5.10 NOISE

This section of the Draft Environmental Impact Report (DEIR) evaluates the potential for implementation of the Creekside Specific Plan to result in noise and vibration impacts in the City of San Juan Capistrano. This section discusses the fundamentals of sound; examines federal, state, and local noise guidelines, policies, and standards; reviews noise levels at existing receptor locations; evaluates potential noise and vibration impacts associated with the proposed Plan; and provides mitigation to reduce noise impacts at sensitive receptor locations. This evaluation uses procedures and methodologies as specified by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) and is based in part on the noise modeling data in Appendix I of this DEIR.

5.10.1 Environmental Setting

Noise and Vibration Fundamentals

Noise is defined as unwanted sound and is known to have several adverse effects on people, including hearing loss, speech and sleep interference, physiological responses, and annoyance. Although sound can be easily measured, the perception of noise and the physical response to sound complicate the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as "noisiness" or "loudness." The following are brief definitions of terminology used in this section:

Technical Terminology

- **Sound.** A disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- **Decibel (dB).** A unitless measure of sound on a logarithmic scale.
- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- **Equivalent Continuous Noise Level (Leq); also called the Energy-Equivalent Noise Level.** The value of an equivalent, steady sound level which, in a stated time period (often over an hour) and at a stated location, has the same A-weighted sound energy as the time-varying sound. Thus, the Leq metric is a single numerical value that represents the equivalent amount of variable sound energy received by a receptor over the specified duration.
- **Statistical Sound Level (Ln).** The sound level that is exceeded "n" percent of time during a given sample period. For example, the L50 level is the statistical indicator of the time-varying noise signal that is exceeded 50 percent of the time (during each sampling period); that is, half of the sampling time, the changing noise levels are above this value and half of the time they are below it. This is called the "median sound level."

The L10 level, likewise, is the value that is exceeded 10 percent of the time (i.e., near the maximum) and this is often known as the "intrusive sound level." The L90 is the sound level exceeded 90 percent of the time and is often considered the "effective background level" or "residual noise level."

- **Day-Night Sound Level (Ldn or DNL).** The energy-average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the sound levels occurring during the period from 10:00 PM to 7:00 AM.

- **Community Noise Equivalent Level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added from 7:00 pm to 10:00 pm and 10 dB from 10:00 pm to 7:00 am. For general community/environmental noise, CNEL and Ldn values rarely differ by more than 1 dB (with the CNEL being only slightly more restrictive, that is, higher than the Ldn value). As a matter of practice, Ldn and CNEL values are interchangeable and are treated as equivalent in this assessment.

- **Sensitive Receptor.** Noise- and vibration-sensitive receptors include land uses where quiet environments are necessary for enjoyment and public health and safety. Residences, schools, motels and hotels, libraries, religious institutions, hospitals, and nursing homes are examples.

- **Peak Particle Velocity (PPV).** The peak rate of speed at which soil particles move (e.g., inches per second) due to ground vibration.

Sound Fundamentals

Sound is a pressure wave transmitted through the air. It is described in terms of loudness or amplitude (measured in decibels), frequency or pitch (measured in Hertz [Hz] or cycles per second), and duration (measured in seconds or minutes). The standard unit of measurement of the loudness of sound is the decibel (dB). Changes of 1 to 3 dBA are detectable under quiet, controlled conditions and changes of less than 1 dBA are usually indiscernible. A 3 dBA change in noise levels is considered the minimum change that is detectable with human hearing in outside environments. A change of 5 dBA is readily discernable to most people in an exterior environment whereas a 10 dBA change is perceived as a doubling (or halving) of the sound.

The human ear is not equally sensitive to all frequencies. Sound waves below 16 Hz are not heard at all and are "felt" more as a vibration. Similarly, while people with extremely sensitive hearing can hear sounds as high as 20,000 Hz, most people cannot hear above 15,000 Hz. In all cases, hearing acuity falls off rapidly above about 10,000 Hz and below about 200 Hz. Since the human ear is not equally sensitive to sound at all frequencies, a special frequency dependent rating scale is usually used 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.

Sound Measurement

Sound pressure is measured through the A-weighted measure to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies.

Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. On a logarithmic scale, an increase of 10 dBA is 10 times more intense than 1 dBA, while 20 dBA is 100 times more intense, and 30 dBA is 1,000 times more intense. A sound as soft as human breathing is about 10 times greater than 0 dBA. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud).

Sound levels are generated from a source and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. This phenomenon is known as "spreading loss." For a single point source, sound levels decrease by approximately 6 dBA for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by on-site operations from stationary equipment or activity at a project site. If noise is produced by a line source, such as highway traffic, the sound decreases by 3 dBA for each doubling of distance in a hard site environment. Line source noise in a relatively flat environment with absorptive vegetation decreases by 4.5 dBA for each doubling of distance.

Time variation in noise exposure is typically expressed in terms of a steady-state energy level equal to the energy content of the time varying period (called Leq), or alternately, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. For example, the L50 noise level represents the noise level that is exceeded 50 percent of the time. Half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour. Similarly, the L2, L8, and L25 values represent the noise levels that are exceeded 2, 8, and 25 percent of the time or 1, 5, and 15 minutes per hour. These "L" values are typically used to demonstrate compliance for stationary noise sources with a city's noise ordinance, as discussed below. Other values typically noted during a noise survey are the Lmin and Lmax. These values represent the minimum and maximum root-mean-square noise levels obtained over the measurement period.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, an artificial dB increment be added to quiet time noise levels in a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or Day-Night Noise Level (Ldn). The CNEL descriptor requires that an artificial increment of 5 dBA be added to the actual noise level for the hours from 7:00 P.M. to 10:00 P.M. and 10 dBA for the hours from 10:00 P.M. to 7:00 A.M. The Ldn descriptor uses the same methodology except that there is no artificial increment added to the hours between 7:00 P.M. and 10:00 P.M. Both descriptors give roughly the same 24-hour level with the CNEL being only slightly more restrictive (i.e., higher).

Psychological and Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, and thereby affecting blood pressure, functions of the heart and the nervous system. In comparison, extended periods of noise exposure above 90 dBA could result in permanent hearing damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling

sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. Table 5.10-1 shows typical noise levels from familiar noise sources.

Table 5.10-1 Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Onset of physical discomfort	120+	
	110	Rock Band (near amplification system)
Jet Flyover at 1,000 feet		
	100	
Gas Lawn Mower at three feet		
	90	
Diesel Truck at 50 feet, at 50 mph		Food Blender at 3 feet
	80	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime		
	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal speech at 3 feet
Heavy Traffic at 300 feet	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (background)
Quiet Suburban Nighttime		
	30	Library
Quiet Rural 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 2013.

Vibration Fundamentals

Vibration is an oscillating motion in the earth. Like noise, vibration is transmitted in waves, but in this case through the earth or solid objects. Unlike noise, vibration is typically of a frequency that is felt rather than heard. Vibration amplitudes can be described in terms of peak particle velocity (PPV), which is the maximum instantaneous peak of the vibration signal. PPV is appropriate for evaluating potential building damage. The units for PPV are normally inches per second (in/sec). Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration.

The way in which vibration is transmitted through the earth is called propagation. As vibration waves propagate from a source, the energy is spread over an ever-increasing area such that the energy level striking a given point is reduced with the distance from the energy source. This geometric spreading loss is inversely proportional to the square of the distance. The amount of attenuation provided by material damping varies with soil type and condition as well as the frequency of the wave.

5.10.1.1 REGULATORY BACKGROUND

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, and municipalities in the state have established standards and ordinances to control noise.

Federal

There are no federal noise regulations directly applicable to the proposed Plan.

State

California Building Code

The California Building Code (CBC), Title 24, Part 2, Volume 1, Chapter 12, Section 1207.11.2, *Allowable Interior Noise Levels*, requires that interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric is evaluated as either the day-night average sound level (L_{dn}) or the community noise equivalent level (CNEL), consistent with the noise element of the local general plan.

Structures with habitable rooms that are near major transportation noise sources within the 60 dBA CNEL noise contour require an acoustical analysis showing that the structure has been designed to limit intruding noise in the prescribed allowable levels. To comply with these regulations, applicants of new the residential projects are required to submit an acoustical report in areas where noise and land use compatibility is a concern. The report is required to analyze exterior noise sources affecting the proposed dwelling site, predicted noise spectra at the exterior of the proposed dwelling structure considering present and future land usage, basis for the prediction (measured or obtained from published data), noise attenuation measures to be applied, and an analysis of the noise insulation effectiveness of the proposed construction showing that the prescribed interior noise level requirements are met. If interior allowable noise levels are met by requiring that windows be inoperable or closed, the design for the structure must also specify the means that will be employed to provide ventilation and cooling, if necessary, to provide a habitable interior environment.

General Plan Guidelines

The California Office of Planning and Research's General Plan Guidelines discusses how ambient noise should influence land use and development decisions and includes a table of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable uses at different noise levels expressed in CNEL. A conditionally acceptable designation implies new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements for each land use is made and needed noise insulation features are incorporated in the design. By comparison, a normally acceptable designation indicates

that standard construction can occur with no special noise reduction requirements. The City of San Juan Capistrano standards are discussed in greater detail below.

Local Noise Standards

City of San Juan Capistrano General Plan

The San Juan Capistrano General Plan Noise Element addresses noise sources in the community and identifies ways to reduce the impacts of these noise sources on the community. The primary type of noise identified by the General Plan Noise Element is transportation from sources such as vehicular traffic, airport, and rail. The noise element contains goals and policies to achieve and maintain noise levels compatible with various land uses. The element identifies land uses that are sensitive to noise and ensures that noise-generating land uses are located so that they do not impact sensitive areas. Table 5.10-2 summarizes the City's noise and land use compatibility standards. The following goals and policies are directly related to the proposed Plan:

- **Noise Goal 1**: Minimize the effects of noise through proper land use planning.

  Policy 1.1 Utilize noise/land use compatibility standards as a guide for future planning and development decisions.

  Policy 1.2 Provide noise control measures and sound attenuating construction in areas of new construction or rehabilitation.

- **Noise Goal 2:** Minimize transportation related noise impacts

  Policy 2.1 Reduce transportation related noise impacts to sensitive land uses through the use of noise control measures.

  Policy 2.2 Control truck traffic routing to reduce transportation related noise impacts to sensitive land uses.

  Policy 2.3 Incorporate sound-reduction design in development projects impacted by transportation related noise.

- **Noise Goal 3**: Minimize non-transportation related noise impacts

  Policy 3.1 Reduce the impacts of noise production land uses and activities on noise-sensitive land uses.

  Policy 3.2 Incorporate sound reduction design in new construction or rehabilitation projects impacted by non-transportation related noise.

Table 5.10-2 Noise/Land Use Compatibility Matrix – San Juan Capistrano General Plan Noise Element

Land Uses	CNEL (dBA)					
	55	60	65	70	75	80
Residential – Single Family, Multifamily, Duplex	A	B	B	C	D	D
Residential- Mobile Homes	A	B	C	C	D	D
Transient Lodging: Hotels and Motels	A	B	B	C	C	D
Schools, Libraries, Churches, Hospitals, Nursing Homes	A	B	C	C	D	D
Auditoriums, Concert Halls, Amphitheaters	B	C	C	D	D	D
Sports Arena, Outdoor Spectator Sports, Amusement Parks	A	A	B	B	D	D
Playground, Neighborhood Parks	A	A	B	C	D	D
Golf Courses, Riding Stables, Water Recreation, Cemeteries	A	A	A	B	C	C
Office and Professional	A	A	B	B	C	D
Commercial Retail, Banks, Restaurants, Theaters	A	A	A	B	B	C
Industrial, Manufacturing, Utilities, Wholesale, Service Stations	A	A	A	B	B	B
Agriculture	A	A	A	A	A	A

Source: San Juan Capistrano General Plan Noise Element, 1999
Explanatory Notes
A = Normally Acceptable – Specified land use is satisfactory based on the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
B = Conditionally Acceptable – New construction or development should be undertaken only after a detailed analysis of the noise 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.
C = Normally Unacceptable – New construction or development should generally be discouraged. If it does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
D = Clearly Unacceptable - New construction or development should generally not be undertaken.

City of San Juan Capistrano Municipal Code

Interior and Exterior Noise Levels

Municipal Code Section 9-3.531, *Noise Standards,* provides noise standards for residential properties. Table 5.10-3 summarizes allowable exterior noise levels at the receiving property lines of residences.

Table 5.10-3 City of San Juan Capistrano Residential Exterior Noise Standards

Time Period	Exterior Noise Level, dBA				
	L_{50} [a]	L_{25} [b]	L_8 [c]	L_2 [d]	L_{max} [e]
7:00 AM – 7:00 PM	65	70	75	80	85
7:00 PM – 10:00 PM	55	60	65	70	75
10:00 PM – 7:00 AM	45	50	55	60	65

Source: City of San Juan Capistrano Municipal Code, Section 9-3.531, *Noise Standards*
Notes:
A 5 dBA penalty shall be applied to impacts of simple tone noises or noises consisting of speech or music.
The standards are based on the following:
[a] The noise standard for a cumulative period of more than 30 minutes in any hour; or
[b] The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour; or
[c] The noise standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour; or
[d] The noise standard plus 15 dBA for a cumulative period of more than 1 minute in any hour; or
[e] The noise standard plus 20 dBA for any period of time.

Special Provisions

Under Section 9-3.531(d), *Special Provisions*, the following activities are exempted:

- Noise associated with construction, repair, remodeling, or grading of any real property, provided activities do not take place between the hours of 6:00 P.M. and 7:00 A.M. Monday through Friday, 4:30 PM to 8:30 AM Saturdays, or any time on Sunday or a federal holiday.

- Noise sources associates with the maintenance of real property used for residential purposes, provided activities take place between 7:00 AM and 8:00 PM on any day except Sunday or between 9:00 AM and 8:00 PM on Sunday.

Noise Management District

Municipal Code Section 9-3.409 discusses the Noise Management District, which is intended to implement the Noise Element of the General Plan, mitigate disruptive sounds and vibrations from mobile sources, require effective exterior-to-interior noise reduction measures in new residential construction, and establish minimum requirements for internal noise levels in residential units.

The Noise Management Distract applies to any area that is impacted by mobile noise sources producing average ambient noise levels of 60 dBA or more. The applicable design standards for residential developments within the Noise Management District are:

- Structural soundproofing. Soundproofing shall be provided for all dwelling units. The amount and type of soundproofing for walls, roofs, and windows shall be sufficient to maintain a maximum ambient noise level in living areas no greater than 45 dBA with all windows, doors, and other openings closed.

- Windows are to meet the required ambient noise level in living areas, all windows, both fixed and openable, shall consist of either double-strength glass or double-paned glass. All windows facing sound waves generated from mobile noise source shall be manufactured and installed to specifications which prevent any sound from window vibration caused by the noise source;

- Doors shall be acoustically designed with gasketed stops and integral drop seals;
- Roofs and ceilings may be subject to special insulation or design features to meet the required interior ambient noise level;
- Exterior walls of living areas shall be of special type construction and/or include special insulation depending on the maximum ambient noise levels generated at any time in a particular area;
- Air conditioning in any dwelling unit may be required to be installed to service all living areas of the dwelling unit;
- Noise source buffering shall be installed within a landscaped buffer strip to maintain ambient noise levels no greater than 60 dBA average in residential yards adjacent to major noise source. Earth berms, decorative block or concrete walls or a combination shall be used.

5.10.1.2 EXISTING CONDITIONS

Based on the Noise Element in the San Juan Capistrano General Plan, a portion of the project site is within the 75 dBA CNEL future noise contour and a portion is within the 70 dBA CNEL future noise contour. Average daily traffic (ADT) volume on I-5 south of Junipero Serra Road is 286,800 trips.[1] Caltrans anticipates a percentage growth of 25 on I-5 in Orange County by 2045. An overall 25 percent growth by 2045 would result in an approximate 1 dBA noise increase. According to the General Plan noise and land use compatibility table (Table 5.10-2), the site plan would fall under *Normally Unacceptable* and *Clearly Unacceptable* conditions. New construction or development should generally be discouraged under *Normally Unacceptable conditions*. If it does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Under *Clearly Unacceptable*, new construction or development should generally not be undertaken.

Residential structures within the noise contours identified may require an acoustical analysis at the discretion of the City's building department showing that the structure has been designed to limit intruding noise to acceptable interior levels. To comply with these regulations, applicants of new the residential projects are required to submit an acoustical report in areas where noise and land use compatibility is a concern. The report is required to analyze exterior noise sources affecting the proposed dwelling site, predicted noise spectra at the exterior of the proposed dwelling structure considering present and future land usage, basis for the prediction (measured or obtained from published data), noise attenuation measures to be applied, and an analysis of the noise insulation effectiveness of the proposed construction showing that the prescribed interior noise level requirements are met. If interior allowable noise levels are met by requiring that windows be inoperable or closed, the design for the structure must also specify the means that will be employed to provide ventilation and cooling to provide a habitable interior environment.

As a general matter, the CEQA process does not evaluate the impact of existing environmental conditions on the project being considered by the lead agency. As a result, while the noise from existing sources is taken into

[1] Caltrans 2017. *Traffic Volumes Route 5-6*.

account as part of the baseline, the direct effects of exterior noise from nearby noise sources relative to land use compatibility of the project is generally not a required topic for impact evaluation under CEQA.

Sensitive Receptors

Certain land uses, such as residences, schools, and hospitals, are particularly sensitive to noise and vibration. Sensitive receptors include residences, senior housing, schools, places of worship, and recreational areas. These uses are regarded as sensitive because they are where citizens most frequently engage in activities which are likely to be disturbed by noise, such as reading, studying, sleeping, resting, working from home, or otherwise engaging in quiet or passive recreation. Commercial and industrial uses are not particularly sensitive to noise or vibration.

The closest sensitive receptors to the Plan Area are residences to the northeast, east and south. The closest residence is within 100 feet east of the project boundary. The closest residence to the southeast is approximately 225 feet from the project boundary. Additional residences are located further to the north and across I-5 to the west.

5.10.2 Thresholds of Significance

According to Appendix G of the CEQA Guidelines, a project would normally have a significant effect on the environment if the project would result in:

N-1 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.

N-2 Generation of excessive groundborne vibration or groundborne noise levels.

N-3 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 two miles of a public airport or public use airport, if the project would expose people residing or working in the project area to excessive noise levels.

The Initial Study, included as Appendix A, substantiates that impacts associated with the following threshold would be less than significant:

- Threshold N-3

This impact will not be addressed further in the following analysis.

5.10.2.1 CONSTRUCTION NOISE THRESHOLDS

The City of San Juan Capistrano does not have an established criterion for construction noise. The FTA provides criteria for acceptable construction noise levels and recommends a daytime noise threshold of 80 dBA $L_{eq(8hr)}$ for residential uses. For the purposes of this analysis, the FTA criterion is applied to nearby sensitive receptors to determine impact significance.

5.10.2.2 TRANSPORTATION NOISE THRESHOLDS

A project will normally have a significant effect on the environment related to noise if it will substantially increase the ambient noise levels for adjoining areas. Most people can detect changes in sound levels of approximately 3 dBA under normal, quiet conditions, and changes of 1 to 3 dBA under quiet, controlled conditions. Changes of less than 1 dBA are usually indiscernible. A change of 5 dBA is readily discernible to most people in an outdoor environment. Based on the noise standards from Table 5.10-2, noise levels above 65 dBA CNEL are normally unacceptable at sensitive receptor locations such as residences, and noise environments in these areas would be considered degraded. Based on this, a significant impact would occur if the following traffic noise increases occur relative to the existing noise environment:

- 1.5 dBA or more for ambient noise environments of 65 dBA CNEL and higher;
- 3 dBA or more for ambient noise environments of 60 -64 CNEL; and
- 5 dBA or more for ambient noise environments of less than 60 dBA CNEL.

5.10.2.3 STATIONARY NOISE THRESHOLDS

As discussed above in Section 5.10.1.1, *Regulatory Background*, the City's noise ordinance establishes exterior noise levels at residential uses per Section 9-3.531 of the Municipal Code as shown in Table 5.10-3. These exterior noise standards are used as thresholds for stationary noise sources.

5.10.2.4 VIBRATION THRESHOLDS

The City of San Juan Capistrano has not established specific limits for vibration. The FTA provides criteria for acceptable levels of groundborne vibration for various types of buildings. These criteria are shown in Table 5.10-4, *Groundborne Vibration Criteria*. For the purposes of this analysis, the FTA criterion is applied to nearby sensitive receptors to determine impact significance.

Table 5.10-4 Groundborne Vibration Criteria

Building Category		PPV (in/sec)
I.	Reinforced concrete, steel, or timber (no plaster)	0.5
II.	Engineered concrete and masonry (no plaster)	0.3
III.	Non-engineered timber and masonry buildings	0.2
IV.	Buildings extremely susceptible to vibration damage	0.12

Source: FTA 2018.
PPV = peak particle velocity

5.10.3 Plans, Programs, and Policies

PPP N-1 Residential development must comply with the CBC, Title 24, Part 2, Volume 1, Chapter 12, Interior Environment, Section 1207.11.2, *Allowable Interior Noise Levels*, and with the Noise Management District residential design standards as per Municipal Code Section 9-3.409.

PPP N-2 The project will be constructed in accordance with Section 9-3.531, *Noise Standards*, of San Juan Capistrano's Municipal Code, which generally prohibits construction, repair, remodeling, or grading of any real property between the hours of 6:00 PM and 7:00 AM on weekdays, 4:30 PM to 8:30 AM Saturdays, or at any time on Sunday or a federal holiday.

PPP N-3 Project stationary sources will comply with the City of San Juan Capistrano's exterior noise standards contained in Section 9-3.531 of the Municipal Code (see Table 5.10-3).

PPP N-4 Per the Creekside Specific Plan, the homes at Creekside will be designed to meet single event interior noise levels of 50 dBA or less in bedrooms and 55 dBA or less in other rooms.

5.10.4 Environmental Impacts

5.10.4.1 METHODOLOGY

This section analyzes impacts related to short-term construction noise and vibration, as well as operational noise and vibration due to buildout of the Specific Plan. Construction noise modeling is conducted using the FHWA Roadway Construction Noise Model (RCNM). Traffic noise increases are calculated using average daily traffic volumes (ADT) provided by Urban Crossroads and comparing existing volumes to future volumes logarithmically.[2],[3] Project vibration impacts are addressed using reference vibration levels for construction equipment provided in FTA 2018.

5.10.4.2 IMPACT ANALYSIS

The following impact analysis addresses thresholds of significance for which the Initial Study disclosed potentially significant impacts. The applicable thresholds are identified in brackets after the impact statement.

Impact 5.13-1: Construction activities would result in temporary noise increases in the vicinity of the proposed project. [Threshold N-1]

Two types of short-term noise impacts could occur during construction: (1) mobile-source noise from transport of workers, material deliveries, and debris and soil haul and (2) stationary-source noise from use of construction equipment. Existing uses surrounding the project site would be exposed to construction noise.

[2] Project noise increase = 10*Log(existing plus project volume/existing volume); Cumulative increase = 10*Log(future plus project volume/existing volume).

[3] Trips generated by the Project's proposed land uses have been estimated based on trip generation rates collected by the Institute of Transportation Engineers (ITE) Trip Generation Manual, (10th Edition, 2017). ADT on study roadway segments are based on existing traffic counts collected in November 2019 plus project and cumulative trips.

Construction Vehicles

The transport of workers and materials to and from the construction site would incrementally increase noise levels along access roadways including, but not limited to, Rancho Viejo Road and Junipero Serra Road. Individual construction vehicle pass-bys and haul trucks may create momentary noise levels of up to 85 dBA (L_{max}) at 50 feet from the vehicle, but these occurrences would be temporary and generally short lived as trucks pass by. Existing average daily trips in the project vicinity range from 10,072 to 12,715 trips.[4] The addition of 121 temporary worker, vendor and 404 haul trips would result in a negligible noise increase in comparison to existing traffic volumes on adjacent roadways and on I-5 (0.2 dBA CNEL increase or less). Therefore, impacts would be less than significant.

Construction Equipment

Noise generated during construction is based on the type of equipment used, the location of the equipment relative to sensitive receptors, and the timing and duration of the noise-generating activities. Each activity phase of construction involves the use of different construction equipment and therefore each activity phase has its own distinct noise characteristics. Noise levels from construction activities are dominated by the loudest piece of construction equipment. The dominant noise source is typically the engine, although work piece noise (such as dropping of materials) can also be noticeable. Construction is anticipated to start in February of 2021 and be completed by May of 2024, for a total duration of approximately 39 months.

The noise generated at each activity phase is determined by combining the L_{eq} contributions from each piece of equipment used at a given time. Construction activities associated with the proposed project would not require blasting or pile driving. Demolition and grading typically generate the highest noise levels because they require the largest equipment. Construction noise quite often exhibits a high degree of variability because factors such as noise attenuation due to distance, the number and type of equipment, and the load and power requirements to accomplish tasks at each construction activity phase result in different noise levels at a given sensitive receptor. Heavy equipment, such as a dozer or a loader, can have maximum, short-duration noise levels of 85 dBA at 50 feet. Since noise from construction equipment is intermittent and diminishes at a rate of 6 dBA per doubling distance,[5] the average noise levels at noise-sensitive receptors would be lower, because mobile construction equipment would move around the site with different loads and power requirements.

Noise levels from project-related construction activities were calculated from the simultaneous use of all applicable construction equipment during each phase at spatially averaged distances (i.e., from the acoustical center of the general construction site) to the nearest receptors. Although construction may occur across the entire construction area, the area around the center of construction activities best represents the potential average construction-related noise levels at the various sensitive receptors for phases such as grading. The nearest sensitive receptors are residences to the northeast on Malspina Trail and to the southeast on Marbella Vista. During the grading phase, noise levels are projected to reach 65 dBA L_{eq} at residences on Malspina Trail

[4] Existing ADT volumes provided by Urban Crossroads.
[5] The sound attenuation rate of 6 dBA is generally conservative and does not consider additional attenuation provided by existing buildings, structures, and natural landscapes around the project site.

at a distance of approximately 500 feet from the center of the construction site. At residences on Marbella Vista, construction noise levels are projected to reach 61 dBA L_{eq} at a distance of approximately 780 feet.

During building construction in the northeast corner of the Project Site, construction noise levels could at times reach 71 dBA L_{eq} at residences on Malspina Trail and 73 dBA L_{eq} at residences on Marbella Vista. Therefore, on average, construction noise levels are not projected to exceed the threshold of 80 dBA L_{eq} when calculated from the center of construction activities. However, when equipment moves around and equipment is closest to off-site residences, noise levels will be louder than the calculated levels from the center of the Project Site, and the levels could potentially exceed 80 dBA L_{eq}. Therefore, considering the anticipated duration of construction of 39 months and proximity of nearby residences, temporary construction noise is conservatively considered to result in a significant impact.

Level of significance Before Mitigation: Potentially Significant.

Impact 5.10-2 Project implementation would result in long-term operational noise that would not exceed standards. [Threshold N-1]

Noise increases are divided into three categories: audible, potentially audible, and inaudible. "Audible" increases are perceptible to humans. They generally refer to a change of 3 dBA or more since this level has been found to be the threshold of perceptibility in exterior environments. "Potentially audible" refers to a change in noise level between 1 and 3 dBA. Changes in noise level of less than 1 dBA are typically "inaudible" to humans except under quiet conditions in controlled environments. Table 5.10-5 below summarizes project-related traffic noise increases by segment calculated using traffic volumes provided by Urban Crossroads.

Table 5.10-5 Traffic Noise Levels for Existing and Project Buildout Conditions

	Traffic Volumes (ADT)				Traffic Noise Increase (dBA CNEL)			
Roadway Segment	Existing	Existing Plus Project	2040 No Project	2040 With Project	Project Noise Increase	Cumulative Noise Increase	Project Contribution to Cumulative Noise Increase	Significant Impact?
Camino Capistrano - north of Junipero Serra Road	4,958	5,198	8,049	9,789	0.2	3.0	0.8	No
Camino Capistrano - south of Junipero Serra Road	16,169	16,409	19,716	19,956	0.1	0.9	0.1	No
Junipero Serra Road - west of Camino Capistrano	206	206	269	269	0.0	1.2	0.1	No
J. Serra High - north of Junipero Serra Road	1,354	1,354	1,644	1,644	0.0	0.8	0.0	No
J. Serra High - south of Junipero Serra Road	4,256	4,256	5,169	5,169	0.0	0.8	0.0	No
Junipero Serra Road - J. Serra High to Camino Capistrano	13,311	13,793	16,386	16,868	0.2	1.0	0.1	No
I-5 SB Ramps - north of Junipero Serra Road	10,549	10,750	12,850	13,051	0.1	0.9	0.1	No
I-5 SB Ramps - south of Junipero Serra Road	5,253	5,414	6,418	6,579	0.1	1.0	0.1	No

Table 5.10-5 Traffic Noise Levels for Existing and Project Buildout Conditions

	Traffic Volumes (ADT)				Traffic Noise Increase (dBA CNEL)			
Roadway Segment	Existing	Existing Plus Project	2040 No Project	2040 With Project	Project Noise Increase	Cumulative Noise Increase	Project Contribution to Cumulative Noise Increase	Significant Impact?
Junipero Serra Road - east of I-5 SB Ramps	18,453	19,297	22,553	23,397	0.2	1.0	0.1	No
Junipero Serra Road - I-5 SB Ramps to J. Serra High	15,462	15,944	23,546	24,028	0.1	1.9	0.2	No
I-5 NB Ramps- north of Junipero Serra Road	8,502	8,703	10,364	10,565	0.1	0.9	0.1	No
I-5 NB Ramps - south of Junipero Serra Road	3,477	3,638	4,265	4,426	0.2	1.0	0.1	No
Junipero Serra Road - I-5 NB Ramps to Rancho Viejo Road	17,859	19,065	21,756	22,962	0.3	1.1	0.2	No
Junipero Serra Road - east of I-5 NB Ramps	18,453	19,297	22,554	23,398	0.2	1.0	0.2	No
Rancho Viejo Road - north of Village Road	10,072	10,312	12,798	13,038	0.1	1.1	0.2	No
Rancho Viejo Road - south of Village Road	10,300	10,540	13,074	13,314	0.1	1.1	0.1	No
Village Road - east of Rancho Viejo Road	6,076	6,076	7,379	7,379	0.0	0.0	0.1	No
Rancho Viejo Road - north of Junipero Serra Road	11,307	11,547	14,298	14,538	0.1	1.1	0.0	No
Rancho Viejo Road - south of Junipero Serra Rad	10,981	12,425	13,875	15,319	0.5	1.4	0.1	No
Junipero Serra Road - east of Rancho Viejo Road	119	119	145	145	0.0	0.8	0.4	No
Rancho Viejo Road - north of driveway 1	10,981	11,783	13,875	14,677	0.3	1.3	0.2	No
Rancho Viejo Road - south of driveway 1	11,264	11,424	14,219	14,379	0.1	1.1	0.2	No
Rancho Viejo Road - north of Golf Club Drive	10,895	11,055	13,771	13,931	0.1	1.1	0.0	No
Rancho Viejo Road - south of Golf Club Drive	11,400	11,560	14,384	14,544	0.1	1.1	0.1	No
Golf Club Drive - east of Rancho Viejo Road	2,935	2,935	3,241	3,241	0.0	0.4	0.0	No
Golf Club Drive - west of Rancho Viejo Road	3,130	3,130	3,456	3,456	0.0	0.4	0.0	No
Rancho Viejo Road - north of Ortega Highway	11,935	12,095	15,034	15,194	0.1	1.0	0.0	No
Rancho Viejo Road - south of Ortega Highway	12,715	12,715	15,442	15,442	0.0	0.8	0.0	No
Ortega Highway - south of Rancho Viejo Road	32,925	33,005	53,499	53,579	0.0	2.1	0.0	No
Ortega Highway - north of Rancho Viejo Road	40,354	40,434	52,523	52,603	0.0	1.2	0.0	No

Source: Traffic data provided by Urban Crossroads, 2020.

As discussed in Section 5.10.2, *Thresholds of Significance*, a significant impact would occur if the following traffic noise increases occur relative to the existing noise environment:

- 1.5 dBA or more for ambient noise environments of 65 dBA CNEL and higher;
- 3 dBA or more for ambient noise environments of 60 -64 CNEL; and
- 5 dBA or more for ambient noise environments of less than 60 dBA CNEL.

As shown in Table 5.10-5, project-related noise increase would be up to 0.5 dBA CNEL and, therefore, impacts would be less than significant. Cumulative traffic noise impacts are discussed below in the Section 5.10.5, *Cumulative Impacts*.

Mechanical Equipment

Heating, ventilation and air conditioning (HVAC) systems are proposed to be screened from street view. Residential units with proposed HVAC equipment are as close as approximately 75 feet to the nearest residential property line to the northeast. Typical HVAC noise is 72 dBA at a distance of 3 feet. At a distance of 75, noise levels would attenuate to 44 dBA, which is below the daytime, evening, and nighttime exterior Municipal Code standards. Therefore, impacts would be less than significant.

Level of Significance Before Mitigation: Less than significant.

Impact 5.10-3: The project would create short-term groundborne vibration that would not exceed standards. [Threshold N-2]

Construction Vibration

Construction can generate varying degrees of ground vibration, depending on the construction procedures and equipment. Operation of construction equipment generates vibrations that spread through the ground and diminish with distance from the source. The effect on buildings in the vicinity of the construction site varies depending on soil type, ground strata, and receptor-building construction. The effects from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibrations at moderate levels, to slight structural damage at the highest levels. Vibration from construction activities rarely reaches the levels that can damage structures.

Table 5.10-6 summarizes vibration levels for typical construction equipment at a reference distance of 25 feet. Typical construction equipment can generate vibration levels ranging up to 0.21 in/sec PPV at 25 feet. Vibration levels at a distance greater than 25 feet would attenuate to 0.2 in/sec PPV or less (FTA 2018). The nearest structure to proposed construction activities is approximately 65 feet to the south, where construction vibration is projected to reach up to 0.05 in/sec PPV. Therefore, construction vibration would not exceed the threshold of 0.2 in/sec PPV and impacts would be less than significant.

Table 5.10-6 Vibration Levels for Typical Construction Equipment

Equipment	PPV (in/sec) at 25 feet
Vibratory Roller	0.21
Large Bulldozer	0.089
Loaded Trucks	0.079
Jackhammer	0.035
Small Bulldozer	0.003

Source: FTA, 2018. *Transit Noise and Vibration Impact Assessment*, September.

Operational Vibration

The proposed project would not have any significant sources of vibration. Such sources typically include above ground or underground rail system such as a subway or railroad tracks. Therefore, no impact would occur.

Level of Significance Before Mitigation: Less than significant.

5.10.5 Cumulative Impacts

A noise increase of 1 dBA or less is generally only noticeable to people under controlled laboratory conditions. Based on this, a significant cumulative traffic noise increase would occur if project traffic were calculated to contribute 1 dBA or more under Cumulative Plus Project conditions to a significant traffic noise increase over existing conditions. There are a three roadway segments that would experience a traffic noise increase of greater than 1.5 dBA where the existing ambient is 65 dBA CNEL or greater: 1) Camino Capistrano - north of Junipero Serra Road, 2) Junipero Serra Road - I-5 SB Ramps to J. Serra High, and 3) Ortega Highway - south of Rancho Viejo Road. However, the project's contribution to the cumulative increase at these segments is up to 0.8 dBA CNEL. Since the project's contribution to cumulative traffic increases is less than 1 dBA CNEL, impacts would be less than significant.

5.10.6 Level of Significance Before Mitigation

The following impacts would be less than significant: 5.10-2 and 5.10-3.

Without mitigation, the following impact would be **potentially significant**:

- **Impact 5.10-1** Due to the anticipated duration of construction (39 months) and proximity of nearby residences, temporary construction noise is conservatively considered to result in a significant impact if uncontrolled.

5.10.7 Mitigation Measures

Impact 5.10-1

N-1 The project applicant shall incorporate the following practices into the construction contract agreement documents to be implemented by the construction contractor during the entire construction phase of the project:

- The project applicant and contractors shall prepare a Construction Noise Control Plan. The details of the Construction Noise Control Plan shall be included as part of the permit application drawing set and the construction drawing set.
- Limit construction to daytime hours of 7:00 a.m. to 6:00 p.m. Monday through Friday, 8:30 a.m. to 4:30 p.m. Saturdays, and prohibit construction on Sundays and national holidays.
- At least 30 days prior to the start of construction activities, all off-site businesses and residents within 500 feet of the Project Site shall be notified of the planned construction activities. The notification shall include a brief description of the project, the activities that would occur, the hours when construction would occur, and the construction period's overall duration. The notification shall include the telephone numbers of the City contact and contractor's authorized representatives that are assigned to respond in the event of a noise or vibration complaint.
- At least 10 days prior to the start of construction activities, a sign shall be posted at the entrance(s) to the job site, clearly visible to the public, that includes permitted construction days and hours, as well as the telephone numbers of the City contact and contractor's authorized representatives that are assigned to respond in the event of a noise or vibration complaint. If the authorized contractor's representative receives a complaint, they shall investigate, take appropriate corrective action, and report the action to the City.
- During the entire active construction period, equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., optimized mufflers, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds), wherever feasible.
- Require the contractor to use impact tools that are hydraulically or electrically powered wherever possible. Where the use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used along with external noise jackets on the tools.
- During the entire active construction period, stationary noise sources shall be located as far from sensitive receptors as possible, and they shall be muffled and enclosed within temporary sheds, or insulation barriers or other measures shall be incorporated to the extent feasible.
- Select haul routes that avoid the greatest amount of sensitive use areas.

- Signs shall be posted at the job site entrance(s), within the on-site construction zones, and along queueing lanes (if any) to reinforce the prohibition of unnecessary engine idling. All other equipment shall be turned off if not in use for more than 5 minutes.

- During the entire active construction period and to the extent feasible, the use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only. The construction manager shall use smart back-up alarms, which automatically adjust the alarm level based on the background noise level, or switch off back-up alarms and replace with human spotters in compliance with all safety requirements and laws.

5.10.8 Level of Significance After Mitigation

Mitigation Measure N-1 would minimize and reduce construction noise to the degree feasible, through the use of best available control technology, scheduling, noticing, location of equipment, and shielding for the duration of the construction period. However, because the reduction from the mitigation measure cannot be quantified, construction noise impacts would remain significant and unavoidable.

5.10.9 References

Airnav, LLC. 2019. Airport Information. Accessed April 16, 2020. http://www.airnav.com/airports.

California Department of Transportation (Caltrans). 2013, September. *Technical Noise Supplement ("TeNS").*

California Department of Transportation (Caltrans). 2017. *Traffic Volumes, Route 5*. Accessed April 14, 2020. https://dot.ca.gov/programs/traffic-operations/census/traffic-volumes/2017

Federal Highway Administration (FHWA). 2006, August. *Construction Noise Handbook*.

Federal Transit Administration (FTA). 2018, September. *Transit Noise and Vibration Impact Assessment*.

Governor's Office of Planning and Research. 2017. *State of California General Plan Guidelines*.

Harris, Cyril M. 1998. *Handbook of Acoustical Measurements and Noise Control.* 3rd edition. Woodbury, NY: Acoustical Society of America.

San Juan Capistrano, City of. 1999, December. San Juan Capistrano General Plan Noise Element. Accessed April 16,2020. http://sanjuancapistrano.org/Departments/Development-Services/Planning-Zoning/General-Plan

San Juan Capistrano, City of. October, 2019. San Juan Capistrano Municipal Code. Accessed April 16, 2020. http://www.qcode.us/codes/sanjuancapistrano/

Urban Crossroads. March, 2020. *Creekside Traffic Impact Analysis*.

5. Environmental Analysis
NOISE

This page intentionally left blank.