4.6 NOISE

4.6.1 INTRODUCTION

The Noise section of the EIR discusses the existing noise environment in the immediate project vicinity and identifies potential noise-related impacts and mitigation measures associated with the proposed project. Specifically, this section analyzes potential increases in noise levels during construction and operation of the proposed project. Construction noise levels attributable to the proposed project and the resultant impact of these noise levels upon any surrounding sensitive receptors is addressed. In addition, the project's increase in noise levels on surrounding roadways is evaluated to determine if any increases would be considered substantial. This section also assesses existing and future anticipated traffic noise levels along roadways surrounding the project site, and the potential effects of such off-site traffic noise upon any sensitive outdoor areas within the proposed project.[1] Groundborne vibration from construction equipment sources is also evaluated to determine whether on-site vibratory construction equipment could result in adverse effects to nearby structures. Information presented in this section is primarily drawn from the Environmental Noise Assessment and supplemental memorandum prepared specifically for the proposed project by j.c. brennan & associates, Inc. (see Appendix K).[2]

4.6.2 EXISTING ENVIRONMENTAL SETTING

The Existing Environmental Setting section provides background information on noise and vibration, a discussion of acoustical terminology and the effects of noise on people, existing sensitive receptors in the project vicinity, existing sources and noise levels in the project vicinity, and groundborne vibration.

Fundamentals of Acoustics

Acoustics is the science of sound. Sound is a mechanical energy of vibration transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough, 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, called Hertz (Hz).

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1 CEQA does not require an analysis of the environment's impact on the project (as opposed to impacts of a project on the environment) (based on *California Building Industry Assn. v. Bay Area Air Quality Management Dist.* [2015] 62 Cal.4th 369, 392; see also *Mission Bay Alliance v. Office of Community Investment & Infrastructure* [2016] 6 Cal.App.5th 160, 197); however, impacts to future residents of the proposed project due to traffic noise along local roadways is evaluated for the purposes of considering the project's consistency with City's General Plan noise standards.

2 j.c. brennan & associates, Inc. *3820 Chiles Road EIR. April 30,* 2018.
j.c. brennan & associates, Inc. *Unit Increase for 3820 Chiles Road Project.* June 9, 2018.

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. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel (dB) scale uses the hearing threshold (20 micropascals or vibrations per second), 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 perceived loudness of sounds is dependent upon 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. A strong correlation exists between A-weighted sound levels and the way the human ear perceives sound. Accordingly, 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.

The decibel scale is logarithmic, not linear. In other words, 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. In addition, because of the logarithmic nature of the decibel scale, provided two sources of noise differ in intensity by at least 10 dB, their noise would not be additive. Two noise levels differing by 10 dB, which are added together, essentially equal the higher of the two noise levels.[3]

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A-weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day/night average noise level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 PM to 7:00 AM)

[3] Because the decibel scale is logarithmic, decibels must be converted into energy before undergoing mathematical conversion, so the formula for adding two sources of noise is as follows:
$L_{sum} = 10 * Log_{10} (10 \wedge (L_1 / 10) + 10 \wedge (L_2 / 10))$
Which for theoretical values of 60 and 70 for L_1 and L_2, respectively, computes as follows:
$L_{sum} = 10 * Log_{10} (10 \wedge (70 / 10) + 10 \wedge (60 / 10))$
Which reduces to:
L_{sum} = 70.41 dB or 70 dB after rounding.

hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, L_{dn} tends to disguise short-term variations in the noise environment.

Table 4.6-1 provides a list of several examples of the noise levels associated with common activities.

Table 4.6-1
Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	--110--	Rock Band
Jet Fly-over at 300 meters (1,000 feet)	--100--	
Gas Lawn Mower at 1 meter (3 feet)	--90--	
Diesel Truck at 15 meters (50 feet), at 80 kilometers/hour (50 miles/hour)	--80--	Food Blender at 1 meter (3 feet) Garbage Disposal at 1 meter (3 feet)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 meters (100 feet)	--70--	Vacuum Cleaner at 3 meters (10 feet)
Commercial Area Heavy Traffic at 90 meters (300 feet)	--60--	Normal Speech at 1 meter (3 feet)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

Source : Caltrans, Technical Noise Supplement, Traffic Noise Analysis Protocol. November, 2009.

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction;
- Interference with activities such as speech, sleep, and learning; or
- Physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. A satisfactory way of measuring the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction does not exist. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way the new noise compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the

more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise would be judged by those hearing the new noise.

With regard to increases in A-weighted noise levels, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1.0 dB cannot be perceived;
- Outside of the laboratory, a 3.0 dB change is considered a barely perceivable difference;
- A change in level of at least 5.0 dB is required before any noticeable change in human response would be expected; and
- A 10 dB change is subjectively heard as approximately a doubling in loudness, and would typically cause an adverse response.

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate of approximately six dB per doubling of distance from the source, depending on environmental conditions (i.e., atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

Existing Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others. Land uses often associated with sensitive receptors generally include residences, schools, libraries, hospitals, and passive recreational areas. Noise sensitive land uses are typically given special attention in order to achieve protection from excessive noise. Sensitivity is a function of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities involved.

In the immediate vicinity of the project site, sensitive land uses include Merryhill Preschool and multi-family residential uses to the south, the Days Inn hotel to the east, and single-family residential uses located west of La Vida Way. The aforementioned land uses could potentially experience noise impacts associated with project construction, and/or increased roadway traffic associated with the project.

Existing Ambient Noise Levels

To quantify existing ambient noise levels in the vicinity of the project site, on February 22 and 23, 2018, j.c. brennan & associates, Inc. staff conducted short-term noise level measurements and continuous 24-hour noise level measurements on the site. Figure 4.6-1 shows the locations of the noise measurement sites. The ambient noise levels measured are presented in Table 4.6-2. The maximum value (L_{max}) represents the highest noise level measured during an interval. The average value (L_{eq}) represents the energy average of all of the noise measured during an interval. The median value (L_{50}) represents the sound level exceeded 50 percent of the time during an interval. Based on field observations and noise measurement data described above, the existing noise environment at the project site is defined by roadway traffic associated with I-80.

Figure 4.6-1
Noise Measurement Locations

Source : j.c. brennan & associates, Inc., 2018.

Table 4.6-2
Summary of Existing Background Noise Measurement Data

Site	Location	L_{dn}	Average Measured Hourly Noise Levels (dBA)					
			Daytime (7 AM – 10 PM) Low-High (Average)			Nighttime (10 PM – 7 AM) Low-High (Average)		
			L_{eq}	L_{50}	L_{max}	L_{eq}	L_{50}	L_{max}
A	Center of Project Site	69	65	64	76	62	60	75
Short-Term Noise Level Measurements								
Site	**Location**	**Time**	L_{eq}	L_{50}	L_{max}	**Notes**		
1	Adjacent to Days Inn	4:10 PM	60.0	57.9	69.4	Train Passby 63 dB to 65 dB Lmax. I-80 is the dominant noise source.		
2	Adjacent to Merryhill	4:30 PM	59.1	56.8	62.9	Train Passby 60 dB to 63 dB Lmax. I-80 is the dominant noise source.		

Source : j.c. brennan & associates, Inc., 2018.

Existing Roadway Noise Levels

The peak hours of traffic occur inside the peak two-hour periods of 7:00 to 9:00 AM and 4:00 to 6:00 PM. Because the PM peak hour traffic volumes are the largest, the PM peak hour traffic volumes were used to represent the environmental worst-case scenario for this analysis. The PM peak hour traffic volumes were compiled into segment volumes and converted into daily traffic volumes. Traffic noise levels are predicted at 75 feet from the centerline along each project-area roadway segment. Sensitive receptors may be located at distances which vary from the assumed calculation distance and may experience shielding from intervening barriers or sound walls. However, the noise level at 75 feet is considered to be representative of the majority of sensitive receptors located along roadways in the project vicinity.

Table 4.6-3 presents the existing traffic noise levels in terms of L_{dn} along each roadway segment, as well as the distances to existing traffic noise contours. Appendix K to this EIR provides details regarding the FHWA modeling, including the complete inputs and results.

Railroad Noise Levels

While railroad operations along the UPRR track are audible at the site, the I-80 traffic noise levels are the dominant source. Based upon the 24-hour noise level measurements conducted on the site, the hourly L_{eq} and L_{50} data were generally within one or two dB of each other. The results of the noise level measurements indicate steady-state noise level which were not influenced by the train passbys.

Table 4.6-3
Existing Traffic Noise Levels and Distances to Contours

Roadway	Segment	dBA L_{dn}	Distance (Feet)	Distance (feet) to Traffic Noise Contours (L_{dn})[1]		
				70 dB	65 dB	60 dB
I-80	Adjacent to Project Site	70	350	325	701	1,511
Cowell Blvd.	Pole Line Rd. to Chiles Rd./Drummond Ave.	63	75	24	52	122
Cowell Blvd.	Chiles Rd./Drummond Ave. to Ensenada Dr.	59	75	14	29	63
Chiles Rd.	Cowell Blvd. to Project Site	63	75	24	51	110
Chiles Rd.	Project Site to Mace Blvd.	64	75	32	69	148
La Vida Way	Chiles Rd. to Cowell Blvd.	58	75	12	27	57

[1] Traffic noise levels do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.

Source : j.c. brennan & associates, Inc., 2018.

Vibration

While vibration is similar to noise, both involving a source, a transmission path, and a receiver, vibration differs from noise because noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration depends on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating. Vibration can be measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities in inches per second. Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities.

The City of Davis does not have specific policies pertaining to vibration levels. However, vibration levels associated with construction activities and project operations are addressed as potential vibration impacts associated with project implementation. Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Table 4.6-4 indicates that the threshold for architectural damage to structures is 0.2 peak particle velocity in inches per second (in/sec p.p.v) and continuous vibrations of 0.1 in/sec p.p.v, or greater, would likely cause annoyance to sensitive receptors.

4.6.3 REGULATORY CONTEXT

In order to limit exposure to physically and/or psychologically damaging noise levels, the State of California, various county governments, and most municipalities in the State have established standards and ordinances to control noise. The following provides a general overview of the existing State and local regulations that are relevant to the proposed project.

Table 4.6-4
Effects of Vibration on People and Buildings

Peak Particle Velocity		Human Reaction	Effect on Buildings
mm/sec	in/sec		
0.15 - 0.30	0.006 - 0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of "architectural" damage to normal buildings
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of "architectural" damage to normal dwelling - houses with plastered walls and ceilings. Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize "architectural" damage
10 - 15	0.4 - 0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage

Source: Caltrans. Transportation Related Earthborne Vibrations(Caltrans Experiences) Technical Advisory, Vibration, TAV-04-01-R0201. January 23, 2004.

Federal Regulations

The following are the federal environmental laws and policies relevant to noise.

Federal Interagency Committee on Noise

The Federal Interagency Committee on Noise (FICON) provides guidance in the assessment of changes in ambient noise levels resulting from aircraft operations. The recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, the recommendations have been widely accepted as being applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the L_{dn}.

State Regulations

The following are the State environmental laws and policies relevant to noise.

California State Building Codes

The State Building Code, Title 24, Part 2 of the State of California Code of Regulations, establishes uniform minimum noise insulation performance standards to protect persons within new buildings which house people, including hotels, motels, dormitories, apartment houses, and dwellings other than single-family dwellings.

Title 24 mandates that interior noise levels attributable to exterior sources shall not exceed 45 dB L_{dn} or CNEL in any habitable room. Title 24 also mandates that for structures containing noise-sensitive uses to be located where the L_{dn} or CNEL exceeds 60 dB, an acoustical analysis must be prepared to identify mechanisms for limiting exterior noise to the prescribed allowable interior levels. If the interior allowable noise levels are met by requiring that windows be kept closed, the design for the structure must also specify a ventilation or air conditioning system to provide a habitable interior environment.

Local Regulations

The following are the local environmental goals and policies relevant to noise.

City of Davis General Plan

The applicable goals, policies, and standards from the Noise Chapter of the Davis General Plan are presented below.

Goal NOISE 1 Maintain community noise levels that meet health guidelines and allow for a high quality of life.

Policy NOISE 1.1 Minimize vehicular and stationary noise sources, and noise emanating from temporary activities.

Standard NOISE 1.1a: The City shall strive to achieve the "normally acceptable" exterior noise levels shown in Table 4.6-5 (Table 19 of the General Plan) and the target interior noise levels in Table 4.6-6 (Table 20 of the General Plan) in future development areas and in currently developed areas.

Standard NOISE 1.1b: New development shall generally be allowed only in areas where exterior and interior noise levels consistent with Table 4.6-5 (Table 19 of the General Plan) and Table 4.6-6 (Table 20 of the General Plan) can be achieved.

Table 4.6-5
Exterior Noise Level Standards

Land Use Category	Community Noise Exposure L_{dn} or CNEL, dBA			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential	Under 60	60-70[1]	70-75	Above 75
Transient Lodging - Motels, Hotels	Under 60	65-75	75-80	Above 80
Schools, Libraries, Churches, Hospitals, Nursing Homes	Under 60	60-70	70-80	Above 80
Auditoriums, Concert Halls, Amphitheaters	Under 50	50-70	N/A	Above 70
Sports Arenas, Outdoor Spectator Sports	NA	Under 75	N/A	Above 75
Playgrounds, Neighborhood Parks	Under 70	N/A	70-75	Above 75
Golf Courses, Riding Stables, Water Recreation, Cemeteries	Under 70	N/A	70-80	Above 80
Office Buildings, Business Commercial and Professional	Under 65	65-75	Above 75	N/A
Industrial, Manufacturing, Utilities, Agriculture	Under 65	70-80	Above 80	N/A

Notes:

- *Normally Acceptable*: Specified land use is satisfactory based upon the assumption that any buildings involved are of normal conventional construction, without special noise insulation requirements.
- *Conditionally Acceptable*: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is conducted, and needed noise attenuation features are included in the construction or development.
- *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 conducted and needed noise attenuation features shall be included in the construction or development.
- *Clearly Unacceptable*: New construction or development shall not be undertaken.
- *N/A*: Not applicable.
- The City Council shall have discretion within the "conditionally acceptable" range for residential use to allow levels in outdoor spaces to go up to 65 dBA if cost effective or aesthetically acceptable measures are not available to reduce noise levels in outdoor spaces to the "normally acceptable" levels. Outdoor spaces which are designed for visual use only (for example, street-side landscaping in an apartment project), rather than outdoor use space may be considered acceptable up to 70 dBA.

Source: City of Davis, January 2007.

Table 4.6-6
Standards for Interior Noise Levels

Use	Noise Level (dBA)
Residences, schools through grade 12, hospitals and churches	45
Offices	55

Source: City of Davis, January 2007.

Standard NOISE 1.1c: New development and changes in use shall generally be allowed only if they will not adversely impact attainment within the community of the exterior and interior noise standards shown in Table 4.6-

5 (Table 19 of the General Plan) and Table 4.6-6 (Table 20 of the General Plan). Cumulative and project specific impacts by new development on existing residential land uses shall be mitigated consistent with the standards in Table 4.6-5 (Table 19 of the General Plan) and Table 4.6-6 (Table 20 of the General Plan).

Standard NOISE 1.1d Required noise mitigation measures for new and existing housing shall be provided with the first stage and prior to completion of new developments or the completion of capacity-enhancing roadway changes wherever noise levels currently exceed or are projected within 5 years to exceed the normally acceptable exterior noise levels in Table 4.6-5 (Table 19 of the General Plan).

Policy NOISE 1.2 Discourage the use of sound walls whenever alternative mitigation measures are feasible, while also facilitating the construction of sound walls where desired by the neighborhood and there is no other way to reduce noise to acceptable exterior levels shown in Table 4.6-5 (Table 19 of the General Plan).

Standard NOISE 1.2a Where sound walls are built, they should include dense landscaping along them to mitigate their visual impact, as illustrated in Figure 38 of the General Plan.

Standard NOISE 1.2b Where sound walls are built, they should provide adequate openings and visibility from surrounding areas to increase safety and access, as illustrated in Figure 38 of the General Plan. Openings should be designed so as to maintain necessary noise attenuation.

Standard NOISE 1.2c Review sound walls and other noise mitigations through the design review process.

Goal NOISE 2 Provide for indoor noise environments that are conducive to living and working.

Policy NOISE 2.1 Take all technically feasible steps to ensure that interior noise levels can be maintained at the levels shown in Table 4.6-6 (Table 20 of the General Plan).

Standard NOISE 2.1a New residential development or construction shall include noise attenuation measures

necessary to achieve acceptable interior noise levels shown in Table 4.6-6 (Table 20 of the General Plan).

Standard NOISE 2.1b Existing areas that will be subjected to noise levels greater than the acceptable noise levels shown in Table 4.6-6 (Table 20 of the General Plan) as a result of increased traffic on existing city streets (including streets remaining in existing configurations and streets being widened) shall be mitigated to the acceptable levels in Table 4.6-6 (Table 20 of the General Plan). If traffic increases are caused by specific projects, then the City shall be the lead agency in implementing cumulative noise mitigation projects. Project applicants shall pay their fair share for any mitigation.

South Davis Specific Plan

The following goals and policies related to noise from the South Davis Specific Plan are applicable to the proposed project.

Goal Ensure that noise levels within south Davis are regulated so that residents shall not be harmed.

Policies: All new development along the frontage of Interstate 80 shall be designed to create a continuous noise wall through the creative use of building walls, landscaping, and high earth berms.

As needed, require acoustical studies for new development per Title 24 and implement study findings.

As a goal, all exterior noise on residential projects shall be mitigated to a base level of 60 dbls.

City of Davis Noise Ordinance

Section 24 of the City of Davis Municipal Code establishes a maximum noise level standard of 55 dB during the hours of 7:00 AM to 9:00 PM, and 50 dB during the hours of 9:00 PM to 7:00 AM for stationary noise sources. The ordinance defines maximum noise level as the "maximum continuous sound level or repetitive peak level produced by a sound source or group of sources." For the purposes of this analysis, j.c. brennan & associates, Inc. interprets this definition to be equivalent to the average noise level descriptor, L_{eq}. The Municipal Code makes exemptions for certain typical activities which may occur within the City. The exemptions are listed in Article 24.02.040, Special Provisions, and are summarized below:

a) Normal operation of power tools for non-commercial purposes are typically exempted between the hours of 8 AM and 8 PM unless the operation unreasonably disturbs the peace and quiet of any neighborhood.
b) Construction or landscape operations would be exempt during the hours of 7 AM to 7 PM Mondays through Fridays and between the hours of 8 AM to 8 PM Saturdays and Sundays assuming that the operations are authorized by valid city permit or business license, or carried out by employees or contractors of the city and one of the following conditions apply:
    (1) No individual piece of equipment shall produce a noise level exceeding eighty-three dBA at a distance of twenty-five feet. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to twenty feet from the equipment as possible.
    (2) The noise level at any point outside of the property plane of the project shall not exceed eighty-six dBA.
    (3) The provisions of subdivisions (1) and (2) of this subsection shall not be applicable to impact tools and equipment; provided, that such impact tools and equipment shall have intake and exhaust mufflers recommended by manufacturers thereof and approved by the director of public works as best accomplishing maximum noise attenuation, and that pavement breakers and jackhammers shall also be equipped with acoustically attenuating shields or shrouds recommended by the manufacturers thereof and approved by the director of public works as best accomplishing maximum noise attenuation. In the absence of manufacturer's recommendations, the director of public works may prescribe such means of accomplishing maximum noise attenuation as he or she may determine to be in the public interest.
    Construction projects located more than two hundred feet from existing homes may request a special use permit to begin work at 6:00 AM on weekdays from June 15th until September 1st. No percussion type tools (such as ramsets or jackhammers) can be used before 7:00 AM. The permit shall be revoked if any noise complaint is received by the police department.
    (4) No individual powered blower shall produce a noise level exceeding seventy dBA measured at a distance of fifty feet.
    (5) No powered blower shall be operated within one hundred feet radius of another powered blower simultaneously.
    (6) On single-family residential property, the seventy dBA at fifty feet restriction shall not apply if operated for less than ten minutes per occurrence.
c) The City Code also exempts air conditioners, pool pumps, and similar equipment from the noise regulations, provided that they are in good working order.
d) Work related to public health and safety is exempt from the noise requirements.
e) Safety devices are exempt from the noise requirements.
f) Emergencies are exempt from the noise requirements.

In addition, Section 24 of the City of Davis Municipal Code establishes the noise violations which can be issued by the Davis Police Department. A Sound (Noise) Permit from the Police Department is required for the following uses:

- Amplified sound at any indoor or outdoor event and more than 100 people will attend; and
- Install, use or operate within the City a loudspeaker or other amplifying equipment in a fixed or moveable position or mounted upon any sound truck for purposes of giving instruction, directions, talks, addresses, lectures or transmitting music to any persons upon a street, alley, sidewalk, park, place or other outdoor property.

The Sound (Noise) Permit outlines the noise limits allowable under the permit as well as the requirements for a noise permit.

4.6.4 IMPACTS AND MITIGATION MEASURES

Existing literature, noise and vibration measurements, and application of accepted noise and vibration prediction and propagation algorithms were used to predict impacts due to and upon development of the proposed project. More specific detail on methodology is provided below.

Impacts of the environment on a project (as opposed to impacts of a project on the environment) are beyond the scope of required California Environmental Quality Act (CEQA) review. "[T]he purpose of an EIR is to identify the significant effects of a project on the environment, not the significant effects of the environment on the project." (*Ballona Wetlands Land Trust v. City of Los Angeles*, (2011) 201 Cal.App.4th 455, 473 (*Ballona*).) The impacts discussed in this section of the EIR relate both to noise that may be caused by the proposed project (e.g. construction noise and operational traffic added to surrounding streets) as well as effects of existing environmental noise sources on residents and users of the project (e.g. railroad noise and background traffic on surrounding streets). The California Supreme Court recently held that "CEQA does not generally require an agency to consider the effects of existing environmental conditions on a proposed project's future users or residents. What CEQA does mandate… is an analysis of how a project might exacerbate existing environmental hazards." (*California Building Industry Assn. v. Bay Area Air Quality Management Dist.* (2015) 62 Cal.4th 369, 392; see also *Mission Bay Alliance v. Office of Community Investment & Infrastructure* (2016) 6 Cal.App.5th 160, 197 ["identifying the effects on the project and its users of locating the project in a particular environmental setting is neither consistent with CEQA's legislative purpose nor required by the CEQA statutes"], quoting *Ballona*, *supra*, 201 Cal.App.4th at p. 474.) Therefore, for the purposes of the CEQA analysis, the relevant inquiry is not whether the proposed project's future users or residents will be exposed to preexisting environmental noise-related hazards, but instead whether project-generated noise will exacerbate the pre-existing conditions. Nonetheless, for informational purposes, this report considers both the proposed project's contribution to on- and off-site noise levels as well as exposure of future users or residents of the proposed project to potential hazards associated with the preexisting noise environment.

Standards of Significance

Consistent with Appendix G of the CEQA Guidelines, the City's General Plan, and professional judgment, a significant impact would occur if the proposed project would result in the following:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without project;
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels; or
- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

The first four thresholds listed above, taken from Appendix G of the CEQA Guidelines, are hereby defined more specifically for the City of Davis based upon General Plan and Noise Ordinance requirements, as well as previous EIRs prepared and certified by the Davis City Council:

- *Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies*

  Specifically, 60 to 70 dB L_{dn} for transportation noise sources at existing residential uses. For non-transportation noise sources, the standards of the City of Davis Municipal Code Section 24 apply. See Table 4.6-5 and Table 4.6-6 above.

- *Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels*

  A limit of 0.2 in/sec p.p.v. is considered a safe criterion that would protect against architectural or structural damage.

- *A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project*

  Table 4.6-7 is based upon recommendations made by the Federal Interagency Committee on Noise (FICON) to provide guidance in the assessment of changes in ambient noise levels resulting from aircraft operations. The recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, it has been accepted that they are applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the L_{dn}.

Table 4.6-7 Significance of Changes in Noise Exposure	
Ambient Noise Level Without Project, L_{dn}	**Increase Required for Significant Impact**
< 60 dB	+ 5.0 dB or more
60 to 65 dB	+ 3.0 dB or more
> 65 dB	+ 1.5 dB or more
FICON provides guidance in the assessment of changes in ambient noise levels resulting from aircraft operations. The recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, it has been widely accepted that they are applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the L_{dn}. *Source: FICON, 1992.*	

Based on Table 4.6-7, an increase in the traffic noise level of 5.0 dB or more would be significant where the pre-project noise level is below 60 dB L_{dn}. Extending this concept to higher noise levels, an increase in the traffic noise level of 1.5 dB or more may be significant where the pre-project traffic noise level exceeds 65 dB L_{dn}. The rationale for the Table 4.6-7 criteria is that, as ambient noise levels increase, a smaller increase in noise resulting from a project is sufficient to cause annoyance.

- *A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without project*

  Section 24.02.240 of the City's Noise Ordinance is used, specifically,

  b) Construction or landscape operations would be exempt during the hours of 7 AM to 7 PM Mondays through Fridays and between the hours of 8 AM to 8 PM Saturdays and Sundays assuming that the operations are authorized by valid city permit or business license, or carried out by employees or contractors of the city and one of the following conditions apply:
     1) No individual piece of equipment shall produce a noise level exceeding eighty-three dBA at a distance of twenty-five feet. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to twenty feet from the equipment as possible.
     2) The noise level at any point outside of the property plane of the project shall not exceed eighty-six dBA.

Issues Not Discussed Further

The project area is not located within the vicinity of a public airport or a private airstrip; nor is the site within an airport land use plan. The nearest airport to the project site is the UC Davis Airport, located approximately 4.5 miles west of the site. Therefore, the Initial Study prepared for the proposed project (see Appendix C) determined that development of the proposed project would result in no impact related to the following noise-related issues:

- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels; or
- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

Accordingly, such impacts are not analyzed further in this EIR.

Method of Analysis

Below are descriptions of the methodologies utilized to determine traffic noise, train noise, as well as construction noise and vibration impacts. Further modeling details and calculations are provided in Appendix K to this EIR. The results of the noise and vibration impact analyses were compared to the standards of significance discussed above in order to determine the associated level of impact.

Traffic Noise

The noise level measurements were conducted to determine typical background noise levels for comparison to the project-related noise levels. The sound-level meters were programmed to record the hourly maximum, median, and average noise levels at each site during the survey. The maximum value, denoted L_{max}, represents the highest noise level measured during each hour. The average value, denoted L_{eq}, represents the energy average of all of the noise received by the sound level meter microphone. The median value, denoted L_{50}, represents the sound level exceeded 50 percent of the time during the monitoring period.

A Larson Davis Laboratories (LDL) Model 820 and Model 824 precision integrating sound level meter was used for the ambient noise level measurement survey. The meter was calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

Traffic volumes were obtained from the project traffic consultant. A detailed summary of such volumes is provided in Chapter 7, Transportation and Circulation, of this EIR. Truck percentages and vehicle speeds on the local area roadways were estimated from field observations and Caltrans counts. Traffic noise levels were predicted at 75 feet from the centerline along each project-area roadway segment. I-80 traffic noise levels were predicted at a distance representative of the project site. The FHWA model was used to estimate traffic noise levels.

In addition to the traffic volumes obtained for existing conditions, traffic volumes were also provided by the traffic consultant for an Existing Plus Approved Projects (EPAP) Conditions scenario and two cumulative scenarios: Cumulative Year 2035 Conditions and Super Cumulative Year 2035 Conditions. The EPAP Conditions include projects that are approved or are reasonably foreseeable in the near term. The Cumulative Year 2035 Conditions include buildout of the City of Davis General Plan, all of the projects identified in the EPAP Conditions, and the revised Nishi Project, referred to as Nishi 2.0. The Super Cumulative Year 2035 Conditions scenario is the

Cumulative Year 2035 Conditions with the addition of traffic generated by the Mace Ranch Innovation Center (MRIC) project. The scenarios are discussed in further detail in Section 4.7, Transportation and Circulation, of this EIR.

It should be noted that the original project application included a maximum of 222 units for the Preferred Site Plan, and the Environmental Noise Assessment that was prepared by j.c. brennan & associates, Inc. was based on the original project application. Since that time, however, the applicant has submitted a revision to the Preferred Site Plan to increase the number of units from 222 to 225. This section of the EIR presents the results from the Environmental Noise Assessment for the maximum 222-unit count. Based on a technical memo[4] provided by j.c. brennan & associates, Inc., the increase of three units would result in an overall change in traffic noise levels of 0.05 dBA L_{dn}, which would be considered a worst-case estimate by assuming that the increase in vehicles would occur on all roadways. The increase would not result in an increase to any impacts identified or any new impacts not identified in the analysis below associated with traffic noise levels. Thus, the analysis within this section of the EIR remain adequate.

Construction Noise and Vibration

Construction noise and vibration was analyzed using data compiled for various pieces of construction equipment at a representative distance of 50 feet. Construction activities are discussed relative to the applicable City of Davis noise policies.

Project-Specific Impacts and Mitigation Measures

The following discussion of potential noise and vibration impacts is based on the implementation of the proposed project in comparison with the standards of significance identified above. Each impact is followed by recommended mitigation to reduce the identified impacts, if needed.

As discussed in Chapter 3, Project Description, of this EIR, two development scenarios for the proposed project are currently being considered: the Preferred Site Plan and Alternative B. The following discussion of impacts is based on implementation of either of the development scenarios. Where impacts would be similar under both of the development scenarios, the discussion of impacts presented below is applicable for both scenarios. However, where impacts would differ between the two development scenarios, the impacts are discussed separately for each scenario, as noted.

4.6-1 A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. Based on the analysis below, and with implementation of mitigation, the impact is *less than significant.*

During the construction of the proposed project, including roads, water and sewer lines, and related infrastructure, noise from construction activities would temporarily add to the noise environment in the project vicinity. The City of Davis Noise Ordinance establishes allowable hours of operation and noise limits for construction activities. The nearest

[4] j.c. brennan & associates, Inc. *Unit Increase for 3820 Chiles Road Project. June 9,* 2018.

sensitive receptor would be located approximately 85 feet to the west, and 20 feet to the south. As shown in Table 4.6-8, activities involved in construction could be expected to generate maximum noise levels ranging from 86 to 98 dB at a distance of 20 feet. As a result, construction could result in periods of elevated ambient noise levels that could exceed the Noise Ordinance standards for construction noise (e.g., noise levels at any point outside of the property plane of the project shall not exceed 86 dBA). Thus, construction noise related to the proposed project could result in a significant impact.

Table 4.6-8
Construction Equipment Noise

Type of Equipment	Predicted Noise Levels, L_{max} dB				Distances to Noise Contours (feet)	
	Noise Level at 20'	Noise Level at 50'	Noise Level at 100'	Noise Level at 200'	70 dB L_{max} contour	65 dB L_{max} contour
Backhoe	86	78	72	66	126	223
Compactor	91	83	77	71	223	397
Compressor (air)	86	78	72	66	126	223
Concrete Saw	98	90	84	78	500	889
Dozer	90	82	76	70	199	354
Dump Truck	84	76	70	64	100	177
Excavator	89	81	75	69	177	315
Generator	89	81	75	69	177	315
Jackhammer	97	89	83	77	446	792
Pneumatic Tools	93	85	79	73	281	500

Source : j.c. brennan & associates, Inc., 2018.

It should be noted that the proposed residential uses could result in short-term noise level increases associated with use of outdoor activity areas and other standard residential noise sources. However, such noise level increases would not be substantial, and would be consistent and compatible with existing residential uses in the project area. Any temporary noise-generating activities would be subject to applicable regulations within the City's Noise Ordinance. As such, short-term noise level increases associated with the proposed residential uses would be less than significant.

Nonetheless, based on the above, project construction activities could result in substantial temporary or periodic increases in ambient noise levels in the project vicinity above levels existing without the project, and a ***significant*** impact could occur.

Mitigation Measure(s)

Implementation of the following mitigation measure for both the Preferred Site Plan and Alternative B would reduce the above impact to a *less-than-significant* level. The City of Davis Noise Ordinance provides provisions for reducing overall noise levels due to construction activities. Construction noise levels can comply with the City of Davis Municipal Code through the implementation of the strategies contained in the Noise Ordinance.

4.6-1 *Prior to issuance of any grading permit, the applicant shall submit proposed noise-reduction practices (to ensure the noise level at any point outside the property plane of the project shall not exceed 86 dBA) for review and approval by the Department of Community Development and Sustainability. One or more of the following measures shall be utilized to reduce the impact of construction noise (below the above stated property boundary standard):*

- *Electric construction equipment as an alternative to diesel-powered equipment.*
- *Sound-control devices on construction equipment.*
- *Muffled exhaust on construction equipment.*
- *Construction equipment staging and operation setbacks from nearby sensitive receptors.*
- *Limits on idling time for construction vehicles and equipment.*
- *Installation of acoustic barriers around stationary construction noise sources.*
- *Installation of temporary barriers between the project site and adjacent sensitive receptors.*

4.6-2 Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels. Based on the analysis below, and with implementation of mitigation, the impact is *less than significant.*

The primary vibration-generating activities associated with the proposed project would occur during construction when activities such as grading, utilities placement, and parking lot construction occur. Construction vibration impacts include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural. Table 4.6-9 shows the typical vibration levels produced by construction equipment.

Table 4.6-9
Vibration Levels for Various Construction Equipment

Type of Equipment	Peak Particle Velocity @ 25 feet	Peak Particle Velocity @ 50 feet
Large Bulldozer	0.089	0.029
Loaded Trucks	0.076	0.025
Pile Driving (Sonic)	0.734	0.50
Small Bulldozer	0.003	0.000
Auger/drill Rigs	0.089	0.029
Jackhammer	0.035	0.011
Vibratory Hammer	0.070	0.023
Vibratory Compactor/roller	0.210	0.070

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Guidelines, May 2006.

The most significant source of groundborne vibrations during the project construction would occur from the use of vibratory compactors, which would result in vibration levels of 0.21 in/sec p.p.v. at 25 feet. The closest residential buildings to the project site where construction activities could include vibratory compactors is at a distance of approximately 20 feet. Thus, vibration levels at the nearest existing residence could exceed the applicable threshold of 0.2 in/sec p.p.v. for short periods of time if vibratory compactors are operating in close proximity to the residence. Construction equipment, including vibratory compactors, operating at a distance of 50 feet or more from the residence would result in vibration levels below the threshold. Nonetheless, implementation of the proposed project could expose persons to or generate excessive groundborne vibration or groundborne noise levels and impacts would be considered ***significant***.

Mitigation Measure(s)
Implementation of the following mitigation measure for both the Preferred Site Plan and Alternative B would reduce the above impact to a *less-than-significant* level.

4.6-2 *Prior to issuance of grading permits, the following note shall be included on the Grading Plans submitted by the applicant for review and approval by the Director of Public Works: "Vibratory compactors shall maintain a minimum distance of 35-feet from any structures, and where possible, use rolling compactors or hand compacting within 50-feet from any structures."*

4.6-3 Transportation noise impacts to existing sensitive receptors in the project vicinity. Based on the analysis below, the impact is *less than significant.*

Development of the proposed project would introduce new sensitive receptors to the area. These new sensitive receptors could be exposed to potentially substantial exterior or interior noise levels associated with the transportation noise occurring in the area. It should be noted that CEQA does not require an analysis of the environment's impact on the project. However, this impact is evaluated for the purpose of considering the project's consistency with policies in the City's General Plan.

Vehicle trips associated with operation of the proposed project would result in changes to traffic on the existing roadway network within the project vicinity. As a result, project buildout would cause an increase in traffic noise levels on local roadways. To assess noise impacts due to project-related traffic increases on the existing local roadway network, noise levels have been calculated for the Existing, Existing Plus Project, EPAP, and EPAP Plus Project traffic conditions.

Traffic noise levels are predicted at locations that are assumed to be typical residential outdoor use areas along each project-area roadway segment. The actual distances to noise level contours may vary from the distances predicted by the FHWA model due to roadway curvature, grade, shielding from local topography or structures, elevated roadways, or elevated receivers. The distances reported in Table 4.6-10 are generally considered by j.c.

brennan & associates to be conservative estimates of noise exposure along the project-area roadways.

Preferred Site Plan

Table 4.6-10 shows the predicted traffic noise level increases on the local roadway network for the Existing, Existing Plus Project, EPAP, and EPAP Plus Project Conditions. As shown in Table 4.6-10, the largest increase in transportation noise levels from the Preferred Site Plan under Existing Plus Project Conditions would be 1 dBA L_{dn} on Chiles Road from the project site to Mace Boulevard, which would not exceed the FICON criteria for the segment of a 3 dB increase (see Table 4.6-7). The Preferred Site Plan would not result in an increase in traffic noise levels associated with any roadway segment under the EPAP Plus Project Condition.

Alternative B

Alternative B would include five single-family homes that would have access to the project site from La Vida Way. Under Alternative B, approximately 50 additional daily trips would be added to the existing number of daily trips along La Vida Way. The overall increase in daily vehicle trips from 2,240 to approximately 2,330 trips would result in an overall increase in existing traffic noise levels of 0.17 dB L_{dn}. The increase in traffic noise levels of 0.17 dB L_{dn} expected for Alternative B would not exceed the FICON criteria of 3.0 dB where existing noise levels are between 60 and 65 dB. It should be noted that Alternative B would result in an overall decrease in trip generation, as compared to the Preferred Site Plan.

Conclusion

Based on the above, neither the Preferred Site Plan nor Alternative B would result in changes in traffic noise in excess of the FICON criteria identified in Table 4.6-7. Therefore, transportation noise impacts to existing sensitive receptors in the project vicinity would be considered ***less than significant***.

Mitigation Measure(s)
None required.

Table 4.6-10
Existing and EPAP Plus Project Traffic Noise Levels

Roadway	Segment	Traffic Noise Levels (L_{dn}, dB)						
		Distance (feet)	Existing	Existing + Project	Change	EPAP	EPAP + Project	Change
Cowell Blvd.	Pole Line Rd. to Chiles Rd./Drummond Ave.	75	63	63	0	64	64	0
Cowell Blvd.	Chiles Rd./Drummond Ave. to Ensenada Dr.	75	59	59	0	59	59	0
Chiles Rd.	Cowell Blvd. to Project Site	75	63	63	0	63	63	0
Chiles Rd.	Project Site to Mace Blvd.	75	64	65	+1	65	65	0
La Vida Way	Chiles Rd. to Cowell Blvd.	75	58	58	0	58	58	0

Notes:
- Distances to traffic noise contours are measured in feet from the centerlines of the roadways.
- Traffic noise levels do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.

Source : j.c. brennan & associates, Inc., 2018.

4.6-4 Transportation noise impacts to new sensitive receptors at the project site. Based on the analysis below and with implementation of mitigation, the impact is *less than significant.*

Traffic noise exposure at the proposed residences is discussed in detail below. Any design for sound walls would need to be based on the worst-case condition. The Super Cumulative Year 2035 Plus Project Conditions would result in the worst-case future noise environment at the project site. Accordingly, in order to evaluate the impacts of traffic noise on the proposed residential development, the analysis relies on noise levels that would occur at the project site under Super Cumulative Year 2035 Plus Project Conditions. Under Super Cumulative Year 2035 Plus Project Conditions, the project site would be exposed to exterior traffic noise levels of 70 dB L_{dn} at first-floor residences and up to 73 dB L_{dn} at upper-floor locations. The dominant traffic noise source is I-80.

Exterior Noise Levels

An analysis of the exterior noise levels at the project site is presented separately below for the project development scenarios.

Preferred Site Plan

As stated above, the exterior noise levels at the project site would be 70 dB $L_{dn.}$ Under the Preferred Site Plan, the proposed project would include a club house, courtyard, pool area and tot-lot, which would be considered the common outdoor areas that would be subject to exterior noise level standards. The proposed common outdoor areas are centrally located and shielded by the proposed building facades, which would provide for a noise reduction of 10 dB. As a result, the common outdoor areas proposed under the Preferred Site Plan would be expected to be exposed to noise levels of approximately 60 dB, which would comply with the City exterior noise level standard of 60 dB L_{dn}/CNEL.

Alternative B

As previously mentioned, the maximum exterior noise level expected at the project site would be 70 dB L_{dn}. Alternative B would include a club house, courtyard, pool area and tot-lot for the multi-family portion of the site, which would be considered the common outdoor activity areas for that portion of the site. Because the common outdoor activity areas would be centrally-located and shielded by the building facades, a minimum noise level reduction of 10 dB would occur in those areas. Thus, the courtyard, pool area and tot-lot would be exposed to exterior noise levels of approximately 60 dB, which would comply with the City's exterior noise level standard of 60 dB L_{dn}/CNEL.

Alternative B would also include single-family residences with backyards that face La Vida Way. The backyards would be considered the outdoor activity areas for the single-family residential portion of Alternative B. The backyard areas would be exposed to the exterior noise level of approximately 70 dB L_{dn}, which would exceed the 60 dB L_{dn}/CNEL exterior noise level standard, but would fall within the "conditionally acceptable" range. City

standards call for preparation of a noise analysis for projects falling within that range and identification of noise attenuation measures. Barriers would be required in order to achieve the exterior noise level standard for the single-family portion of the project site.

Figure 4.6-2 shows the proposed barrier locations. Table 4.6-11 shows the required barrier heights to achieve the "normally acceptable" exterior noise level standard of 60 dB L_{dn}, as well as the "conditionally acceptable" exterior noise level standard between 60 dB L_{dn} and 70 dB L_{dn}. It should be noted that while General Plan Policy NOISE 1.2 discourages the use of sound walls/noise barriers, alternatives to noise barriers are not considered feasible for the proposed project. Based upon Table 4.6-11, a barrier height of 12 feet would be required to achieve the exterior noise level standard of 60 dB L_{dn}/CNEL. However, according to j.c. brennan & associates, Inc., that height is not considered to be practical. A typical barrier height of six feet would be required to achieve an exterior noise level standard of 65 dB L_{dn}/CNEL and would break line-of-sight to the noise sources. City noise policies provide for City Council approval of residential projects with exterior noise levels of 65 dBA, which would be met with the six-foot barrier.

Table 4.6-11
Single-Family Project Site Required Traffic Noise Barrier Heights

Exterior Traffic Noise Level	Barrier Height	Resulting Noise Level
70/L_{dn}	Not Required	70 dB L_{dn}
	6-feet	65 dB L_{dn}
	7-feet	65 dB L_{dn}
	8-feet	64 dB L_{dn}
	9-feet	63 dB L_{dn}
	10-feet	62 dB L_{dn}
	11-feet	61 dB L_{dn}
	12-feet	60 dB L_{dn}

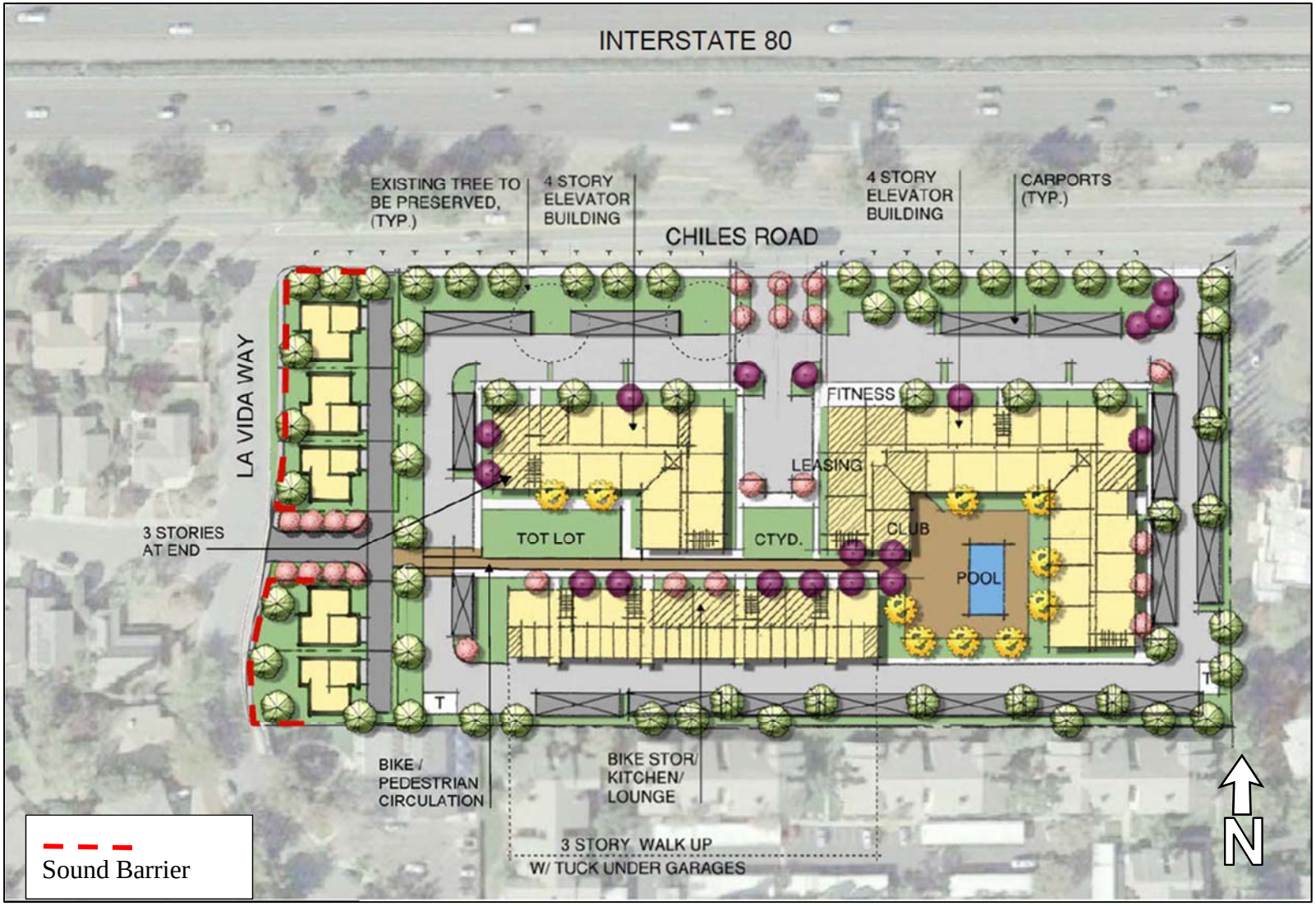
Source : j.c. brennan & associates, Inc., 2018.

Interior Noise Levels

Modern construction typically provides a 25-dB exterior-to-interior noise level reduction with windows closed. Therefore, sensitive receptors exposed to exterior noise of 70 dB L_{dn}, or less, would be exposed to interior noise levels of 45 dB, which would comply with the City's 45 dB CNEL/L_{dn} interior noise level standard. Exterior noise levels over 70 dB L_{dn} generally require specific upgrades to the building facades such as upgraded STC rated windows, or details on wall construction improvements.

The project site would be exposed to exterior traffic noise levels of approximately 70 dB L_{dn} at first-floor residences and up to 73 dB L_{dn} at upper-floor locations. Considering modern construction, the first-floor residences would not be exposed to interior noise levels in excess of the interior noise level standard of 45 dB L_{dn}. However, upper floors would be expected to be exposed to interior noise levels of 48 dB L_{dn} with inclusion of the 25 dB exterior-to-interior noise level reduction with the windows closed, which would exceed the interior noise level standard of 45 dB L_{dn}.

Figure 4.6-2
Alternative B Sound Barrier Location



Source : j.c. brennan & associates, Inc., 2018.

Conclusion

The future potential exterior noise levels expected at the backyards of the single-family residences along La Vida Way under the Alternative B development scenario would exceed the City's 60 dB L_{dn} exterior noise level standard. In addition, future potential interior noise levels at the upper floors under both the Preferred Site Plan and Alternative B would exceed the City's interior noise level standard of 45 dB $L_{dn.}$ Therefore, transportation noise impacts to new sensitive receptors at the project site would be considered ***significant***.

Mitigation Measure(s)
Implementation of the following mitigation measures would reduce the above impact to a *less-than-significant* level.

Preferred Site Plan and Alternative B

4.6-4(a) *Prior to building permit issuance, the applicant shall retain an expert noise consultant to perform a focused noise analysis to evaluate interior noise levels taking into consideration final building materials, and adjustments to building locations, facade construction, etc. to determine if the final site and building plans would result in interior noise levels with the potential to exceed the standard of 45 dB CNEL/L_{dn}. If the final site plans result in interior noise levels that do not exceed 45 dB, further mitigation is not required. If the final site and building plans result in interior noise levels with the potential to exceed the standard of 45 dB CNEL/L_{dn} within one or more residential units, then windows facing I-80 for all such residential units shall include recommended improvements to the building facades. Improvements could include upgraded STC rated windows, or other construction-related facade improvements. Upgrading of the windows shall be performed in accordance with the recommendations outlined in the noise report performed specifically for the project by j.c. brennan & associates, Inc. The final design of the window upgrades shall be approved by the City of Davis Department of Community Development and Sustainability prior to building permit issuance.*

Alternative B Only

4.6-4(b) *Prior to building permit issuance for proposed residential lots under Alternative B, the construction drawings shall include a noise barrier measuring six feet in height located adjacent to La Vida Way, in the area of the single-family residences. The locations of the recommended noise barriers are shown in* Figure 4.6-2 *of the EIR.*

Cumulative Impacts and Mitigation Measures

The following discussion of impacts is based on the implementation of the proposed project in combination with other cumulative development within the City's Planning Area. Refer to Chapter 5, Statutorily Required Sections, of this EIR for more detail regarding the cumulative setting.

4.6-5 Cumulative impacts on traffic noise-sensitive receptors. Based on the analysis below, the cumulative impact is *less than significant.*

Traffic noise levels are predicted at locations that are assumed to be typical residential outdoor use areas along each project-area roadway segment. The actual distances to noise level contours may vary from the distances predicted by the FHWA model due to roadway curvature, grade, shielding from local topography or structures, elevated roadways, or elevated receivers. The distances reported in Table 4.6-12 are generally considered to be conservative estimates of noise exposure along the project-area roadways.

Table 4.6-12 shows the predicted traffic noise level increases on the local roadway network for the Cumulative Year 2035, Cumulative Year 2035 Plus Project, Super Cumulative Year 2035, and Super Cumulative Year 2035 Plus Project Conditions, assuming implementation of the Preferred Site Plan. As shown in the table, the Preferred Site Plan would result in a maximum increase of 1 dB in traffic noise levels under Cumulative Year 2035 Plus Project and Super Cumulative Year 2035 Plus Project Conditions. Alternative B would further increase traffic along La Vida Way. However, based on the total maximum increase in daily vehicle trips anticipated for the proposed project, the overall increase in traffic noise levels that would occur from implementation of the proposed project was estimated to be 0.19 dBA L_{dn}, which would not exceed the FICON criteria of a 3 dB increase and, thus, would not be considered a significant increase in traffic noise levels. Therefore, under Cumulative Year 2035 Plus Project and Super Cumulative Year 2035 Plus Project Conditions, cumulative impacts on traffic noise-sensitive receptors would be ***less-than-significant***.

Mitigation Measure(s)
None required.

Table 4.6-12
Cumulative Traffic Noise Levels

Roadway	Segment	Traffic Noise Levels (L_{dn}, dB)						
		Distance (feet)	Cumulative Year 2035	Cumulative Year 2035 + Project	Change	Super Cumulative Year 2035	Super Cumulative Year 2035 + Project	Change
Cowell Blvd.	Pole Line Rd. to Chiles Rd./Drummond Ave.	75	63	63	0	63	63	0
Cowell Blvd.	Chiles Rd./Drummond Ave. to Ensenada Dr.	75	61	61	0	62	62	0
Chiles Rd.	Cowell Blvd. to Project Site	75	63	64	+ 1	63	64	+ 1
Chiles Rd.	Project Site to Mace Blvd.	75	65	65	0	65	65	+ 1
La Vida Way	Chiles Rd. to Cowell Blvd.	75	59	59	0	59	59	0

Notes:
- Distances to traffic noise contours are measured in feet from the centerlines of the roadways.
- Traffic noise levels do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.

Source: j.c. brennan & associates, Inc., 2018.