4.10 NOISE

This section of the Environmental Impact Report (EIR) provides a discussion of existing noise sources, evaluates potential noise impacts associated with the proposed project, and identifies mitigation measures recommended for potentially significant adverse impacts. Noise data and assumptions that are used for quantifying the proposed project's emissions are based on the following sources. The noise data and calculations are included in Appendix I of this EIR.

- California Department of Transportation.
- Federal Highway Administration.
- Noise Data and Calculation.

4.10.1 BACKGROUND

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

Noise is defined as loud, unexpected, or annoying sound. In acoustics, the fundamental model consists of a sound (or noise) source, a receptor, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receptor determine the sound level and characteristics of the noise perceived by the receptor. Acoustics deals primarily with the propagation and control of sound. A typical noise environment consists of a base of steady background noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These sources can vary from an occasional aircraft or train passing by to virtually continuous noise from, for example, traffic on a major highway. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals) as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness. *Table 4.10-1: Typical Noise Levels*, provides typical noise levels associated with common activities.

Table 4.10-1: Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	– 110 –	Rock Band
Jet fly-over at 1,000 feet		
	– 100 –	
Gas lawnmower at 3 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		
Gas lawnmower, 100 feet	**– 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 in 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

dBA = A-weighted decibels; mph = miles per hour
Source: California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

NOISE DESCRIPTORS

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The equivalent noise level (L_{eq}) is a measure of the average noise level averaged over the measurement period, while the day-night noise level (L_{dn}) and Community Equivalent Noise Level (CNEL) are measures of energy average during a 24-hour period, with dB weighted sound levels from 7:00 p.m. to 7:00 a.m. Most commonly, environmental sounds are described in terms of an average level (L_{eq}) that has the same acoustical energy as the summation of all the time-varying events. Each is applicable to this analysis and defined in *Table 4.10-2: Definitions of Acoustical Terms.*

Table 4.10-2: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micropascals (or 20 micronewtons per square meter), where 1 pascal is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micropascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, Leq	The average acoustic energy content of noise for a stated period of time. Thus, the Leq of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
Lmax, Lmin	The maximum and minimum A-weighted noise level during the measurement period.
L01, L10, L50, L90	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, Ldn or DNL	A 24-hour average Leq with a 10 dBA “weighting” added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour Leq would result in a measurement of 66.4 dBA Ldn.
Community Noise Equivalent Level, CNEL	A 24-hour average Leq with a 5 dBA “weighting” during the hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA “weighting” added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour Leq would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

The A weighted decibel sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the

variations must be used. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

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

A-WEIGHTED DECIBELS

The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

ADDITION OF DECIBELS

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

SOUND PROPAGATION AND ATTENUATION

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

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The manner in which older homes in California were constructed

generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

HUMAN RESPONSE TO NOISE

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

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in A-weighted noise levels (dBA), the following relationships should be noted:

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

EFFECTS OF NOISE ON PEOPLE

Hearing Loss

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

The Occupational Safety and Health Administration (OSHA) has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable

level is 90 dBA averaged over 8 hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. A noise level of about 55 dBA L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance.[1]

GROUNDBORNE VIBRATION

Sources of groundborne vibrations include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides, etc.) or man-made causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions). Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); another is the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

Table 4.10-3: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations, displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise-causing induced vibration in exterior doors and windows.

Both construction and operation of development projects can generate ground-borne vibration. However, vibrations associated with construction are the most likely to result in perceptible vibrations to surrounding use. Most development projects do not include sources of vibration which are likely to be perceptible to off-site uses. Construction equipment such as vibratory compactors or rollers, pile drivers,

[1] Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992.

and pavement breakers can generate perceptible vibration during construction activities. Heavy trucks can also generate ground-borne vibrations that vary depending on vehicle type, weight, and pavement conditions.

Table 4.10-3: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations

Peak Particle Velocity (in/sec)	Approximate Vibration Velocity Level (VdB)	Human Reaction	Effect on Buildings
0.006-0.019	64-74	Range of threshold of perception	Vibrations unlikely to cause damage of any type
0.08	87	Vibrations readily perceptible	Recommended upper level to which ruins and ancient monuments should be subjected
0.1	92	Level at which continuous vibrations may begin to annoy people, particularly those involved in vibration-sensitive activities	Virtually no risk of architectural damage to normal buildings
0.2	94	Vibrations may begin to annoy people in buildings	Threshold at which there is a risk of architectural damage to normal dwellings
0.4-0.6	98-104	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Architectural damage and possibly minor structural damage

Source: California Department of Transportation, Transportation and Construction-Induced Vibration Guidance Manual, 2004.

Ground vibration can be a concern in instances where buildings shake and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. Common sources for groundborne vibration are planes, trains, and construction activities such as earth-moving which requires the use of heavy-duty earth moving equipment. For the purposes of this analysis, a PPV descriptor with units of inches per second (in/sec) is used to evaluate construction-generated vibration for building damage and human complaints.

4.10.2 EXISTING CONDITIONS

The City of Vallejo is impacted by various noise sources. Mobile sources of noise, especially cars and trucks, are the most common and significant sources of noise in most communities. Other sources of noise are the various land uses (i.e., residential, commercial, institutional, and recreational and parks activities) throughout the City that generate stationary-source noise.

NOISE MEASUREMENTS

To determine ambient noise levels in the project area, four 10-minute noise measurements were taken using a 3M SoundPro DL-1 Type I integrating sound level meter between 11:16 a.m. and 12:42 p.m. on December 11, 2018; refer to Appendix H for existing noise measurement data and **Figure 4.10-1: Noise Measurement Locations**. Noise Measurement 1 was taken to represent the ambient noise level east of the project site near the existing single-family residences; Noise Measurement 2 was taken to represent the ambient noise level south of the project site near the existing apartment complex; Noise Measurement 3 was taken to represent the ambient noise level south of the site along Turner Parkway, Admiral Callaghan Lane and I-80; and Noise Measurement 4 represents the existing ambient noise from the existing shopping center southwest of the project site. The primary noise sources during all four measurements was traffic on one of the major roadways and parking lot noises. *Table 4.10-4*: *Noise Measurements*, provides the ambient noise levels measured at these locations.

Table 4.10-4: Noise Measurements

Site No.	Location	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Time
1	Hunter Court	55.4	55.3	65.1	11:16 a.m.
2	Sundance Apartment Complex	56.0	55.3	79.8	11:40 a.m.
3	Turner Parkway and Admiral Callaghan Lane	67.3	60.1	75.9	12:20 p.m.
4	Rotary Street near Shopping Center	62.8	55.3	80.2	12:42 p.m.

Source: Noise measurements taken by Kimley-Horn on December 11, 2018.

Existing Mobile Noise

Existing roadway noise levels were calculated for the roadway segments in the project vicinity. This task was accomplished using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) and existing traffic volumes from the project Traffic Impact Analysis (Fehr and Peers 2018). The noise prediction model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (also referred to as energy rates) used in the FHWA model have been modified to reflect average vehicle noise rates identified for California by Caltrans. The Caltrans data indicates that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels. The average daily noise levels along roadway segments in proximity to the project site are included in Table 4.10-8 in the discussion below, under Impact NOI-1.

The project site is bordered by residential uses to the south and east. The existing mobile noise in the project area is generated along I-80 and Admiral Callaghan Lane which borders the site on the west and Turner Parkway which borders the site on the north.

Source: Kimley-Horn, 2019

FIGURE 4.10-1: Noise Measurement Locations
Fairview at Northgate Project

Not to scale

Kimley»Horn

Existing Stationary Noise

The primary sources of stationary noise in the project vicinity are those associated with the operations of adjacent residential uses to the south and east and commercial uses north of the site. The noise associated with these sources may represent a single-event noise occurrence, short-term noise, or long-term/continuous noise.

Sensitive Receptors

Noise exposure standards and guidelines for various types of land uses reflect the varying noise sensitivities associated with each of these uses. Residences, hospitals, schools, guest lodging, libraries, and churches are treated as the most sensitive to noise intrusion and therefore have more stringent noise exposure targets than do other uses, such as manufacturing or agricultural uses that are not subject to impacts such as sleep disturbance. As shown in *Table 4.10-5: Sensitive Receptors*, sensitive receptors near the project site include single-family residences adjacent to the eastern boundary, approximately 96 feet from the property line. Multi-family condominiums and apartments are located adjacent to the southeastern boundary and a car dealership is adjacent to the southwestern portion of the site. These distances are from the proposed project site to the sensitive receptor property line. Additionally, the proposed on-site residences would be a sensitive receptor.

Table 4.10-5: Sensitive Receptors

Receptor Type/Description	Distance and Direction from the Project Site[1]
Single-family residences	15 feet east
Multi-family residences	150 feet south
Day Care	450 feet south
Cooper Elementary School	0.6 miles west
Hanns Park	1 mile south
Blue Rock Springs Park	1 mile southeast

[1] Distance calculated from property line of proposed project site and property line of the sensitive receptors

4.10.3 REGULATORY SETTING

FEDERAL

Federal Noise Control Act

In response to the federal Noise Control Act of 1972 (NCA), the U. S. Environmental Protection Agency (U.S. EPA) has identified noise levels requisite to protect public health and welfare against hearing loss, annoyance, and activity interference. The NCA also helps provide a basis for State and local governments' judgments in setting standards. In doing so, the information presented by the U.S. EPA must be used along with other relevant factors. These factors include the balance between costs and benefits

associated with setting standards at particular noise levels, the nature of the existing or projected noise problems in any particular area, and the local aspirations and the means available to control environmental noise.

The NCA also identifies a 24-hour exposure level of 70 dB as the level of environmental noise which would prevent any measurable hearing loss over a lifetime. Likewise, levels of 55 dB outdoors and 45 dB indoors are identified as preventing activity interference and annoyance. These levels of noise are considered those which will permit spoken conversation and other activities such as sleeping, working and recreation, which are part of the daily human condition. The levels are not single event or peak levels. Instead, they represent averages of acoustic energy over periods of time such as 8 or 24 hours and over even longer periods (e.g., years).

STATE

California Government Code

California Government Code Section 65302 (f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of "normally acceptable," "conditionally acceptable," "normally unacceptable," and "clearly unacceptable" noise levels for various land use types. Single-family homes are "normally acceptable" in exterior noise environments up to 60 CNEL and "conditionally acceptable" up to 70 CNEL. Multiple-family residential uses are "normally acceptable" up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

Title 24 – California Building Code

The State's noise insulation standards are codified in the California Code of Regulations, Title 24: Part 1, Building Standards Administrative Code, and Part 2, California Building Code. These noise standards are applied to new construction in California for the purpose of interior noise compatibility from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 65 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new residential buildings, the acceptable interior noise limit for new construction is 45 dBA CNEL.

California Noise Control Act of 1973

Sections 46000 through 46080 of the California Health and Safety Code, known as the California Noise Control Act, find that excessive noise is a serious hazard to public health and welfare, and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. The Act also finds that there is a continuous and increasing bombardment of noise in urban, suburban, and rural areas.

It declares that the State has a responsibility to protect the health and welfare of its citizens by the control, prevention, and abatement of noise. It is the policy of the State to provide an environment for all Californians that is free from noise that jeopardizes their health or welfare.

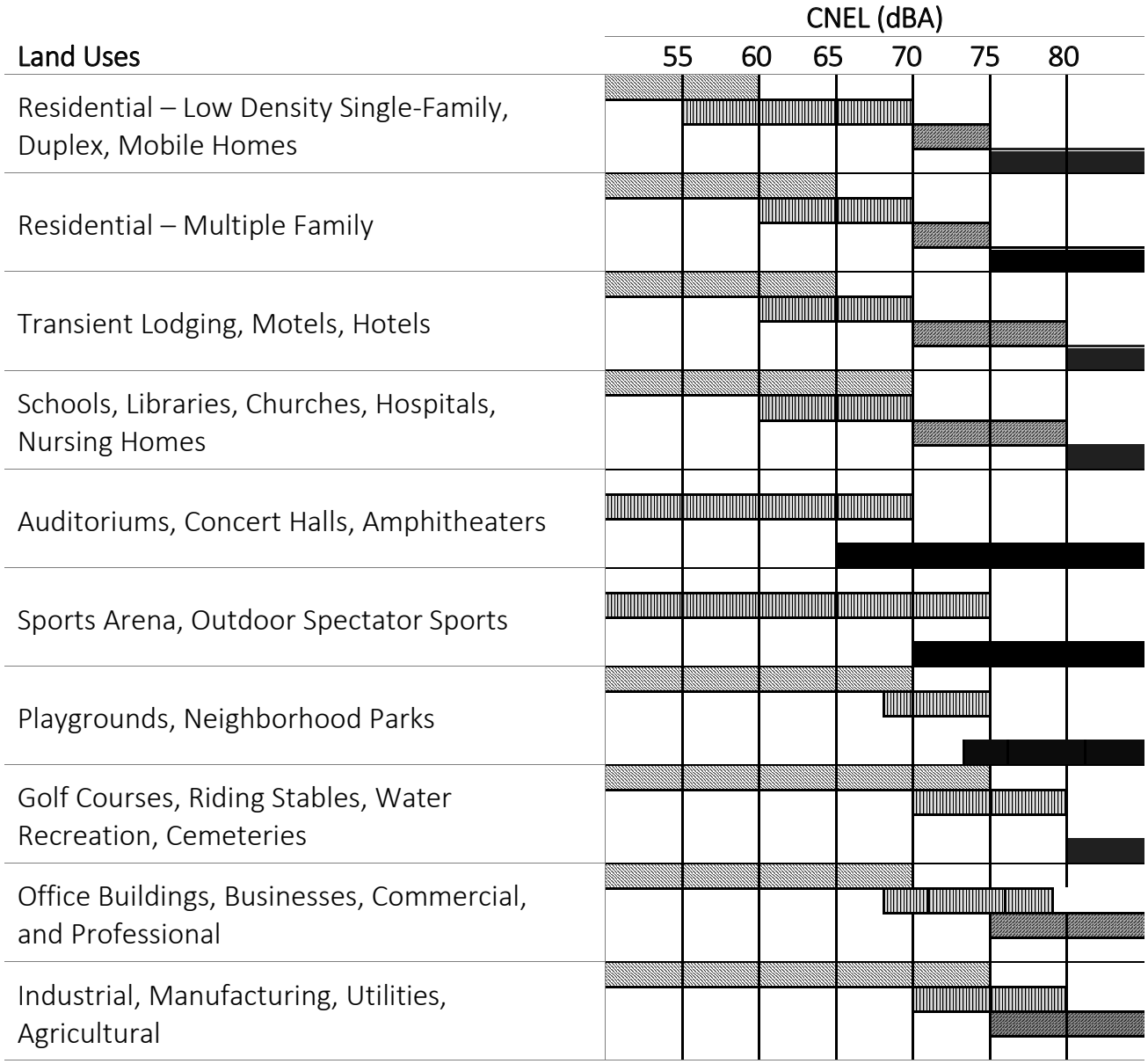
LOCAL

Propel Vallejo General Plan 2040

The City of Vallejo General Plan- Propel Vallejo General Plan 2040 is a roadmap that encompasses the hopes, aspirations, values and dreams of the Vallejo community. The Nature and Built Environment Element of the General Plan covers the State-mandated Noise Element. The City's land use compatibility standards for community noise environments are shown in **Figure 4.10-2: Land Use Compatibility for Community Noise Environments**. The noise policies of the General Plan limit construction, maintenance, and unloading and loading activities from operating in such a manner as to cause noise disturbance across residential real property boundaries except between the hours of 7:00 a.m. and 9:00 p.m. In addition, the City's noise policy limits project-related noise increases to no more than 10 dB in non-residential areas and 5 dB in residential areas where with-project noise level is less than the maximum "normally acceptable level."

The following lists applicable noise goals and targets that apply to the proposed project obtained from the General Plan:

Policy NBE-5.13	Noise Control. Ensure that noise does not affect quality of life in the community.
Action NBE-5.13A	Continue to require that new noise-producing uses are located sufficiently far away from noise-sensitive receptors and/or include adequate noise mitigation, such as screening, barriers, sound enclosures, noise insulation, and/or restrictions on hours of operation.
Action NBE-5.13B	Update City regulations to require that parking, loading, and shipping facilities and all associated mechanical equipment be located and designed to minimize potential noise and vibration impacts on residential neighborhoods.



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

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

Conditionally Acceptable:
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and the 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.

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

Source: Governor's Office of Planning and Research, General Plan Guidelines, November 2003.

FIGURE 4.10-2: Land Use Compatibility for Community Noise Environment
Fairview at Northgate Project

Kimley»Horn

Action NBE-5.13C	Update City regulations to restrict the allowable hours to between 7 AM and 7 PM on weekdays for construction, demolition, maintenance, and loading/unloading activities that may impact noise-sensitive land uses.
Action NBE-5.13D	Require proponents of mixed-use projects to notify potential residents that they may be affected by noise from adjacent/nearby commercial, retail, entertainment, and/or circulation components of the project.
Policy NBE-5.14	Vibration Control. Ensure that vibration does not affect quality of life in the community.
Action NBE-5.14A	Update City regulations to establish quantified vibration level limits similar to commonly used guidelines found in the Federal Transit Administration document "Transit Noise and Vibration Impact Assessment" (2006).
Policy NBE-5.15.	Noise Compatibility Standards. Apply the General Plan noise and land use compatibility standards to all new residential, commercial, and mixed-use development and redevelopment.
Action NBE-5.15A	For new single-family residential projects, use a standard of 60 L_{dn} for exterior noise in private use areas, and require appropriate impact mitigation.
Action NBE-5.15D	Require maximum interior noise levels at 45 L_{dn} in all new residential units, and require appropriate impact mitigation.
Action NBE-5.15E	When approving new development, limit project-related noise increases to the following for permanent stationary and transportation-related noise sources: • No more than 10 dB in non-residential areas; • No more than 5 dB in residential areas where the with-project noise level is less than the maximum "normally acceptable" level in the Noise and Land Use Compatibility figure; and • No more than 3 dB where the with-project noise level exceeds the "normally acceptable" level in Noise and Land Use Compatibility figure.
Action NBE-5.15F	Require acoustical studies with appropriate mitigation measures for projects that are likely to be exposed to noise levels that exceed the 'normally acceptable' standard and for any other projects that are likely to generate noise in excess of these standards.

City of Vallejo Municipal Code

Noise standards applicable to the project are found in Municipal Code (VMC) Chapters 7.84, Regulation of Noise Disturbances, 7.90 (Motor Vehicles Operated on Public and Private Property), 12.40 (Excavations, Grading, and Filling), and 16.72 (Performance Standards Regulations).

Performance Standards

VMC Section 16.72.030 sets noise performance standards per zoning district, shown in *Table 4.10-6: Noise Performance Standards*.

Table 4.10-6: Noise Performance Standards

Zoning	Maximum Noise Level in Decibels
Resource Conservation, Rural Residential, and Medical Districts	55
Low, Medium, and High-Density Residential Districts	60
Professional Offices, Neighborhood, Pedestrian, and Waterfront Shopping and Services Districts	70
Freeway Shopping and Service, Linear Commercial and Intensive Use Districts	75

Source: City of Vallejo Municipal Code Section 16.72.030

VMC Section 16.72.040 provides a correction factor of plus 5 dB to the above sound levels for noise emitted between 7 a.m. and 10 p.m. In addition, VMC Section 16.72.050 provides that certain sounds may exceed the above sound levels, including "[s]ounds from transportation equipment used exclusively in the movement of goods and people to and from a given premises, temporary construction or demolition work" as activities that may exceed the maximum sound levels. Therefore, post-construction delivery, construction and demolition activities are exempt from the maximum sound levels in Section 16.72.030, but not the general prohibition on "loud, unnecessary or unusual noise" in Section 7.84.010 (see below).

Excavations, Grading, and Filling

Per VMC Section 12.40.070, all excavation, grading, and filling, that is conducted in residential zones or within 1,000 feet of any residential occupancy, hotel, motel or hospital shall be limited between the hours of 7:00 a.m. and 6:00 p.m.

Regulation of Noise Disturbances

According to VMC Section 7.84.010, General prohibition – loud, unnecessary or unusual noise, it is unlawful to generate noise disturbances which disturb the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area. The standard which may be considered in determining whether a violation of the provisions of this chapter exist may include, but not be limited to, the following:

- The level of noise;
- Whether the nature of the noise is usual or unusual;

- Whether the origin of the noise is natural or unnatural;
- The level and intensity of the background noise, if any;
- The proximity of the noise to residential sleeping facilities;
- The nature and zoning of the area within which the noise emanates;
- The density of the inhabitation of the area within which the noise emanates;
- The time of the day and night the noise occurs;
- The duration of the noise;
- Whether the noise is recurrent, intermittent, or constant; and
- Whether the noise is produced by a commercial or noncommercial activity.

4.10.4 STANDARDS OF SIGNIFICANCE

SIGNIFICANCE CRITERIA AND THRESHOLDS

Based upon the criteria derived from Appendix G of the CEQA Guidelines, a project normally would have a significant effect on the environment if it would:

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

METHODOLOGY

Construction

The analysis of noise impacts considers the effects of both temporary construction-related noise and operational noise associated with long-term project-related activities, including, without limitation, project-generated traffic. Predicted construction noise levels were based on typical noise levels generated by construction equipment published by the Federal Transit Administration (FTA). Construction noise level estimates do not account for the presence of intervening structures or topography, which may reduce noise levels at receptor locations. Therefore, the noise levels presented herein represent a conservative, reasonable worst-case estimate of actual temporary construction noise.

Operations

Traffic noise impacts are assessed using the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108). Model input data includes without- and with-project average daily traffic volumes on adjacent roadway segments, day/night percentages of autos, medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths. The roadway speeds are based on the posted speed limits observed during site visits. The model analyzed the noise impacts from the nearby roadways onto the project vicinity, which consists of the area that has the potential of being impacted from the on-site noise sources as well as the project-generated traffic on the nearby roadways. The roadway traffic model input assumptions are provided in Appendix G.

Operational noise issues evaluated in this section include vehicle traffic noise and land use compatibility of potential future uses with the City's Compatibility Guidelines as well as stationary source noise (e.g., mechanical equipment, on-site trucks/loading docks, etc.). Traffic noise modeling was completed using the FHWA RD-77-108 model. Traffic noise level significance is determined by comparing the increase in noise levels (traffic contribution only) to increments recognized by Caltrans as representing a perceptible increase in noise levels.

Operational noise is evaluated based on the standards within VMC Sections 12.40.70 and 16.72.030, and General Plan Police NBE-5.15. A significant noise impact would occur if a project results in an exceedance of the noise level standards or the project will result in an increase in ambient noise levels by more than 3 dB, whichever is greater.

4.10.5 PROJECT IMPACTS AND MITIGATION

IMPACT NOI-1	***WOULD THE PROJECT RESULT IN A 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?***
	(LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED)

CONSTRUCTION

There are two types of short-term noise impacts associated with construction, noise generated from equipment and increase in traffic flow on local streets. Construction for the proposed project is expected to last approximately three years.

Equipment Noise

Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., land clearing, grading, excavation, paving). Noise generated by construction equipment, including earthmovers, material handlers, and portable generators, and helicopters used to lift and place mechanical heating and cooling units on the roof of the proposed Costco building can reach high levels. Noise levels typically attenuate (or drop off) at a rate of 6 dB per doubling of distance from point sources, such as industrial machinery. During construction, exterior noise levels could affect the residential neighborhoods near the construction site. At the nearest, project construction would occur at adjacent to existing single-family residences. It should be noted that only a limited amount of equipment can operate near a given location at a particular time. Equipment typically used during this stage includes heavy-duty trucks, backhoes, bulldozers, excavators, front-end loaders, and scrapers. During construction, the equipment typically travels around the project site. From the perspective of a sensitive receptor, the equipment approaches, passes by, and then recedes into the distance. Peak noise levels would thus be periodic, intermittent, and temporary during brief pass-by periods when construction equipment operates at the far extent of the grading limits. Construction activities would occur throughout the project site and would not be concentrated at the point closest to the sensitive receptors.

Grading and excavation phases of project construction tend to be the shortest in duration and create the highest construction noise levels due to the operation of heavy equipment required to complete these activities. It should be noted that only a limited amount of equipment can operate near a given location at a particular time. Equipment typically used during this stage includes heavy-duty trucks, backhoes, bulldozers, excavators, front-end loaders, and scrapers. Operating cycles for these types of construction equipment may involve one or two minutes of full-power operation followed by three to four minutes at lower power settings. Other primary sources of noise would be shorter-duration incidents, such as dropping large pieces of equipment or the hydraulic movement of machinery lifts, which would last less than one minute. According to the applicant, no pile-driving would be required during construction.

Construction activities would include site preparation, grading, building construction, paving, and architectural coating. Such activities would require graders, scrapers, and tractors during site preparation; graders, dozers, and tractors during grading; cranes, forklifts, generators, tractors, and welders during building construction; pavers, rollers, mixers, tractors, and paving equipment during paving; and air compressors during architectural coating. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 to 4 minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts). Noise generated by construction equipment, including earthmovers, material handlers, and portable generators, can reach high levels. Typical noise levels associated with individual construction equipment are listed in *Table 4.10-7*: *Typical Construction Noise Levels*.

Per VMC Section 12.40.070, all grading that is conducted in residential zones or within 1,000 feet of any residential occupancy, hotel, motel or hospital shall be limited between the hours of 7:00 a.m. and 6:00 p.m. Sensitive receptors near the project site include: residences approximately 15 feet east of the site

and approximately 150 feet south. These distances are from the proposed project site to the sensitive receptor property line. These sensitive uses may be exposed to elevated noise levels during project construction. However, as noted earlier, VMC Section 16.072.050(C) exempts temporary construction and demolition activities from the maximum sound levels established for residential districts. Nevertheless, construction activities would generally be limited to weekday daytime hours when most people would typically be out of their houses, and grading activities would conform to the time-of-day restrictions of VMC Section 12.040.070. Mitigation Measure NOI-1 is required to ensure that grading noise levels do not exceed the City's standards and that time-of-day restrictions are adhered to. In addition, as a standard condition of approval for all discretionary permits, the City applies the time-of-day restrictions for grading activities to all other construction activities. With Implementation of Mitigation Measure NOI-1, construction noise impacts to nearby receptors would be less than significant. Nevertheless, it should be noted that Chapter 16.072.050(C) of the City's Municipal Code identifies temporary construction activities as those activities that may exceed the maximum sound levels established for residential districts.

As noted above and in Chapter 3.0, the project will also require the use of a helicopter to lift and place large Heating Ventilation, and Air Conditioning Units (HVAC) units on the roof of the Costco building. A crane cannot be used for these units due to their weight and distance from the building perimeter. The helicopter will be used on up to two days for up to eight hours per day. The HVAC units will be delivered to the site by truck and the helicopter will be used only to lift the units to their final positions on the roof of the Costco building. The helicopter will not land on the site, but instead will hover above the site for the duration of its project activities, descending and ascending as necessary to lift each HVAC unit. The type of helicopter used for transferring mechanical requirement to the roof of the Costco building would be a utility or "lift" helicopter such as the Kaman K-Max. While suspending a load and hovering 200 feet above the ground, this helicopter produces a noise level of 92 dBA at 100 feet horizontal feet from the ground location below the hover point.[2]

As with other construction activities, the use of a helicopter is not subject to the City's maximum sound levels pursuant to VMC Section 16.072.050.C. In addition, VMC Section 7.84.010 allows a wide variety of factors to be used in determining whether a noise is "loud, unnecessary or unusual", including but not limited to the level and intensity of background noise, the nature and zoning of the area, the time of day, and whether the noise is produced by commercial or noncommercial activity. The use of a helicopter would also not be considered a violation of VMC Section 7.84.010 given the high level of ambient noise at the site (due to the proximity to Interstate 80), the site's commercial zoning and adjacency to a large commercial area, the daytime hours of the helicopter use, and the fact that this is the conventional method for installation of heavy rooftop equipment on commercial buildings of this size. For these reasons, the use of a helicopter would not have a significant noise impact. However, for the comfort and convenience of nearby residents, Mitigation Measure NOI-1 below includes additional time and day restrictions on the use of the helicopter and requires advance notice to properties within 500 feet of the site.

[2] United States Forest Service, 2008. https://www.fs.fed.us/eng/techdev/IM/sound_measure/helo_results.shtml; Accessed January 13, 2020.

Table 4.10-7: Typical Construction Noise Levels

Equipment	Typical Noise Level (dBA) at 50 Feet from Source		Typical Noise Level (dBA) at 100 Feet from Source[1]	
	L_{max}	L_{eq}	L_{max}	L_{eq}
Air Compressor	80	76	74	70
Backhoe/Front End Loader	80	76	74	70
Compactor (Ground)	80	73	74	67
Concrete Mixer Truck	85	81	79	75
Concrete Mixer (Vibratory)	80	73	74	67
Concrete Pump Truck	82	75	76	69
Concrete Saw	90	83	84	77
Crane	85	77	79	71
Dozer/Grader/Excavator/Scraper	85	81	79	75
Drill Rig Truck	84	77	78	71
Generator	82	79	76	73
Gradall	85	81	79	75
Hydraulic Break Ram	90	80	84	74
Jackhammer	85	78	79	72
Mounted Impact Hammer	90	83	84	77
Pavement Scarifier/Roller	85	78	79	72
Paver	85	82	79	76
Pneumatic Tools	85	82	79	76
Pumps	77	74	71	68
Truck (Dump/Flat Bed)	84	80	78	74

1. Calculated using the inverse square law formula for sound attenuation: $dBA_2 = dBA_1+20Log(d_1/d_2)$

Where: dBA_2 = estimated noise level at receptor; dBA_1 = reference noise level; d_1 = reference distance; d_2 = receptor location distance

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, 2018.

Construction Traffic Noise

Construction noise may be generated by large trucks moving materials to and from the project site. Large trucks would be necessary to deliver building materials as well as remove dump materials. Excavation and cut and fill would be required. Soil hauling would not be required as the earthwork would balance on-site. Soil transported from west to east across the site would either occur within the project site or along Turner Parkway, away from sensitive receptors. Based on the California Emissions Estimator Model (CalEEMod) default assumptions for this project, as analyzed in Chapter 4.2, Air Quality, the project would generate the highest number of construction-related daily trips during the building construction phase (i.e., worker and vendor trips that occur while structures are being erected). The model estimates that the project would generate up to 548 worker trips and 215 vendor trips per day. Because of the logarithmic nature of noise levels, a doubling of the traffic volume (assuming that the speed and vehicle

mix do not also change) would result in a noise level increase of 3 dBA. Admiral Callaghan Lane between Columbus Parkway and Auto Club Drive has an average daily trip volume of 20,725 vehicles (Fehr and Peers 2019). Therefore, 291 project construction trips (239 worker trips plus 52 vendor trips) would not double the existing traffic volume of 20,725 vehicles per day. Construction related traffic noise would not be noticeable and would not create a significant noise impact.

California establishes noise limits for vehicles licensed to operate on public roads using a pass-by test procedure. Pass-by noise refers to the noise level produced by an individual vehicle as it travels past a fixed location. The pass-by procedure measures the total noise emissions of a moving vehicle with a microphone. When the vehicle reaches the microphone, the vehicle is at full throttle acceleration at an engine speed calculated for its displacement.

For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dBA. The State pass-by standard for light trucks and passenger cars (less than 4.5 tons gross vehicle rating) is also 80 dB at 15 meters from the centerline. According to the FHWA, dump trucks typically generate noise levels of 77 dBA and flatbed trucks typically generate noise levels of 74 dBA, at a distance of 50 feet from the truck (FHWA, Roadway Construction Noise Model, 2006).

OPERATIONS

Implementation of the proposed project would create new sources of noise in the project vicinity. The major noise sources associated with the project that would potentially impact existing and future nearby residences include the following:

- Off-site traffic noise;
- Mechanical equipment (i.e., trash compactors, air conditioners, etc.);
- Delivery trucks on the project site, and approaching and leaving the loading areas;
- Activities at the loading areas (i.e., maneuvering and idling trucks, loading/unloading, and equipment noise);
- Parking areas (i.e., car door slamming, car radios, engine start-up, maintenance activities, and car pass-by); and
- Landscape maintenance activities.

As discussed above and shown in Figure 3-2 in Chapter 3, Project Description, the closest sensitive receptors are single-family residences adjacent to the east and multi-family residences located approximately 150 feet to the south. The City of Vallejo's stationary source exterior noise standard for residential areas is 60 dBA (Table 4.10-6). The land use compatibility standard for residential areas is also 60 dBA for normally acceptable conditions.

Traffic Noise

Implementation of the project would generate increased traffic volumes along study roadway segments. The project is expected to generate 18,560 average daily trips (11,060 net new trips), which would result in noise increases on project area roadways. In general, a traffic noise increase of less than 3 dBA is barely perceptible to people, while a 5.0 dBA increase is readily noticeable (Caltrans, 2013). Generally, traffic volumes on project area roadways would have to approximately double for the resulting traffic noise levels to increase by 3.0 dBA. Therefore, permanent increases in ambient noise levels of less than 3 dBA are considered to be less than significant.

As shown in *Table 4.10-8: Existing and Project Traffic Noise*, the existing traffic-generated noise level on project area roadways is 64.1 dBA CNEL at 100 feet from the centerline of Admiral Callaghan Lane. As previously described, CNEL is 24-hour average noise level with a 5.0 dBA "weighting" during the hours of 7:00 p.m. to 10:00 p.m. and a 10.0 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.

Traffic noise levels for roadways primarily affected by the project were calculated using the FHWA's Highway Noise Prediction Model (FHWA-RD-77-108). Traffic noise modeling was conducted for conditions with and without the project, based on traffic volumes (Fehr and Peers, 2019). As noted in Table 4.10-8, the project would not have a significant impact on existing traffic noise levels. The increase from existing noise levels from Admiral Callaghan Lane near the site is less than 1 dBA interlocutory. The proposed project includes the relocation and construction of a Costco store. The existing Costco store is located in the Gateway Plaza shopping center approximately 0.75-mile northwest of the proposed Costco. Although not a part of the proposed project, the existing Costco store would be closed and the building is assumed to ultimately be re-occupied by a future general commercial retail tenant as allowed under the existing zoning. The building would not be reoccupied until the new Costco store was operational. The vehicle trips from the existing Costco would be removed from area roadways and vehicle trips to the new Costco are considered net new trips. The distribution of vehicle trips is anticipated to change so that there would be fewer trips on certain roadways such as Plaza Drive and Turner Parkway and increased trips on Admiral Callaghan Lane.

Table 4.10-8: Existing and Project Traffic Noise

Roadway Segment	Existing Conditions (Existing Development)		With Project		Project Change from Existing Conditions	Significant Impact?
	ADT	dBA CNEL[1]	ADT	dBA CNEL[1]		
Admiral Callaghan Lane						
Columbus Pkwy to Auto Club Dr	20,725	64.1	20,267	64.0	-0.1	No
Auto Club Dr to Plaza Dr	17,910	63.3	17,457	63.2	-0.1	No
Plaza Dr to Vallejo Corners	9,405	60.5	13,095	61.9	1.4	No
Vallejo Corners to Target Driveway	11,400	61.3	15,090	62.6	1.2	No

Table 4.10-8: Existing and Project Traffic Noise

Roadway Segment	Existing Conditions (Existing Development)		With Project		Project Change from Existing Conditions	Significant Impact?
	ADT	dBA CNEL[1]	ADT	dBA CNEL[1]		
Target Driveway to Turner Pkwy	11,520	61.4	15,210	62.6	1.2	No
Turner Pkwy to Rotary Way	16,680	62.9	23,755	64.4	1.5	No
Rotary Way to I-80 Ramps	18,175	63.4	28,945	65.4	2.0	No
Plaza Drive						
Admiral Callaghan Ln to Gateway Plaza	10,620	61.0	9,790	60.7	-0.4	No
Gateway Plaza to Costco Driveway	7,070	59.3	7,472	59.5	0.2	No
Costco Driveway to Turner Pkwy	10,280	60.9	9,360	60.5	-0.4	No
Turner Parkway						
Admiral Callaghan Ln to Plaza Dr	7,500	60.8	7,360	60.7	-0.1	No
Redwood Parkway						
West of Admiral Callaghan Ln	16,140	62.9	17,240	63.2	0.3	No
East of Admiral Callaghan Ln	13,020	61.9	14,120	62.3	0.4	No

ADT = average daily trips; dBA = A-weighted decibels; CNEL = community noise equivalent level
1. Traffic noise levels are at 100 feet from the roadway centerline.
Source: Based on traffic data within the *Transportation Impact Analysis for the Fairview at Northgate*, prepared by Fehr and Peers, 2019.
Refer to Appendix H for traffic noise modeling assumptions and results.

Table 4.10-9: Near-Term and Near-Term With Project Traffic Noise, shows the near-term traffic. As shown in the table, near-term roadway noise levels with project would range from 51.7 to 65.6 dBA. The highest increase in noise levels would occur along Admiral Callaghan Lane between Rotary Avenue and the I-80 Ramps. Noise levels along Admiral Callaghan Lane would increase by 1.9 dBA with the project. This level is below the perceptible noise level change of 3.0 dBA. As discussed above, the proposed project includes a new Costco that is anticipated to indirectly result in the redistribution of trips from the existing Costco in Gateway Plaza. Therefore, fewer trips would occur on certain roadways such as Plaza Drive and Turner Parkway. This redistribution of trips would also affect Admiral Callaghan Lane. Since the noise level increase along the roadways in the project area would not be perceptible, no significant impacts would occur.

Table 4.10-9: Near Term and Near Term With Project Traffic Noise

Roadway Segment	Near Term		With Project		Project Change from Existing Conditions	Significant Impact?
	ADT	dBA CNEL[1]	ADT	dBA CNEL[1]		
Admiral Callaghan Lane						
Columbus Pkwy to Auto Club Dr	21,550	64.2	21,092	64.1	-0.1	No
Auto Club Dr to Plaza Dr	18,550	63.4	18,097	63.3	-0.1	No
Plaza Dr to Vallejo Corners	9,915	60.7	13,605	62.1	1.4	No
Vallejo Corners to Target Driveway	12,080	61.6	15,770	62.7	1.2	No
Target Driveway to Turner Pkwy	12,230	61.6	15,920	62.8	1.1	No
Turner Pkwy to Rotary Way	17,810	63.2	24,885	64.6	1.5	No
Rotary Way to I-80 Ramps	19,735	63.7	30,505	65.6	1.9	No
Plaza Drive						
Admiral Callaghan Ln to Gateway Plaza	10,700	61.1	10,375	60.9	-0.1	No
Gateway Plaza to Costco Driveway	7,600	59.6	8,002	59.8	0.2	No
Costco Driveway to Turner Pkwy	10,900	61.2	10,350	60.9	-0.2	No
Turner Parkway						
Admiral Callaghan Ln to Plaza Dr	7,980	61.1	7,840	61.0	-0.1	No
Redwood Parkway						
West of Admiral Callaghan Ln	17,280	63.2	18,380	63.5	0.3	No
East of Admiral Callaghan Ln	13,770	62.2	14,870	62.5	0.3	No

ADT = average daily trips; dBA = A-weighted decibels; CNEL = community noise equivalent level

1. Traffic noise levels are at 100 feet from the roadway centerline.

Source: Based on traffic data within the *Transportation Impact Analysis for the Fairview at Northgate*, prepared by Fehr and Peers, 2019. Refer to Appendix H for traffic noise modeling assumptions and results.

The project would not result in a doubling of traffic on area roadways. Moreover, project traffic would traverse and disperse over project area roadways, where existing ambient noise levels already exist. Future development associated with the proposed project would result in additional traffic on adjacent roadways, thereby increasing vehicular noise near existing and proposed land uses. However, this level is below the perceptible noise level change of 3.0 dBA. Since the noise level increase along the roadways in the project area would not be perceptible, impacts would be less than significant.

Stationary Noise Sources

Implementation of the proposed project would create new sources of noise in the project vicinity from residential sources, mechanical equipment, truck loading areas, parking lot noise, and landscape maintenance.

Residential Areas

Noise that is typical of high-density residential areas includes group conversations, pet noise, vehicle noise (see discussion below) and general maintenance activities. Noise from residential stationary sources would primarily occur during the "daytime" activity hours of 7:00 a.m. to 10:00 p.m. Furthermore, the residences would be required to comply with the noise standards set forth in the City's General Plan and Municipal Code.

Mechanical Equipment

Regarding mechanical equipment, the proposed project would generate stationary-source noise associated with heating, ventilation, and air conditioning (HVAC) units. Residential HVAC units typically generate noise levels of approximately 55 dBA at 3 feet[3]. The types of HVAC equipment would be consistent with those types used within the surrounding residences. As stated above, the nearest existing sensitive receptor's property lines are adjacent to the residential portion of the project site to the east. As shown on the Plan Development application, HVAC units would be ground-mounted and approximately 15 feet from the property line. The HVAC units would be located within the rear yards, screened from view, and mounted next to the proposed house which would provide some noise shielding as this area is within the property line fences. At this distance, noise levels would attenuate to 41 dBA and would not exceed the City's 60 dBA exterior standard for residential areas.

The nearest existing sensitive receptors south of the project site would be approximately 150 feet south of the proposed commercial area. Mechanical equipment is expected to be roof-mounted for one-story houses, and ground-mounted for two-story houses more than 300 feet from the closest receptors. Conservatively, at 300 feet, commercial mechanical equipment noise levels would be up to 60 dBA at 50 feet and attenuate to 48 dBA based on distance attenuation alone. This noise level is below the City's 60 dBA exterior standard for residential areas and would not be perceptible considering the existing ambient levels of 56 dBA in this area (Table 4.10-6). Mechanical equipment is anticipated to be enclosed and located more than 300 feet from the closest receptors, which would further reduce noise levels. Operation of mechanical equipment would not increase ambient noise levels beyond the acceptable compatible land use noise levels. Therefore, the proposed project would result in a less than significant impact related to stationary noise levels.

Tire Center Noise

The primary perceived source of operational noise from a Costco tire center is from the air wrenches used to loosen and tighten the lug nuts on a tire. However, most stationary source noise performance standards are in terms of a 60-minute energy- average level (Leq) and not for a few seconds of wrench operation. There are also multiple additional service activities that occur at tire centers that can cause short term noise generation (air compressors, tire inflation, on-vehicle tire balancing at a high spin rate, etc.).

[3] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, June 26, 2015.

Additionally, the tire center would receive approximately 2 deliveries per week for new stock and disposing of used tires. Not all activities would occur simultaneously.

The typical Costco tire department layout is for a row of service bays with individual roll-up doors typically facing the parking lot and vehicle staging area. The proposed Costco tire center would have all its service areas located inside the building with the roll-up doors located along the northern facade, such that the nearest residences would have no direct line-of-sight to the actual interior workspaces of the tire department.

Although various noise measurements at tire centers throughout California have shown some variation because of differences in activity, intensity, layout, etc., they tend to cluster in a fairly narrow band. The combination of lug wrench operation plus numerous other noise sources (e.g., car starts, car horn, dropped tools, banging hammer on a stuck brake drum, air compressor, phone ringing, music, etc.) comprise the total noise generation expected from the tire facility associated with the proposed project. A reference noise level of 65 dBA at 50 feet from the tire center facade has been used as a conservative input assumption in other noise analyses for Costco tire center based on a sampling of tire center sound level measurements.[4] The proposed tire center would have roll-up doors facing north, the closest existing noise-sensitive land uses to the north would be approximately 1 mile away and shielded by the intervening commercial development and the Interstate 80/SR 37 Freeway interchange, with no line of sight to the sensitive uses from the tire center interior. The shortest distance from the door of the tire center to the residences to the south is approximately 500 feet and these residences would be shielded by the Costco building. At a distance of 400 feet the noise level from the tire center would be below the City's threshold of 60 dBA. Therefore, potential impacts are considered less than significant.

Loading Area Noise

The proposed project is a mixed-use development with commercial and retail uses that would necessitate occasional truck delivery operations. The primary noise associated with truck deliveries is the arrival and departure of trucks. Normal deliveries typically occur during the hours of 2:00 AM to 10:00 AM. During loading and unloading activities, noise would be generated by the trucks' diesel engines, exhaust systems, and brakes during low gear shifting' braking activities; back-up beepers while backing up toward the docks/loading areas; dropping down the dock ramps; and maneuvering away from the docks. The proposed project is not anticipated to require a significant number of truck deliveries. The majority of deliveries for the commercial uses would consist of vendor deliveries in vans and would be somewhat infrequent and irregular. Truck deliveries for the proposed Costco store would be approximately 10 trucks per day. The loading dock area of the proposed Costco store is located approximately 90 feet north of the southern property boundary and approximately 150 feet north of the closest existing multi-family residences. While there would be temporary noise increases during truck maneuvering and engine idling, these impacts would of short duration and infrequent. Typically, heavy truck operations generate a noise level of 68 dBA at a distance of 30 feet. At 150 feet, noise levels would attenuate to 54 dBA, which is below the City's 60 dBA standard for residential areas and below the ambient noise levels from the adjacent

[4] River Crossing Marketplace Specific Plan Draft EIR, dated April 2018. prepared by Placeworks, page 4.10-34.

roadways in this location. Loading area noise levels would be further attenuated by an 8-foot noise wall on the south side of the loading area. The truck ramps that serve Costco warehouse trucks descend approximately 6-8 feet. The noise attenuation wall is located at the same elevation as the parking lot thereby attenuating noise from the loading docks. As noise levels associated with trucks and loading/unloading activities would be below City standards and ambient levels, impacts would be less than significant. Furthermore, as previously discussed, VMC Section 16.072.050(C) identifies "sounds from transportation equipment used exclusively in the movement of goods and people to and from a given premises" as sounds that can exceed the City's noise standard of 60 dBA for the project site.

Gas Station Noise

The proposed gas station is located in the southwestern portion of the site. General gas station operations are expected to have similar sound levels as the parking areas described below. Fuel supply trucks are expected to deliver fuel to the gas station up to 12 times per day during the hours the gas station is in operation from 5 AM to 10:00 PM. Typically, only one truck at a time would be at the gas station. The drive aisles for the gas station are approximately 300 feet from the nearest residence. As discussed above, heavy truck operations generate a noise level of 68 dBA at a distance of 30 feet. At a distance of 300 feet the noise level would attenuate to approximately 51 dBA which is below the City standard of 60 dBA and below the ambient traffic noise levels from the adjacent roadways. As such, potential impacts are less than significant.

Furthermore, gas station deliveries would fall within the sound level exceptions provided in VMC Section 16.072.050(C) which identifies "sounds from transportation equipment used exclusively in the movement of goods and people to and from a given premises" as sounds that can exceed the City's noise standard of 60 dBA for the project site.

Parking Areas

Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the CNEL scale. Also, noise would primarily remain on the project site and would be intermittent (during peak-events, e.g., car door slamming, engine starting, etc.). However, the instantaneous maximum sound levels generated by a car door slamming, engine starting up and car pass-bys may be an annoyance to adjacent noise-sensitive receptors. Parking lot noise can also be considered a "stationary" noise source.

The commercial center would have approximately 962 surface parking spaces. The instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car pass-bys range from 60 to 63 dBA at 50 feet and may be an annoyance to adjacent noise-sensitive receptors. Conversations in parking areas may also be an annoyance to adjacent sensitive receptors. Sound levels of speech typically range from 33 dBA at 48 feet for normal speech to 50 dBA at 50 feet for very loud speech. Surface parking lot noise would be partially masked by background noise from traffic along I-80 and Admiral Callaghan Lane. Additionally, the nearest sensitive receptors would be approximately 300 feet south of the surface parking area and parking lot noise would attenuate to 47 dBA at this distance. Therefore, parking lot noise

would not result in substantially greater noise levels than currently exist in the vicinity and would not exceed the City's 60 dBA standard for residential areas. Noise impacts would less than significant.

Landscape Maintenance Activities

Development and operation of the proposed project includes new landscaping that would require periodic maintenance. Noise generated by a gasoline-powered lawnmower is estimated to be approximately 70 dBA at a distance of 5 feet. However, maintenance activities would operate during daytime hours for brief periods of time as allowed by the City's Municipal Code and would not permanently increase ambient noise levels in the project vicinity and would be consistent with landscape maintenance activities that currently occur at the surrounding uses. Therefore, with adherence to the City's Municipal Code, impacts associated with landscape maintenance would be less than significant.

Overall, implementation of MM NOI-1 and adherence to the City's Municipal Code requirements, noise impacts associated with traffic, mechanical equipment, deliveries, loading/unloading activities, and parking lot noise would be reduced to a less than significant level.

Mitigation Measure:

MM NOI-1: **Construction Noise.** Prior to the start of grading, the Construction Manager shall provide evidence acceptable to the City of Vallejo Planning & Development Services Director ("Director"), that:

- Construction activities shall be restricted to day time hours of between 7:00 a.m. and 6:00 p.m. Mondays through Saturdays. No construction activity shall occur on Sundays or federal holidays. The Director shall have authority to grant exceptions from this restriction for the concrete pour of the Costco store and for activities occurring within a fully sealed building envelope.
- Helicopter usage shall be limited to no more than two weekdays between 9 a.m. and 5 p.m. At times when the helicopter is not actively in the process of connecting straps to and lifting and placing HVAC units on the roof of the Costco building, the helicopter shall ascend, as appropriate, to lessen the level of noise. At least 14 days prior to helicopter usage, the construction contractor shall provide written notice of such usage to residents, businesses and owners of property within 500 feet of the project site. The Director shall review and approve such notice prior to distribution.
- Prior to the start of construction activities, the construction contractor shall:
    - Maintain and tune all proposed equipment in accordance with the manufacturer's recommendations to minimize noise emission.
    - Inspect all proposed equipment and should fit all equipment with properly operating mufflers, air intake silencers, and engine shrouds that are no less effective than as originally equipped by the manufacturer.

- Post a sign, clearly visible at the site, with a contact name and telephone number of the City of Vallejo's authorized representative to respond in the event of a noise complaint.
- Place stationary construction equipment and material delivery in loading and unloading areas as far as practicable from the residences.
- Limit unnecessary engine idling to the extent feasible.
- 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.
- Use low-noise emission equipment.
- Limit use of public address systems.
- Minimize grade surface irregularities on construction sites.

IMPACT NOI-2	***WOULD THE PROJECT RESULT IN GENERATION OF EXCESSIVE GROUNDBORNE VIBRATION OR GROUNDBORNE NOISE LEVELS?*** ***(LESS THAN SIGNIFICANT IMPACT)***

CONSTRUCTION

Increases in groundborne vibration levels attributable to the proposed project would be primarily associated with construction-related activities. Construction on the project site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Groundborne vibrations from construction activities rarely reach levels that damage structures.

The FTA has published standard vibration velocities for construction equipment operations. In general, depending on the building category of the nearest buildings adjacent to the potential pile driving area, the potential construction vibration damage criteria vary. For example, for a building constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.50 inches per second (in/sec) peak particle velocity (PPV) is considered safe and would not result in any construction vibration damage. The FTA architectural damage criterion for continuous vibrations for non-engineered timber and masonry buildings (i.e., 0.20 inch/second) appears to be conservative, as identified in *Table 4.10-10: Groundborne Vibration Criteria: Architectural Damage*. The types of construction vibration impact include human annoyance and building damage. Human annoyance occurs when construction

vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment.

Table 4.10-10: Groundborne Vibration Criteria: Architectural Damage

	Building Category	PPV (in/sec)	L_v (VdB)[1]
I.	Reinforced concrete, steel, or timber (no plaster)	0.5	102
II.	Engineered concrete and masonry (no plaster)	0.3	98
III.	Non-engineered timber and masonry buildings	0.2	94
IV.	Buildings extremely susceptible to vibration damage	0.12	90

1. RMS velocity calculated from vibration level (VdB) using the reference of one micro-inch/second.

Source: City of Vallejo, Propel Vallejo General Plan Update and Sonoma Boulevard Specific Plan Environmental Impact Report, 2016.

Construction-related ground vibration is normally associated with impact equipment such as pile drivers, jackhammers, and the operation of some heavy-duty construction equipment, such as dozers and trucks. According to the applicant, no pile drivers would be used during construction. Vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. Since there are no established vibration standards in the City's Municipal Code, this evaluation uses the FTA (2018) recommended standard of 0.2 inches per second peak particle velocity with respect to the prevention of structural damage for normal buildings. This measurement is also the level at which vibrations may begin to annoy people inside buildings (Caltrans 2013).

Table 4.10-11: Typical Construction Equipment Vibration Levels, identifies vibration levels feet for typical construction equipment. Based on FTA data, vibration velocities from typical heavy construction equipment operations that would be used during project construction would range from 0.003 to 0.210 inches/second PPV at 25 feet from the source of activity. It is also acknowledged that construction activities would occur throughout the project site and would not be concentrated at the point closest to the nearest structure.

The nearest sensitive receptors are approximately 96 feet to the east and 150 feet to the south. Based on typical vibration levels, ground vibration generated by heavy-duty equipment could reach levels of 0.028 inch per second peak particle velocity at 96 feet and 0.014 at 150 feet. The use of construction equipment would not result in a groundborne vibration velocity level above the established threshold of 0.2 inch per second PPV. As a result, impacts associated with excessive groundborne vibration during construction would be less than significant.

Table 4.10-11: Typical Construction Equipment Vibration Levels

Equipment Type	Peak Particle Velocity at 25 Feet (inches per second)	Peak Particle Velocity at 96 Feet (inches per second)	Peak Particle Velocity at 150 Feet (inches per second)
Large Bulldozer	0.089	0.0118	0.0061
Caisson Drilling	0.089	0.0118	0.0061
Loaded Trucks	0.076	0.0101	0.0052
Rock Breaker	0.059	0.0078	0.0040
Jackhammer	0.035	0.0047	0.0024
Vibratory Roller	0.210	0.0279	0.0143
Small Bulldozer/Tractor	0.003	0.0004	0.0002

1. Calculated using the following formula: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$, where: PPV (equip) = the peak particle velocity in inch per second of the equipment adjusted for the distance; PPV (ref) = the reference vibration level in inch per second from Table 7-4 of the FTA Transit Noise and Vibration Impact Assessment Guidelines (September 2018); D = the distance from the equipment to the receiver.

OPERATIONS

The proposed project would not generate groundborne vibration that could be felt at surrounding uses. The project would not involve railroads or substantial heavy truck operations, with the exception of delivery vehicles to the project site once facilities are operational. As a result, impacts from vibration associated with project operation would be less than significant.

IMPACT NOI-3 ***WOULD THE PROJECT BE 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, WOULD THE PROJECT EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS?***

(NO IMPACT)

Napa County Airport lies approximately six miles northwest of the project site. Other public airport facilities include Buchanan Field Airport in the City of Concord and Sonoma Valley Airport in the City of Sonoma, both approximately 12 miles from the project site. According to the General Plan EIR, no private air facilities such as helipads are within ten miles of the City. Therefore, no impacts would occur.

4.10.6 CONCLUSION

As described above, the proposed project would comply with the noise and vibration standards established in the City of Vallejo General Plan and Noise Ordinance codified in the City's Municipal Code. Implementation of MM NOI-1 would reduce construction noise to a less than significant level. Noise level increases associated with project vehicular traffic would not exceed significance thresholds. The proposed project would introduce new stationary noise sources that would result in small noise level increases proximate to noise-sensitive land uses. However, noise levels from project-related stationary sources would not exceed the City's standards. The proposed project would not generate a temporary or permanent increase in ambient noise levels in excess of City standards. Groundborne vibration impacts would also be less than significant. The project site is located approximately six miles from the nearest public airport and ten miles from the nearest private air facility. Therefore, the project would not expose residents or employees in the area to excessive noise levels due to airstrips or airports. Noise impacts for the proposed project would be less than significant with implementation of MM NOI-1.

4.10.7 CUMULATIVE IMPACTS

Noise by definition is a localized phenomenon, and drastically reduces as distance from the source increases. Cumulative noise impacts involve development of the proposed project in combination with ambient growth and other related development projects. As noise levels decrease as distance from the source increases, only projects in the nearby area could combine with the proposed project to potentially result in cumulative noise impacts.

CONSTRUCTION

The project's construction activities would be less than significant with the implementation of MM NOI-1. Based on the fact that noise dissipates as it travels away from its source, noise impacts from on-site activities and other stationary sources would be limited to the project site and vicinity. The project site is bordered by I-80 to the west, existing residences to the southeast and east, and existing commercial uses to the north and south. Construction activities at other planned and approved projects would be required to take place during daytime hours, and the City and project applicants would be required to evaluate construction noise impacts and implement mitigation, if necessary, to minimize noise impacts. Each project would be required to comply with the applicable City's Municipal Code limitations on allowable hours of construction. Therefore, project construction would not contribute to cumulative impacts and impacts in this regard are not cumulatively considerable.

OPERATIONS

Cumulative noise impacts describe how much noise levels are projected to increase over existing conditions with the development of the proposed project and other foreseeable projects. Cumulative noise impacts would occur primarily as a result of increased traffic on local roadways due to buildout of the proposed project and other projects in the vicinity. However, noise from generators and other stationary sources could also generate cumulative noise levels but are not found to be significant.

Stationary Noise

As discussed above, impacts from the project's operations would be less than significant. Due to site distance, intervening land uses, and the fact that noise dissipates as it travels away from its source, noise impacts from on-site activities and other stationary sources would be limited to the project site and vicinity. No known past, present, or reasonably foreseeable projects would compound or increase the operational noise levels generated by the project. Thus, cumulative operational noise impacts from related projects, in conjunction with project-specific noise impacts, would not be cumulatively significant.

Traffic Noise

A project's contribution to a cumulative traffic noise increase would be considered significant when the combined effect exceeds perception level (i.e., auditory level increase) threshold. Cumulative increases in traffic noise levels were estimated by comparing the Existing With Project and Near Term scenarios to existing conditions. The traffic analysis considers cumulative traffic from future growth assumed in the traffic mode, as well as cumulative projects identified by the City of Vallejo.

The following criteria is used to evaluate the combined effect of the cumulative noise increase.

- *Combined Effect.* The cumulative with project noise level ("Cumulative With Project") would cause a significant cumulative impact if a 3.0 dB increase over "Existing" conditions occurs and the resulting noise level exceeds the applicable exterior standard at a sensitive use. Although there may be a significant noise increase due to the proposed project in combination with other related projects (combined effects), it must also be demonstrated that the project has an incremental effect. In other words, a significant portion of the noise increase must be due to the proposed project.

The following criteria have been used to evaluate the incremental effect of the cumulative noise increase.

- *Incremental Effects.* The "Cumulative With Project" causes a 1.0 dBA increase in noise over the "Cumulative Without Project" noise level.

A significant impact would result only if both the combined and incremental effects criteria have been exceeded. Noise by definition is a localized phenomenon and reduces as distance from the source increases. Consequently, only the proposed project and growth due to occur in the general area would contribute to cumulative noise impacts. *Table 4.10-12: Cumulative With Project Conditions Predicted Traffic Noise Levels,* identifies the traffic noise effects along roadway segments in the vicinity of the project site for "Existing," "Cumulative Without Project," and "Cumulative With Project," conditions, including incremental and net cumulative impacts.

Table 4.10-12: Cumulative With Project Conditions Predicted Traffic Noise Levels

Roadway Segment	Existing	Cumulative Without Project	Cumulative With Project	Combined Effects	Incremental Effects	Cumulatively Significant Impact?
	dBA @ 100 Ft from Centerline	dBA @ 100 Ft from Centerline	dBA @ 100 Ft from Centerline	dBA Difference: Existing and Cumulative With Project	dBA Difference: Cumulative Without and With Project	
Admiral Callaghan Lane						
Columbus Pkwy to Auto Club Driveway	64.1	64.9	65.2	1.2	0.3	No
Auto Club Dr to Plaza Dr	63.3	64.2	64.5	1.2	0.3	No
Plaza Dr to Vallejo Corners	60.5	61.4	62.6	2.1	1.2	No
Vallejo Corners to Target Driveway	61.3	62.2	63.2	1.9	1.0	No
Target Driveway to Turner Pkwy	61.4	62.3	63.3	1.9	1.0	No
Turner Pkwy to Rotary Way	62.9	63.8	65.3	2.4	1.5	No
Rotary Way to I-80 Ramps	63.4	64.3	66.2	2.8	1.9	No
Plaza Drive						
Admiral Callaghan Ln to Gateway Plaza	61.0	61.7	62.1	1.1	0.4	No
Gateway Plaza to Costco Driveway	59.3	60.2	61.0	1.7	0.8	No
Costco Driveway to Turner Pkwy	60.9	61.8	62.4	1.5	0.6	No
Turner Parkway						
Admiral Callaghan Ln to Plaza Dr	60.8	61.7	62.3	1.5	0.5	No
Redwood Parkway						
West of Admiral Callaghan Ln	62.9	63.9	64.2	1.2	0.3	No
East of Admiral Callaghan Ln	61.9	62.8	63.2	1.3	0.4	No

ADT = average daily trips; dBA = A-weighted decibels; CNEL = community noise equivalent level

1. Traffic noise levels are at 100 feet from the roadway centerline.

Source: Based on traffic data within the *Transportation Impact Analysis for the Fairview at Northgate*, prepared by Fehr and Peers, 2019. Refer to Appendix H for traffic noise modeling assumptions and results.

First, it must be determined whether the "Future With Project" increase above existing conditions (Combined Effects) is exceeded. As indicated in the table, the proposed project has no street segments that exceed combined effects criterion. Next, under the Incremental Effects criteria, cumulative noise impacts are defined by determining if the forecast ambient ("Future Without Project") noise level is increased by 1 dB or more.

The project's contribution to traffic noise is evaluated in Table 4.10-12. As shown in the table, the majority of Admiral Callaghan Lane segments exceed in the incremental effects criterion, but do not exceed the combined effects criterion. As discussed above, the proposed project would increase local noise levels by a maximum of 2.1 dBA CNEL. As the increase is less than 3 dBA, the project's cumulative noise contribution would be less than significant. Based on the significance criteria set forth in this EIR, no roadway segments would result in significant impacts because they would not exceed both the combined or the incremental effects criteria. The proposed project would not result in long-term mobile noise impacts based on project-generated traffic as well as cumulative and incremental noise levels. Therefore, the proposed project, in combination with cumulative background traffic noise levels, would result in a less than significant cumulative impact. The proposed project's contribution to noise levels would not be cumulatively considerable.

4.10.8 REFERENCES

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