sidonia Street, which are a minimum of 60 feet from the proposed pedestrian trail. At a distance of 60 feet, the noise levels would drop 26 decibels and would therefore be below the 50 dBA standard even if the noise was continuous. Therefore, impacts would be **less than significant**.

Combined Operational Noise

As described above, the noise levels for each operations use were found to comply with the City's noise thresholds per Section 30.40 of the City of Encinitas Municipal Code.

Mitigation Measures: None required.

Level of Significance: Less than significant.

EXCESSIVE VIBRATIONS OR NOISE

Impact 3.10-2	**The project would not result in the generation of excessive groundborne vibration or groundborne noise levels. Impacts would be less than significant.**

Construction

Increases in groundborne vibration and noise levels attributable to the proposed project would be primarily associated with short-term construction-related activities. Construction on the project site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance.

Construction-related ground vibration is normally associated with impact equipment such as pile drivers and jackhammers, and the operation of some heavy-duty construction equipment, such as dozers and trucks. This impact discussion is based on the City's residential vibration threshold of 0.03 RMS velocity measured in inches per second; refer to Table 3.10-5.

The nearest vibration-sensitive uses are the residential uses on Sidonia Street located approximately 60 feet east of the project site. Table 3.10-13, Vibration Levels from Construction Activities (Nearest Receptors), provides the anticipated average vibration levels that would be

experienced at the nearest sensitive receptors from temporary construction activities. To be conservative, the vibration from loaded trucks traveling on-site were assessed at a minimum distance of 60 feet from the proposed construction activities.

Table 3.10-13: Vibration Levels from Construction Activities (Nearest Receptors)

Equipment	Approximate Velocity Level at 25 Feet (VdB)	Approximate RMS Velocity at 25 Feet (in/sec)[1]	Approximate RMS Velocity at 60 Feet (in/sec)[2]
Small bulldozer	58	0.003	0.0008
Jackhammer	79	0.035	0.0094
Loaded trucks	86	0.076	0.0204
Large bulldozer	87	0.089	0.0239
		City Criteria	0.03
		Significant Impact?	No

[1] RMS Velocity provided by the FTA (2006).
[2] PPV at Distance D = PPVref x $(25/D)^{1.5}$ provided by the FTA (2006).
Notes: RMS = root-mean square. The RMS velocity is that of a wave through sub-surface layers of different interval velocities along a specific ray path.

Project construction would occur approximately 60 feet from the nearest residential structures on Sidonia Street. Table 3.10-13 shows that vibration levels from construction equipment would not exceed 0.03 inches per second. The project does not propose the use of pile drivers during construction. Furthermore, it is acknowledged that construction activities would occur throughout the project site and would not be concentrated at a point closest to the sensitive receptors for an extended period of time. Therefore, groundborne vibration impacts from construction equipment would be **less than significant**.

Mitigation Measures: None required.

Level of Significance: Less than significant.

Operational

Operation of the project would not generate substantial levels of vibration due to the absence of vibration-generating sources. **No impact** would occur.

Mitigation Measures: None required.

Level of Significance: No impact.

PUBLIC AIRPORT OR PRIVATE AIRSTRIP

Impact 3.10-3	**The project would not be located in the vicinity of a private airstrip or an airport land use plan or, where such plan has not been adopted, within 2 miles of a public airport or public use airport, and would not expose people residing or working in the project area to excessive noise levels. No impact would occur.**

There are no public or private airports within 2 miles of the project site, and the project site is outside of an airport land use plan. The closest (public) airport is McClellan-Palomar Airport, approximately 4 miles north of the project site, and there are no private airstrips in the immediate vicinity. Therefore, **no impact** would occur.

Mitigation Measures: None required.

Level of Significance: No impact.

CUMULATIVE IMPACTS

Impact 3.10-4	**The project would not result in a significant cumulative noise impact. Impacts would be less than cumulatively considerable.**

Geographic Scope

When determining whether the overall noise (and vibration) impacts from cumulative projects would be cumulatively significant and whether the proposed project's incremental contribution to any significant cumulative impacts would be cumulatively considerable, it is important to note that noise and vibration are localized occurrences; as such, they decrease rapidly in magnitude as the distance from the source to the receptor increases. Therefore, only those cumulative projects identified in Table 3.0-1 and Figure 3.0-1 in Section 3.0 of this EIR that are in the direct vicinity of the project study areas and those that are considered influential in regard to noise and vibration would have the potential to be considered in a cumulative context with the proposed project's incremental contribution.

Potential Cumulative Impacts

Cumulative noise impacts would occur primarily as a result of increased traffic on area roadways due to buildout of the proposed project and other projects in the vicinity. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions (FTA 2006). An increase of 3 dB is widely accepted as "barely perceptible." With regard to traffic noise, traffic volumes would need to roughly double to result in a perceptible change in ambient noise levels.

To determine if cumulative traffic noise levels would increase to a level of significance with the development of the proposed project and other planned projects, data from the *Vehicle Operations and Queuing Analysis* (Appendix O-2) was analyzed for the following traffic scenarios:

- Existing: Current day noise conditions without construction of the project.
- Existing Plus Cumulative Projects Plus Project: Current day noise conditions plus the completion of the project and the completion of other permitted, planned projects or approved ambient growth factors.
- Existing vs. Existing Plus Cumulative Projects Plus Project: Comparison of the existing noise levels and the related noise level increases from the combination of the project and all other planned or permitted projects in the vicinity of the site.

As shown in Table 3.10-14, Existing vs. Near Term + Project Noise Levels, the overall roadway segment noise levels would increase between 0.1 dBA and 1.6 dBA with development of the proposed project and other cumulative projects. As the noise increase would not exceed the 3 dBA threshold, the proposed project would not contribute to a significant cumulative noise impact to any existing or future noise sensitive land use. Therefore, impacts are **less than cumulatively considerable**.

Table 3.10-14: Existing vs. Near Term + Project Noise Levels

Roadway Segment	Existing Noise Level @ 50 feet (dBA Ldn)	Existing + Project + Near Term Noise Level @ 50 feet (dBA Ldn)	Difference (dBA Ldn)
Leucadia Boulevard			
I-5 Northbound Ramps to Urania Ave	72.3	72.4	0.2
Urania Ave to Saxony Rd	72.3	72.5	0.2
Saxony Rd to Sidonia St	72.6	72.7	0.2
Sidonia St to Quail Gardens Dr	72.6	72.8	0.1
Quail Gardens Dr to Garden View Rd	73.0	73.1	0.1
Garden View Rd to Town Center Pl	71.7	71.9	0.1
Town Center Pl to El Camino Real	71.9	72.1	0.1
Quail Gardens Drive			
Ranch Rd to Project Driveway #1	58.6	58.6	0.1
Project Driveway #1 to Leucadia Blvd	58.6	60.2	1.6

Source: Chen Ryan 2020b (Appendix O-2); Ldn Consulting, 2020c (Appendix N)

Mitigation Measures: None required.

Level of Significance: Less than cumulatively considerable.

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