4.12 NOISE

This chapter of the Draft Environmental Impact Report (EIR) describes the potential noise impacts associated with the adoption and implementation of the proposed project. This chapter describes the regulatory framework and existing conditions, identifies criteria used to determine impact significance, provides an analysis of the potential noise impacts, and identifies proposed General Plan 2050 goals, policies, and actions, as well as feasible mitigation measures, that would minimize any potentially significant impacts.

4.12.1 ENVIRONMENTAL SETTING

4.12.1.1 NOISE AND VIBRATION FUNDAMENTALS

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

- **Sound.** A disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- **Decibel (dB).** A unitless measure of sound on a logarithmic scale.
- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- **Equivalent Continuous Noise Level (L_{eq}); also called the Energy-Equivalent Noise Level.** The value of an equivalent, steady sound level, which, in a stated time period (often over an hour) and at a stated location, has the same A-weighted sound energy as the time-varying sound. Thus, the L_{eq} metric is a single numerical value that represents the equivalent amount of variable sound energy received by a receptor over the specified duration.
- **Statistical Sound Level (L_n).** The sound level that is exceeded "n" percent of time during a given sample period. For example, the L_{50} level is the statistical indicator of the time-varying noise signal that is exceeded 50 percent of the time (during each sampling period); that is, half of the sampling time, the changing noise levels are above this value and half of the time they are below it. This is called the "median sound level." The L_{10} level, likewise, is the value that is exceeded 10 percent of the time (i.e., near the maximum) and this is often known as the "intrusive sound level." The L_{90} is the sound level exceeded 90 percent of the time and is often considered the "effective background level" or "residual noise level."
- **Day-Night Sound Level (L_{dn} or DNL).** The energy-average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.

- **Community Noise Equivalent Level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added from 7:00 p.m. to 10:00 p.m. and 10 dB from 10:00 p.m. to 7:00 a.m. For general community/environmental noise, CNEL and L_{dn} values rarely differ by more than 1 dB (with the CNEL being only slightly more restrictive, that is, higher than the L_{dn} value). As a matter of practice, L_{dn} and CNEL values are interchangeable and are treated as equivalent in this assessment.
- **Noise-Sensitive Receptor.** Noise- and vibration-sensitive receptors include land uses where quiet environments are necessary for enjoyment and public health and safety. Residences, schools, motels and hotels, libraries, religious institutions, hospitals, and nursing homes are examples.
- **Peak Particle Velocity (PPV).** The peak rate of speed at which soil particles move (e.g., inches per second) due to ground vibration.

Sound Fundamentals

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

The human ear is not equally sensitive to all frequencies. Sound waves below 16 Hz are not heard at all and are “felt” more as a vibration. Similarly, while people with extremely sensitive hearing can hear sounds as high as 20,000 Hz, most people cannot hear above 15,000 Hz. In all cases, hearing acuity falls off rapidly above about 10,000 Hz and below about 200 Hz. Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale is usually used to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by weighting frequencies in a manner approximating the sensitivity of the human ear.

Noise is defined as unwanted sound and is known to have several adverse effects on people, including hearing loss, speech and sleep interference, physiological responses, and annoyance. Based on these known adverse effects, the federal government, the State of California, and many local governments have established criteria to protect public health and safety and to prevent disruption of certain human activities.

Sound Measurement

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

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

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

Time variation in noise exposure is typically expressed in terms of a steady-state energy level equal to the energy content of the time varying period (called L_{eq}), or alternately, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. For example, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time. Half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour. Similarly, the L_2, $L_{8,}$ and L_{25} values represent the noise levels that are exceeded 2, 8, and 25 percent of the time, or 1, 5, and 15 minutes per hour. These “L_n” values are typically used to demonstrate compliance for stationary noise sources with a city’s noise ordinance, as discussed subsequently.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, State law and the County require that, for planning purposes, an artificial dB increment be added to quiet time noise levels in a 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or Day-Night Noise Level (L_{dn}). The CNEL descriptor requires that an artificial increment of 5 dBA be added to the actual noise level for the hours from 7:00 p.m. to 10:00 p.m. and 10 dBA for the hours from 10:00 p.m. to 7:00 a.m. The L_{dn} descriptor uses the same methodology but only adds a 10 dBA increment between 10:00 p.m. and 7:00 a.m. Both descriptors give roughly the same 24-hour level, with the CNEL being only slightly more restrictive (i.e., higher).

Psychological and Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, and thereby affecting blood pressure, functions of the heart, and the nervous system. In comparison, extended periods of noise exposure above 90 dBA could result in permanent hearing damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. Table 4.12-1, *Typical Noise Levels*, shows typical noise levels from familiar noise sources.

NOISE

TABLE 4.12-1 TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Onset of physical discomfort	120+	
	110	Rock Band (near amplification system)
Jet Flyover at 1,000 feet		
	100	
Gas Lawn Mower at 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		
	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal speech at 3 feet
Heavy Traffic at 300 feet	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (background)
Quiet Suburban Nighttime		
	30	Library
Quiet Rural Nighttime		Bedroom at Night, Concert Hall (background)
	20	
		Broadcast/Recording Studio
	10	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Source: California Department of Transportation, May 13, 2011, *I-80 Davis OGAC Pavement Noise Study*, https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/davis-noise-study-12yr-report-may2011-a11y.pdf, accessed October 4, 2022.

Vibration Fundamentals

Vibration is an oscillating motion. Like noise, vibration is transmitted in waves, but in this case through earth or solid objects. Unlike noise, vibration is typically felt rather than heard. Vibration can be either natural, as in the form of earthquakes, volcanic eruptions, landslides, or human-made, as from explosions, heavy machinery, or trains. Both natural and human-made vibration may be continuous such as from operating machinery, or impulsive as from an explosion.

Vibration amplitudes are usually described in terms of either vibration decibels (VdB) or peak particle velocity (PPV). Table 4.12-2, *Human and Architectural Reactions to Typical Vibration Levels in Peak Particle Velocity,* and Table 4.12-3, *Human Reaction to Typical Vibration Levels in Vibration Decibels*, present the human reaction to various levels of PPV and VdB, respectively.

TABLE 4.12-2 HUMAN AND ARCHITECTURAL REACTIONS TO TYPICAL VIBRATION LEVELS IN PEAK PARTICLE VELOCITY

Vibration Level Peak Particle Velocity (in/sec)	Human Reaction	Effect on Buildings
0.006 to 0.019	Threshold of perception, possibility of intrusion	Vibrations unlikely to cause damage of any type
0.08	Vibrations readily perceptible	Recommended upper level of vibration to which ruins and ancient monuments should be subjected
0.10	Level at which continuous vibration begins to annoy people	Virtually no risk of "architectural" (i.e., not structural) damage to normal buildings
0.20	Vibrations annoying to people in buildings	Threshold at which there is a risk to "architectural" damage to normal dwelling (houses with plastered walls and ceilings)
0.4 to 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: California Department of Transportation, 2020, *Transportation and Construction Vibration Guidance Manual*.

TABLE 4.12-3 HUMAN REACTION TO TYPICAL VIBRATION LEVELS IN VIBRATION DECIBELS

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

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

Vibrations also vary in frequency, and this affects perception. Typical construction vibrations fall in the 10 to 30 Hz range and usually occur around 15 Hz. Traffic vibrations exhibit a similar range of frequencies; however, due to their suspension systems, buses often generate frequencies around 3 Hz at high vehicle speeds. It is less common, but possible, to measure traffic frequencies above 30 Hz. The way in which vibration is transmitted through the earth is called propagation. As vibration waves propagate from a source, the energy is spread over an ever-increasing area such that the energy level striking a given point is reduced with the distance from the energy source. This geometric spreading loss is inversely proportional to the square of the distance. Wave energy is also reduced with distance as a result of material damping in the form of internal friction, soil layering, and void spaces. The amount of attenuation provided by material damping varies with soil type and condition as well as the frequency of the wave.

4.12.1.2 REGULATORY FRAMEWORK

Federal Regulations

Federal Highway Administration

Proposed federal or federal-aided highway construction projects at a new location, or the physical alteration of an existing highway that significantly changes the horizontal or vertical alignment or increases the number of through-traffic lanes, require an assessment of noise and consideration of noise abatement pursuant to Title 23 of the Code of Federal Regulations (CFR) Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*. The Federal Highway Administration (FHWA) adopted noise abatement criteria for sensitive receivers (e.g., picnic and recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals) when "worst-hour" noise levels approach or exceed 67 dBA L_{eq}.[1]

United States Environmental Protection Agency

In addition to FHWA standards, the United States Environmental Protection Agency (USEPA) has identified the relationship between noise levels and human response. The USEPA has determined that over a 24-hour period, a L_{eq} of 70 dBA will result in some hearing loss. Interference with activity and annoyance will not occur if exterior levels are maintained at a L_{eq} of 55 dBA and interior levels are at or below 45 dBA. These levels are relevant to planning and design and useful for informational purposes, but they are not land use planning criteria because they do not consider economic cost, technical feasibility, or the needs of the community; therefore, they are not mandated. The USEPA also has set 55 dBA L_{dn} as the basic goal for exterior residential noise intrusion. However, other federal agencies, in consideration of their own program requirements and goals, as well as difficulty of actually achieving a goal of 55 dBA L_{dn}, have settled on the 65 dBA L_{dn} level as their standard. At 65 dBA L_{dn}, activity interference is kept to a minimum, and annoyance levels are still low. It is also a level that can realistically be achieved.

United States Department of Housing and Urban Development

The United States Department of Housing and Urban Development (HUD) has set the goal of 65 dBA L_{dn} as a desirable maximum exterior standard for residential units developed under HUD funding. This level is also generally accepted in the State of California.

[1] California Department of Transportation, April 2020, *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects*, https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/traffic-noise-protocol-april-2020-a11y.pdf, accessed October 4, 2022.

Federal Transit Administration

The Federal Transit Administration (FTA) has identified construction noise thresholds in the *Transit Noise and Vibration Impact Assessment Manual*,[2] which limit daytime construction noise to 80 dBA L_{eq} at residential land uses and to 90 dBA L_{eq} at commercial and industrial land uses.

The FTA also provides damage criteria during construction vibration exposure depending on building material type and vibration impact criteria for sensitive buildings, residences, and institutional land uses near rail transit and railroads. The thresholds for residences and buildings where people normally sleep (e.g., nearby residences) are 72 VdB for frequent events (more than 70 events of the same source per day), 75 VdB for occasional events (30 to 70 vibration events of the same source per day), and 80 VdB for infrequent events (less than 30 vibration events of the same source per day).

State Regulations

General Plan Guidelines

The State of California, through its General Plan Guidelines, discusses how ambient noise should influence land use and development decisions and includes a table of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable uses at different noise levels, expressed in CNEL. A conditionally acceptable designation implies new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements for each land use and needed noise insulation features are incorporated in the design. By comparison, a normally acceptable designation indicates that standard construction can occur with no special noise reduction requirements. The General Plan Guidelines provide cities with recommended community noise and land use compatibility standards that can be adopted or modified at the local level based on conditions and types of land uses specific to that jurisdiction. The City of Santa Rosa has not adopted its own noise and land use compatibility guidelines. Therefore, the State of California's guidelines shown in Table 4.12-4, *State Community Noise and Land Use Compatibility*, are applied in this Draft EIR.

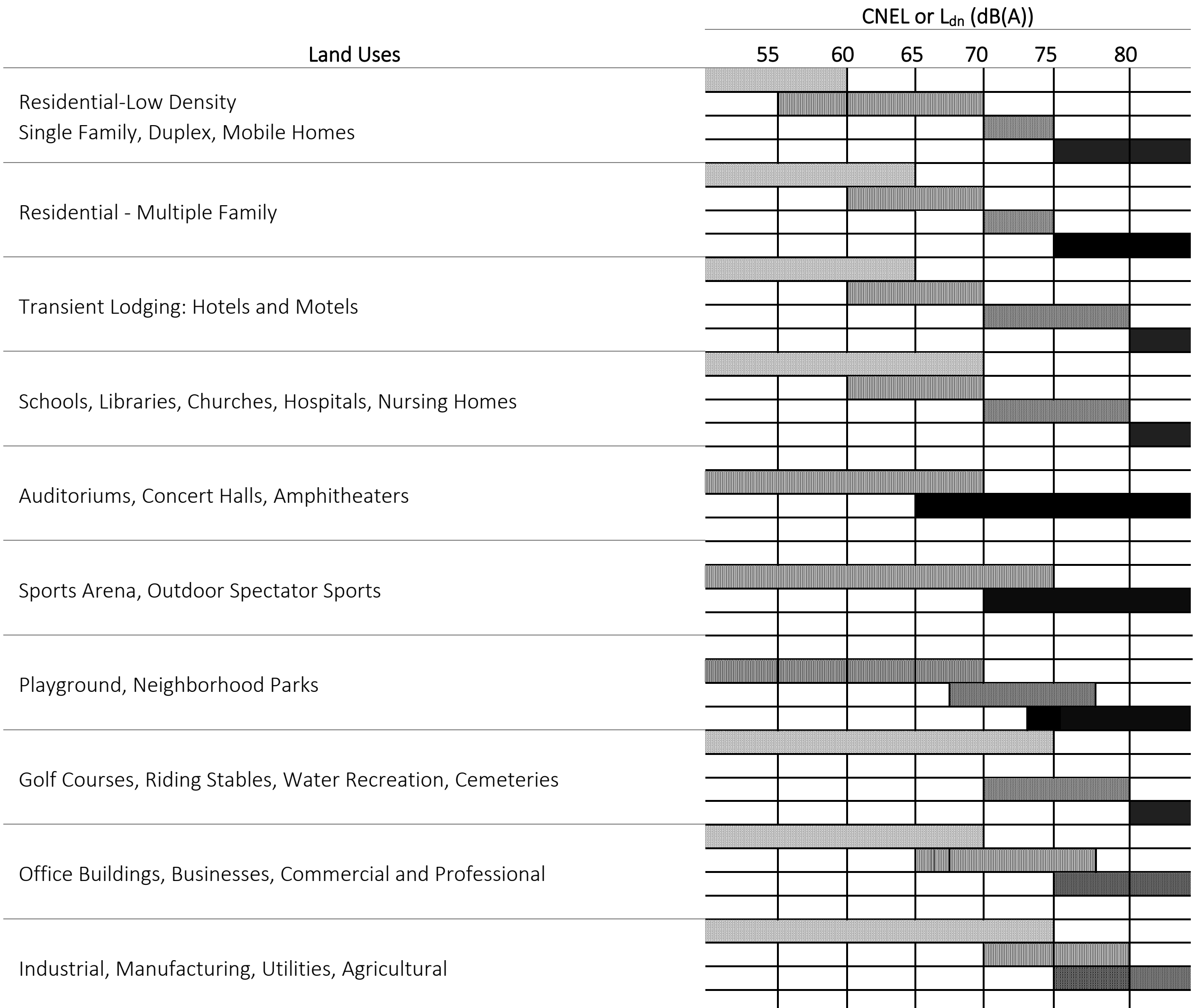
California Building Code

The State of California provides a minimum standard for building design through Title 24 of the CCR, commonly referred to as the California Building Code (CBC). The CBC is in Part 2 of Title 24. The CBC is updated every three years. It is generally adopted on a jurisdiction-by-jurisdiction basis, subject to further modification based on local conditions. The CBC, Title 24, Part 2, Volume 1, Chapter 12, Section 1207.11.2, *Allowable Interior Noise Levels*, requires that interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric is evaluated as either the L_{dn} or the CNEL, consistent with the Noise Element of the local General Plan.

[2] Federal Transit Administration, September 2018, *Transit Noise and Vibration Impact Assessment Manual*, FTA Report No. 0123.

NOISE

TABLE 4.12-4 STATE COMMUNITY NOISE AND LAND USE COMPATIBILITY



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

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

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

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

Source: Governor's Office of Planning and Research, 2017, *State of California General Plan 2017 Guidelines*, Appendix D.

California Building Code: CALGreen

The State of California's noise insulation standards are codified in the CCR, Title 24, Part 11, *California Green Building Standards Code* (CALGreen). CALGreen noise standards are applied to new or renovation construction projects in California to control interior noise levels resulting from exterior noise sources. Proposed projects may use either the prescriptive method (Section 5.507.4.1) or the performance method (Section 5.507.4.2) to show compliance. Under the prescriptive method, a project must demonstrate transmission loss ratings for the wall and roof-ceiling assemblies and exterior windows when located in a noise environment of 65 dB(A) CNEL or higher. Under the performance method, a project must demonstrate that interior noise levels do not exceed 50 dB(A) $L_{eq(1hr)}$.

Division of Aeronautic Noise Standards

CCR Title 21 sets forth the State's airport noise standards.[3] In the findings described in Section 5006, the standard states the following: "A level of noise acceptable to a reasonable person residing in the vicinity of an airport is established as a CNEL value of 65 dB for purposes of these regulations. This criterion level has been chosen for reasonable persons residing in urban residential areas where houses are of typical California construction and may have windows partially open. It has been selected with reference to speech, sleep, and community reaction." Based on this finding, the airport noise standard as defined in Section 5012 is set at a CNEL of 65 dBA. Assembly Bill (AB) 2776 requires any person who intends to sell or lease residential properties in an airport influence area to disclose that fact to the person buying the property.

California Department of Transportation

The California Department of Transportation (Caltrans) recommends a vibration limit of 0.5 inches per second (in/sec) peak particle velocity (PPV) for buildings structurally sound and designed to modern engineering standards. A conservative vibration limit of 0.25 to 0.30 in/sec PPV has been used for older buildings that are found to be structurally sound but cosmetic damage to plaster ceilings or walls is a major concern. For historic buildings or buildings that are documented to be structurally weakened, a conservative limit of 0.08 in/sec PPV is often used to provide the highest level of protection. All of these limits have been used successfully and compliance with these limits has not been known to result in appreciable structural damage. All vibration limits referred to herein apply on the ground level and take into account the response of structural elements (i.e., walls and floors) to groundborne excitation.

Assembly Bill 1307

Signed into law on September 7, 2023, AB 1307 amends the California Environmental Quality Act (CEQA) and adds Public Resources Code (PRC) Section 21085. Pursuant to PRC Section 20185 for residential projects, the effects of noise generated by project occupants and their guests on human beings is not a significant effect on the environment. Accordingly, the noise from residential development projects is limited to construction noise, noise from the operation of the house (e.g., heating, ventilation, and air

[3] California Code of Regulations Airport Noise Standards, Title 21, Public Works Division 2.5, Division of Aeronautics (Department of Transportation), Chapter 6 Noise Standards, Article 1. General.

conditioning [HVAC] equipment), and increases in transportation noise from vehicle trips generated from the residential project.

Local Regulations

Santa Rosa City Code

The Santa Rosa City Code (SRCC) includes various directives to minimize adverse noise impacts in Santa Rosa. The SRCC is organized by title, chapter, and section, and in some cases, articles. Most provisions related to noise are in Title 17, *Environmental Protection*, and Title 18, *Buildings and Construction,* as follows:

- **Chapter 17-16, *Noise*.** This chapter is also known as the City's noise ordinance and is designed to protect people from non-transportation noise sources such as machinery, equipment, pumps, fans, air conditioners, or other similar mechanical devices.
  - **Section 17-16.030, *Ambient Base Noise Level Criteria.*** This section establishes the criteria to be used as a base (ambient noise level) from which noise levels can be compared, as shown in Table 4.12-5, *Ambient Base Noise Level Criteria*.

TABLE 4.12-5 AMBIENT BASE NOISE LEVEL CRITERIA

Zone	Time	Sound Level A (decibels) Community Environment Classification
R-1 and R-2	10:00 p.m. to 7:00 a.m.	45
	7:00 p.m. to 10:00 p.m.	50
	7:00 a.m. to 7:00 p.m.	55
Multi-family	10:00 p.m. to 7:00 a.m.	50
	7:00 a.m. to 10:00 p.m.	55
Office & Commercial	10:00 p.m. to 7:00 a.m.	55
	7:00 a.m. to 10:00 p.m.	60
Intensive Commercial [a]	10:00 p.m. to 7:00 a.m.	55
	7:00 a.m. to 10:00 p.m.	65
Industrial	Anytime	70

Note:
[a] See Appendix B of the City Clerk's file as set forth on a map on file in the office of the City clerk.
Source: Santa Rosa City Code, Section 17-16.030.

  - **Section 17-16.040, *Standards for Determining Violation*.** This section provides a list of qualitative variables to take into account when determining whether a noise disturbs the peace and quiet of a neighborhood, including background noise levels, proximity to residences, time of day, and duration. More specifically, Section 17-16.120, *Machinery and Equipment*, states that noise produced by machinery, equipment, pumps, fans, HVAC, and similar mechanical devices is not to exceed the ambient base noise level by more than 5 dB at receiving properties. Other sections discuss restrictions on noise sources, such as leaf blowers and sound-amplifying equipment.

- Section 17.16-120, *Machinery and Equipment*. This section sets the standards for operating machinery and equipment, which could include construction-related equipment, not to exceed ambient base noise level by more than 5 dB at receiving properties.
- Section 17-16.170, *Regulations Generally*. This section limits the operation of sound-amplifying equipment at commercial and noncommercial uses to between the hours of 9:00 a.m. and 6:00 p.m. each day except Sunday and legal holidays. No operation of sound-amplifying equipment for commercial purposes shall be permitted on Sundays or legal holidays. The operation of sound-amplifying equipment for noncommercial purposes on Sundays and legal holidays shall only occur between the hours of 10:00 a.m. and 6:00 p.m. Additionally, noise levels emanating from sound-amplifying equipment shall not exceed 15 dBA above the ambient base noise levels in Table 4.12-5. Sound-amplifying equipment shall not be operated within 200 feet of churches, schools, or hospitals.
- Chapter 18-16, *California Building Code*. Section 18-16.010, *Citation of California Building Code,* adopts the CBC in its entirety, subject, however, to the amendments, additions, and deletions set forth in this chapter. The purpose of the CBC is to prescribe regulations governing the erection, construction, enlargement, alteration, repair, moving, removal, demolition, conversion, occupancy, equipment, use, height, area, and maintenance of all buildings and structures in the city. By regulating the design and construction of excavations, foundations, building frames, retaining walls, and other structures, the City's Building Code provides protections during the design, permitting, and construction of structures intended for human occupancy.
- Chapter 18-42, *California Green Building Standards Code*. Section 18-42.010, *Citation of California Green Building Standards Code,* adopts all sections of the California Green Building Standards Code, Part 11 of Title 24, 2022 Edition, published by the California Building Standards Commission, including its appendices, to, amongst other things, control interior noise levels resulting from exterior noise sources.

4.12.1.3 EXISTING CONDITIONS

Noise-Sensitive Receptors

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

Ambient Noise Measurements

Noise from transportation activity is the primary component of the noise environment in Santa Rosa. Transportation corridors that traverse the city, such as US Highway 101 and State Route (SR) 12; major arterial roadways, such as Santa Rosa Avenue and Stony Point Road; and train activity along the Sonoma-Marin Area Rapid Transit (SMART) corridor, are the predominant sources of environmental noise. Aircraft associated with the Charles M. Schulz-Sonoma County Airport also contribute to the noise environment during overflights. Lastly, portions of the city include industrial land uses that contribute to the noise environment in localized areas.

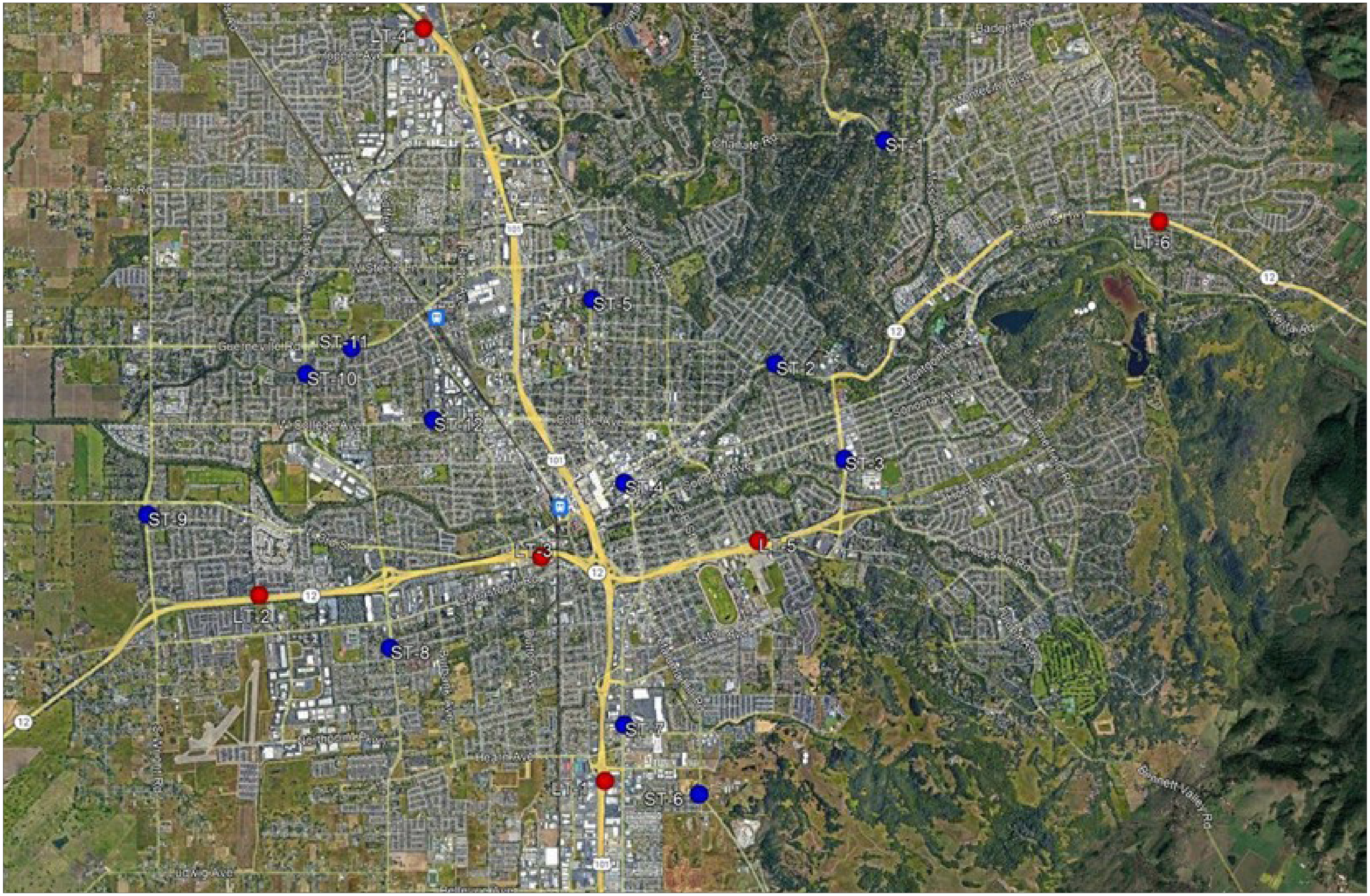
The monitoring was completed to establish existing sources and noise levels in the city. Long-term (LT) measurements made hour-by-hour over a period of 24 hours or more provide information on how noise levels vary throughout the day and night and how noise levels may vary from day to day. A series of attended short-term (ST) measurements were also made. The person attending the measurements identified the noise sources that occurred during the measurement and noted the level of noise associated with identifiable events, which assisted in quantitatively and qualitatively characterizing the noise environments along the major roadways and also in the quieter areas. The day-night average noise level (L_{dn}) is the metric used in the city to characterize the 24-hour average noise exposure level. It is also important to know how noise levels vary within each hour of the day and night. For this purpose, standard acoustical descriptors L_{eq}, L_{max}, L_1, L_{10}, L_{50}, L_{90}, and L_{min} were also measured and reported.

The ambient noise monitoring survey was completed between Wednesday, May 3, 2023, and Friday, May 5, 2023. Six long-term (LT) noise measurements (LT-1 through LT-6) and 12 short-term (ST) (10-minute duration) noise measurements (ST-1 through ST-12) were made within the EIR Study Area. The measurement locations are shown on Figure 4.12-1, *Long-Term and Short-Term Noise Measurement Locations*.

Long-Term Noise Monitoring

The LT measurements were made hour-by-hour over a period of 24 hours between Wednesday, May 3, 2023, and Friday, May 5, 2023. A description of each LT location is provided herein:

- **LT-1** was at the western boundary of the Cost Plus parking lot near the US Highway 101 northbound off-ramp at Yolanda Avenue, approximately 90 feet from the centerline of the nearest through lane of US Highway 101 northbound and approximately 40 feet from the nearest lane of the off-ramp. LT-1 was positioned above the existing six-foot sound wall along the perimeter of the shopping center.
- **LT-2** was positioned in the northeast corner of the Occidental Road/Michael Drive intersection, approximately 45 feet north of the centerline of Occidental Road and approximately 120 feet north of the centerline of the nearest through lane of westbound SR 12.
- **LT-3** was at Holbrook Street, approximately 115 feet south of the nearest through lane along eastbound SR 12 and approximately 515 feet west of the center of the SMART tracks.
- **LT-4** was along the northern boundary of the Kohl's parking lot, approximately 70 feet southwest of the centerline of the nearest through lane of southbound US Highway 101.
- **LT-5** was made along Maple Avenue between Gordon Lane and Brookwood Avenue. LT-5 was approximately 25 feet north of the centerline of Maple Avenue and approximately 150 feet north of the centerline of the nearest through lane of westbound SR 12.
- **LT-6** was made in the southwestern corner of the SR 12/Peppertree Lane intersection, approximately 60 feet south of the centerline of the nearest through lane of eastbound SR 12.



Source: © Google Earth, 2023.

Long-term (LT) noise monitoring

Short-term (ST) noise monitoring

Figure 4.12-1
Long-Term and Short-Term Noise Measurement Locations

Table 4.12-6, *Summary of Long-Term Noise Monitoring*, summarizes measurement details of each LT measurement location.

TABLE 4.12-6 SUMMARY OF LONG-TERM NOISE MONITORING

Receptor ID	Location	Hourly Average Noise Levels, dBA L_{eq}		Day-Night Average Noise Level, dBA L_{dn}
		Daytime Hours (7:00 a.m. to 10:00 p.m.)	Nighttime Hours (10:00 p.m. to 7:00 a.m.)	
LT-1	Western boundary of Cost Plus parking lot near US Highway 101 northbound exit at Yolanda Avenue	70 to 76	66 to 75	78
LT-2	Northeast corner of Occidental Road/Michael Drive	69 to 75	59 to 73	75
LT-3	Along Holbrook Street, ~115 feet south of centerline of nearest through lane of eastbound SR 12	62 to 66	54 to 66	68
LT-4	Northern boundary of Kohl's parking lot, ~70 feet southwest of centerline of nearest through lane of southbound US Highway 101	68 to 79	65 to 78	80
LT-5	Along Maple Avenue, ~150 feet north of the centerline of nearest through lane of eastbound SR 12	67 to 74	57 to 72	74
LT-6	Southwest corner of SR 12/Peppertree Lane	64 to 76	53 to 69	71

Source: Illingworth and Rodkin, 2023.

Short-Term Noise Monitoring

Short-term measurements at ST-1 through ST-5 were made on Wednesday May 3, 2023, between 12:20 p.m. and 2:10 p.m. in 10-minute increments. Measurements at ST-6 through ST-12 were made on Thursday May 4, 2023, between 9:10 a.m. and 12:10 p.m. in 10-minute increments. A description of each ST location is provided herein:

- **ST-1** measurements were made at the end of Montecito Avenue, approximately 70 feet from the centerline of Fountaingrove Parkway, which was the dominant noise at ST-1. During this 10-minute period, 206 passenger vehicles passed ST-1 along Fountaingrove Parkway, generating noise levels of 57 to 75 dBA.
- **ST-2** measurements were made in the northeastern corner of the 4th Street/Diamond Court intersection. Traffic along 4th Street was the dominant noise source, with passenger vehicles generating noise levels of 64 to 74 dBA and heavy trucks generating noise levels of 73 to 75 dBA.
- **ST-3** measurements were made along the western boundary of the Ross Dress for Less parking lot, approximately 70 feet from the centerline of Farmers Lane, which was the dominant noise source at ST-3. Passenger vehicles along Farmers Lane generated noise levels of 60 to 76 dBA, and heavy trucks generated noise levels of 69 to 76 dBA during the ST-3 measurement.
- **ST-4** measurements were made at the Old Courthouse Square, approximately 45 feet north of the centerline of 3rd Street. Passenger vehicles (57 to 70 dBA) and a single bus (67 dBA) along 3rd Street were the dominant noise sources.

- **ST-5** measurements were from the parking lot along Mendocino Avenue between Dexter Street and Carr Avenue. ST-5 was approximately 60 feet east of the centerline of Mendocino Avenue, which was the dominant noise source at ST-5. Passenger vehicles (58 to 79 dBA) and a single bus (76 dBA) along 3rd Street were the dominant noise sources.
- **ST-6** measurements were made at the Petaluma Hill Road/Old Petaluma Hill Road intersection, approximately 65 feet west of the centerline of Petaluma Hill Road, which was the dominant noise source at ST-6. During this 10-minute period, traffic along Petaluma Hill Road consisted of passenger vehicles (63 to 78 dBA), heavy trucks (75 dBA), and motorcycles (73 dBA).
- **ST-7** measurements were made at the western boundary of the parking lot of Applebee's Grill and Bar along Santa Rosa Avenue, approximately 80 feet from the centerline of ST-7. Traffic along Santa Rosa Avenue, consisting of passenger vehicles (58 to 75 dBA), heavy trucks (70 to 74 dBA), and buses (71 dBA), was the dominant noise source.
- **ST-8** measurements were made at the southwestern corner of the Stony Point Road/Mesa Way intersection, approximately 70 feet from the centerline of Stony Point Road. Traffic along Stony Point Road, consisting of passenger vehicles (60 to 77 dBA), heavy trucks (71 to 75 dBA), and buses (70 dBA), was the dominant noise source.
- **ST-9** measurements were made south of the parking lot of commercial retail uses located at 2496 West 3rd Street, approximately 75 feet east of the centerline of Fulton Road. Passenger vehicles (54 to 75 dBA) and heavy trucks (65 to 77 dBA) along Fulton Road were the dominant noise sources.
- **ST-10** measurements were made between residences at 1951 Jennings Avenue and 1950 Greeneich Avenue, representing the backyards of both residences. ST-10 was approximately 60 feet east of the centerline of Marlow Road, which was the dominant noise source at ST-10 and consisted of passenger vehicles (60 to 76 dBA) and a single bus (79 dBA).
- **ST-11** measurements were made along Guerneville Road, representing the backyards of residences at 1660 and 1658 Ridley Avenue. ST-11 was approximately 60 feet south of the centerline of Guerneville Road, which was the dominant noise source and consisted of passenger cars (60 to 77 dBA), heavy trucks (75 dBA), and buses (74 dBA).
- **ST-12** measurements were made at the West College Avenue/Eardley Avenue intersection, approximately 60 feet north of the centerline of West College Avenue. Traffic along West College Avenue, consisting of passenger vehicles (61 to 76 dBA), heavy trucks (74 dBA), and motorcycles (74 dBA), was the dominant noise.

Table 4.12-7, *Summary of Short-Term Noise Monitoring*, summarizes measurement details of each ST measurement location.

TABLE 4.12-7 SUMMARY OF SHORT-TERM NOISE MONITORING

Receptor ID	Location	Date, Time	10-minute Noise Level Measurements, dBA					
			L_{max}	L_1	L_{10}	L_{50}	L_{max}	10-minute L_{eq}
ST-1	Side yard equivalent at 5710 Montecito Avenue	5/3/2023, 12:20 to 12:30	75	73	70	63	53	66
ST-2	Side yard equivalent at 2129 4th Street	5/3/2023, 12:50 to 13:00	75	74	72	69	62	69
ST-3	Parking lot of 750 Farmers Lane (Ross Dress for Less)	5/3/2023, 1:10 to 1:20	76	75	72	68	60	69
ST-4	Front of Old Courthouse Square along 3rd Street	5/3/2023, 1:40 to 1:50	70	69	67	61	56	63
ST-5	At parking lot along Mendocino Avenue between Dexter Street and Carr Avenue	5/3/2023, 2:10 to 2:20	79	77	71	67	60	68
ST-6	At the intersection of Petaluma Hill Road and Old Petaluma Hill Road	5/4/2023, 9:10 to 9:20	78	73	70	66	57	67
ST-7	Parking lot of 2250 Santa Rosa Avenue (Applebee's Grill + Bar)	5/4/2023, 9:30 to 9:40	75	73	68	63	56	65
ST-8	Side yard equivalent at 1103 Stony Point Road	5/4/2023, 10:10 to 10:20	77	76	72	62	52	67
ST-9	South of parking lot of 2496 West 3rd Street, along Fulton Road	5/4/2023, 10:30 to 10:40	77	74	69	63	49	65
ST-10	Backyard equivalent of 1951 Jennings Avenue and 1950 Greeneich Avenue, along Marlow Road	5/4/2023, 11:00 to 11:10	79	75	72	66	56	68
ST-11	Backyard equivalent of 1660 and 1658 Ridley Avenue, along Guerneville Road	5/4/2023, 11:20 to 11:30	77	76	73	65	52	68
ST-12	At the intersection of West College Avenue and Eardley Avenue	5/4/2023, 12:00 to 12:10	76	74	72	67	58	68

Source: Illingworth and Rodkin, 2023.

Vehicular Noise

SoundPLAN Version 8.2, a three-dimensional ray-tracing computer program, was used to develop the traffic noise contours calculated for the Existing (2019) traffic conditions along major roadways in the EIR Study Area. Calculations accounted for the source of noise (traffic), the frequency spectra of the noise source, traffic speeds, vehicle mix information, and the topography of the area. In order to provide a credible worst-case assessment of existing and future traffic noise conditions throughout the city, the modeling did not incorporate existing buildings or barriers, including centerline K-rails on the expressway medians, into the calculations. The geometric data used to create the model were based on GIS information provided by the City. Existing (2019) peak hour traffic data and traffic speeds provided by the traffic consultants (W-Trans) were input into the model for local roadways and expressways. A truck mix of 1 percent was used along the local roadways, while truck mix along US Highway 101 and SR 12 were obtained from the Caltrans website.[4] Through Santa Rosa, heavy and medium trucks consist of 3 percent each along US Highway 101 and consist of 1 percent and 2 percent, respectively, along SR 12.

The noise contours represent the primary traffic noise sources in the EIR Study Area. Figure 4.12-2, *Traffic Noise Contours for the Existing (2019) Scenario*, provides the existing (2019) traffic noise contours for the EIR Study Area.

Table 4.12-8, *Existing Noise Levels in the EIR Study Area*, summarizes the Existing L_{dn} noise levels, as measured at a distance of 75 feet from the centerline of the roadway. For all receptors along US Highway 101 and SR 12, 75-foot distances were measured from the centerline of the nearest through lane.

TABLE 4.12-8 EXISTING NOISE LEVELS IN THE EIR STUDY AREA

		L_{dn} at 75 feet, dBA
Roadway	**Segment**	**Existing (2019)**
US Highway 101	South of Todd Road	81
	Todd Road to Yolanda Avenue	81
	Yolanda Avenue to Baker Avenue	81
	Baker Avenue to SR 12	82
	SR 12 to 3rd Street	81
	3rd Street to College Avenue	82
	College Avenue to Steele Lane/ Guerneville Road	82
	Steele Lane/Guerneville Road to Bicentennial Way	82
	North of Bicentennial Way	80
SR 12	Farmers Lane to Brookwood Avenue	78
	Brookwood Avenue to US Highway 101	79
	US Highway 101 to Dutton Avenue	79
	Dutton Avenue to Stony Point Road	78
	West of Stony Point Road	75
3rd Street	Brookwood Avenue to E Street	57
	E Street to Santa Rosa Avenue	60
	Santa Rosa Avenue to B Street	64
	B Street to US Highway 101	72
	US Highway 101 to Olive Street/ Railroad Street /Wilson Street	73
	Olive Street/Railroad Street/ Wilson Street to Dutton Avenue	65
	Dutton Avenue to Stony Point Road	65
	Stony Point Road to Fulton Road	67
Administration Drive	West of Mendocino Avenue	59
Aston Avenue/Allan Way	Petaluma Hill Road to Brookwood Avenue	61
B Street	South of 3rd Street	64
	3rd Street to Healdsburg Avenue/Mendocino Avenue	62

[4] Caltrans Traffic Census Program. https://dot.ca.gov/programs/traffic-operations/census

TABLE 4.12-8 EXISTING NOISE LEVELS IN THE EIR STUDY AREA

Roadway	Segment	L_{dn} at 75 feet, dBA Existing (2019)
Badger Road	Calistoga Road to Wallace Road	55
Bellevue Avenue	East of Dutton Avenue	65
	Dutton Avenue to Stony Point Road	62
Bennett Valley Road	Santa Rosa Avenue to E Street	73
	E Street to Brookwood Avenue	73
	Brookwood Avenue to Farmers Lane	71
	Farmers Lane to Tachevah Drive	67
	Tachevah Drive to Bethards Drive	64
	Bethards Drive to Yulupa Avenue	53
	East of Yulupa Avenue	55
Bethards Drive	Bennett Valley Road to Yulupa Avenue	63
	Yulupa Avenue to Creekside Road	59
	Creekside Road to Summerfield Road	61
Bicentennial Way	Fountaingrove Parkway to Mendocino Avenue	68
	Mendocino Avenue to US Highway 101	70
	US Highway 101 to Range Avenue	72
Brookwood Avenue	Kawana Springs Road to Linwood Avenue	57
	Aston Avenue to SR 12	62
	SR 12 to Sonoma Avenue	67
	Sonoma Avenue to 3rd Street	66
	3rd Street to College Avenue	67
Brush Creek Road	Sonoma Highway to Fountaingrove Parkway	60
	Fountaingrove Parkway to Badger Road	61
Bryden Lane	4th Street to Montecito Avenue	65
Burbank Avenue	Hearn Avenue to Sebastopol Road	59
Calistoga Road	Sonoma Highway to Montecito Boulevard	64
	Montecito Boulevard to Badger Road	67
	North of Badger Road	66
Chanate Road	Mendocino Avenue to Franklin Avenue	66
	Franklin Avenue to Parker Hill Road	66
	Parker Hill Road to Fountaingrove Parkway	63
Cleveland Avenue	9th Street to College Avenue	67
	College Avenue to Frances Street/ Range Avenue	71
	Frances Street/Range Avenue to Guerneville Road	73
	Guerneville Road to Bicentennial Way	71
	Bicentennial Way to Piner Road	74
	Piner Road to Hopper Avenue	68

TABLE 4.12-8 EXISTING NOISE LEVELS IN THE EIR STUDY AREA

Roadway	Segment	L_{dn} at 75 feet, dBA Existing (2019)
Coffey Lane	Guerneville Road to Steele Lane	59
	Steele Lane to Piner Road	59
	Piner Road to Pine Meadows Drive/Barnes Road	66
	Pine Meadows Drive/Barnes Road to Hopper Avenue	60
	North of Hopper Avenue	58
Colgan Avenue	Santa Rosa Avenue to Petaluma Hill Road	61
College Avenue	4th Street to Brookwood Avenue	65
	Brookwood Avenue to E Street	68
	E Street to Mendocino Avenue	69
	Mendocino Avenue to US Highway 101	71
	US Highway 101 to Cleveland Avenue	74
	Cleveland Avenue to Dutton Avenue	72
	Dutton Avenue to Stony Point Road	68
	Stony Point Road to Fulton Road	66
Corby Avenue	Bellevue Avenue to US Highway 101 southbound ramps	78
	US Highway 101 southbound ramps to Hearn Avenue	69
	North of Hearn Avenue	67
Corporate Center Parkway	Northpoint Parkway to Sebastopol Road	65
Cross Creek Road	North of Thomas Lake Harris Drive	59
Cypress Way	Hoen Avenue to Creekside Road	58
Dutton Avenue	South of Bellevue Avenue	60
	North of Bellevue Avenue	57
	Hearn Avenue to Sebastopol Road	62
	Sebastopol Road to SR 12	68
	SR 12 to 3rd Street	72
	3rd Street to College Avenue	62
	College Avenue to Guerneville Road	69
E Street	Maple Avenue to Sonoma Avenue	62
	Sonoma Avenue to 3rd Street	62
	3rd Street to 4th Street	65
	4th Street to College Avenue	62
Farmers Lane	Bennett Valley Road to SR 12	68
	SR 12 to Hoen Avenue	70
	Hoen Avenue to Sonoma Avenue	70
	Sonoma Avenue to Montgomery Drive	69
	Montgomery Drive to 4th Street	69

TABLE 4.12-8 EXISTING NOISE LEVELS IN THE EIR STUDY AREA

Roadway	Segment	L_{dn} at 75 feet, dBA Existing (2019)
Fountaingrove Parkway	Brush Creek Road to Chanate Road	66
	Chanate Road to Thomas Lake Harris Drive	61
	Thomas Lake Harris Drive to Stagecoach Road/Parker Hill Road	63
	Stagecoach Road/Parker Hill Road to Bicentennial Way	67
	Bicentennial Way to Old Redwood Highway	67
	Old Redwood Highway to US Highway 101	74
Frances Street/ Range Avenue	Cleveland Avenue to Guerneville Road	61
	Guerneville Road to Steele Lane	65
	Steele Lane to Bicentennial Way	68
	Bicentennial Way to Piner Road	70
Franklin Avenue/ Humboldt Street	Poppy Drive to Chanate Road	64
Fulton Road	SR 12 to Occidental Road	72
	Occidental Road to 3rd Street	70
	3rd Street to College Avenue	71
	College Avenue to Guerneville Road	71
	Guerneville Road to Piner Road	70
	Piner Road to Wood Road/ Francisco Avenue	71
	North of Wood Road/Francisco Avenue	71
Guerneville Road	Steele Lane to Range Avenue	67
	Range Avenue to Coffey Lane	69
	Coffey Lane to Dutton Avenue	70
	Dutton Avenue to Marlow Road	69
	Marlow Road to Fulton Road	67
	West of Fulton Road	67
Hall Road	West of Fulton Road	60
Healdsburg Avenue	B Street to Mendocino Avenue	61
Hearn Avenue	Santa Rosa Avenue to Corby Avenue	73
	Corby Avenue to Dowd Drive	70
	Dowd Drive to Dutton Avenue	67
	Dutton Avenue to Burbank Avenue	63
	Burbank Avenue to Stony Point Road	58
Hoen Avenue	Summerfield Road to Yulupa Avenue	65
	Yulupa Avenue to Cypress Way	67
	Cypress Way to Farmers Lane	60
	Farmers Lane to Sonoma Avenue	53
Hoen Frontage Road	Farmers Lane to Hoen Avenue	67
Hopper Avenue	Cleveland Avenue to Coffey Lane	66
	Coffey Lane to Barnes Road	56

TABLE 4.12-8 EXISTING NOISE LEVELS IN THE EIR STUDY AREA

Roadway	Segment	L_{dn} at 75 feet, dBA Existing (2019)
Kawana Springs Road	Santa Rosa Avenue to Petaluma Hill Road	62
	Petaluma Hill Road to Brookwood Avenue	62
	East of Brookwood Avenue	57
Ludwig Avenue	Stony Point Road to Wright Road	62
Maple Avenue	Brookwood Avenue to E Street	73
	E Street to Santa Rosa Avenue	72
Marlow Road	College Avenue to Guerneville Road	68
	Guerneville Road to Steele Lane	65
	Steele Lane to Piner Road	65
Mendocino Avenue	4th Street to College Avenue	59
	College Avenue to Pacific Avenue	70
	Pacific Avenue to Steele Lane	70
	Steele Lane to Chanate Road	67
	Chanate Road to Bicentennial Way	70
	Bicentennial Way to Fountaingrove Parkway	68
Middle Rincon Road	Sonoma Highway to Montecito Boulevard	65
	Montecito Boulevard to Badger Road	60
Mission Boulevard	Montgomery Drive to Sonoma Highway	65
	Sonoma Highway to Montecito Boulevard	66
Montecito Boulevard	Calistoga Road to Middle Rincon Road	67
	Middle Rincon Road to Mission Boulevard	67
	Mission Boulevard to Brush Creek Road	66
Montgomery Drive	East of Mission Boulevard	67
	Mission Boulevard to Summerfield Road	68
	Summerfield Road to Farmers Lane	68
	Farmers Lane to 3rd Street	60
North Street	College Avenue to Pacific Avenue	61
	North of Pacific Avenue	56
Northpoint Parkway	Stony Point Road to Corporate Center Parkway	66
	West of Corporate Center Parkway	58
Occidental Road	Stony Point Road to Wright Road	71
	West of Wright Road	65
Old Redwood Highway	North of Fountaingrove Parkway	72
Olive Street/Railroad Street	South of Sebastopol Road	68
	North of Sebastopol Road	66
Pacific Avenue	Montecito Avenue to North Street	65
	North Street to King Street	61
	King Street to Mendocino Avenue	63

TABLE 4.12-8 EXISTING NOISE LEVELS IN THE EIR STUDY AREA

Roadway	Segment	L_{dn} at 75 feet, dBA Existing (2019)
Parker Hill Road	Chanate Road to Fountaingrove Parkway	59
Petaluma Hill Road	South of Yolanda Avenue	64
	Yolanda Avenue to Kawana Springs Road	65
	Kawana Springs Road to Colgan Avenue	66
	Colgan Avenue to Santa Rosa Avenue	65
Pine Meadows Drive/ Barnes Road	Coffey Lane to Hopper Avenue	54
	North of Hopper Avenue	58
Piner Road	Cleveland Avenue to Range Avenue	69
	Range Avenue to Coffey Lane	69
	Coffey Lane to Marlow Road	70
	Marlow Road to Fulton Road	66
	West of Fulton Road	65
Santa Rosa Avenue	South of Todd Road	69
	Todd Road to Bellevue Avenue	68
	Bellevue Avenue to Yolanda Avenue	69
	Yolanda Avenue to Hearn Avenue	69
	Hearn Avenue to Kawana Springs Road	68
	Kawana Springs Road to Colgan Avenue	68
	Colgan Avenue to Petaluma Hill Road	70
	Petaluma Hill Road to SR 12	71
	SR 12 to Sonoma Avenue	66
	Sonoma Avenue to 3rd Street	63
Sebastopol Road	Olive Street to Dutton Avenue	62
	Dutton Avenue to Burbank Avenue	68
	Burbank Avenue to Stony Point Road	65
	Stony Point Road to Corporate Center Parkway	69
	Corporate Center Parkway to Wright Road	67
Sonoma Avenue	Summerfield Road to Yulupa Avenue	63
	Yulupa Avenue to Farmers Lane	65
	Farmers Lane to Brookwood Avenue	66
	Brookwood Avenue to E Street	64
	E Street to Santa Rosa Avenue	65

TABLE 4.12-8 EXISTING NOISE LEVELS IN THE EIR STUDY AREA

Roadway	Segment	L_{dn} at 75 feet, dBA Existing (2019)
Sonoma Highway/4th Street	East of Calistoga Road	70
	Calistoga Road to Middle Rincon Road	70
	Middle Rincon Road to Mission Boulevard	70
	Mission Boulevard to Brush Creek Road	71
	Brush Creek Road to Farmers Lane	71
	Farmers Lane to Bryden Lane	68
	Bryden Lane to College Avenue	67
	College Avenue to Brookwood Avenue	65
	Brookwood Avenue to E Street	64
	E Street to Mendocino Avenue	56
	Mendocino Avenue to B Street	59
Standish Avenue	Todd Road to Robles Avenue	62
Steele Lane	Mendocino Avenue to US Highway 101	70
	US Highway 101 to Guerneville Road	74
	Guerneville Road to Coffey Lane	64
	Coffey Lane to Marlow Road	62
Stony Point Road	South of Todd Road	69
	Todd Road to Bellevue Avenue	69
	Bellevue Avenue to Hearn Avenue	69
	Hearn Avenue to Northpoint Parkway	69
	Northpoint Parkway to Sebastopol Road	67
	Sebastopol Road to SR 12	71
	SR 12 to 3rd Street	69
	3rd Street to College Avenue	69
Summerfield Road	Bethards Drive to Horseshoe Drive/Santa Rosita Court	64
	Horseshoe Drive/Santa Rosita Court to Hoen Avenue	64
	Hoen Avenue to Sonoma Avenue	63
	Sonoma Avenue to Montgomery Drive	64
Tachevah Drive	Bennett Valley Road to Yulupa Avenue	62
	Yulupa Avenue to Bethards Drive	56
Thomas Lake Harris Drive	East of Cross Creek Road	61
	West of Cross Creek Road	57
Todd Road	Stony Point Road to Standish Avenue	67
	Standish Avenue to US Highway 101	69
	US Highway 101 to Santa Rosa Avenue	68
	East of Santa Rosa Avenue	59
Wallace Road	North of Badger Road	57
Wiljan Court/Dowd Drive	Bellevue Avenue to Hearn Avenue	61

TABLE 4.12-8 EXISTING NOISE LEVELS IN THE EIR STUDY AREA

Roadway	Segment	L_{dn} at 75 feet, dBA Existing (2019)
Wilson Street	3rd Street to 9th Street	66
Wright Road	Ludwig Avenue to Sebastopol Road	63
	Sebastopol Road to SR 12	69
Yolanda Avenue	US Highway 101 to Petaluma Hill Road	61
Yulupa Avenue	Bennett Valley Road to Bethards Drive	64
	Bethards Drive to Tachevah Drive	66
	Tachevah Drive to Creekside Road	65
	Creekside Road to Hoen Avenue	65
	Hoen Avenue to Sonoma Avenue	63
	Sonoma Avenue to Montgomery Drive	59
	North of Montgomery Drive	64

Source: Illingworth and Rodkin, 2023.

Aircraft Noise

The Charles M. Schulz-Sonoma County Airport is located more than two miles northwest of the EIR Study Area. The future 2030 noise exposure map provided in the Sonoma County General Plan 2020 is shown on Figure 4.12-3, *Charles M. Schulz Sonoma County Airport 2030 Noise Contours*. As shown on Figure 4.12-3, the EIR Study Area falls outside the Airport Land Use Compatibility Referral Area, which is considered to be the area of influence with regard to aircraft noise.

Railroad Noise

Railroad operations in the EIR Study Area from the SMART rail and the Northwest Pacific Railroad (NWPRR) rail line are a substantial source of noise in areas nearest railroad crossings. Day-night average noise levels vary throughout the community depending on the number of trains operating along a given rail line per day, the timing and duration of train pass-by events, and whether or not trains must sound their warning whistles near “at-grade” crossings.

To the west of US Highway 101, the NWPRR rail line runs north-south through the EIR Study Area. The SMART Project Supplemental EIR (SMART EIR) states that the proposed NWPRR’s freight service would add up to six freight train pass-bys per day between Novato and Santa Rosa. The six pass-bys per day would be generated by three North Coast Railroad Authority freight trains: two with two locomotives and up to 60 rail cars, and one train of up to 25 rail cars. The SMART EIR also states that freight train speeds would be limited to 25 mph in some areas. Weekday commuter rail passenger service would involve 12 round trips per day with a service frequency of 30 minutes in peak periods and weekend passenger rail service would involve four round trips per day.[5] Estimates in the SMART EIR indicate that the cumulative noise exposure levels from passenger and six freight pass-bys per day running at 25 mph would be around 56 dBA L_{dn} at 100 feet from the track centerline.[6] This estimate assumes that the freight operations do not occur at night (between the hours of 10:00 p.m. and 7:00 a.m.). With one nighttime freight train, noise level would increase to "over 68 L_{dn} within 50 feet of the tracks." Considering that most of the passenger train operations would occur during the daytime (i.e., 7:00 a.m. to 10:00 p.m.), some nighttime freight operations could be expected along this rail line.

When railroad trains approach a passenger station or at-grade crossing, they are required to sound their warning whistle within 0.25 miles. Trains are required to sound a long signal followed by a short signal when approaching stations, curves, or other points where view may be obscured, and when approaching passenger or freight trains. When passing a standing train, the moving train is required to sound two long signals followed by a short signal followed by a long signal, the same requirement when signaling for at-grade crossings.

Information provided in the SMART EIR indicates that the train horns could produce maximum noise levels of approximately 100 dBA at 100 feet from the track, and the engines of passing trains can produce maximum noise levels of up to 85 dBA at 100 feet from the track.[7] As tracks have been reconstructed to prepare for SMART use, at-grade crossings between Guerneville Road in Santa Rosa and downtown San Rafael have been upgraded with special crossing gates and traffic islands required for Quiet Zones[8] to keep motorists from being able to drive onto the train tracks.

Stationary Source Noise

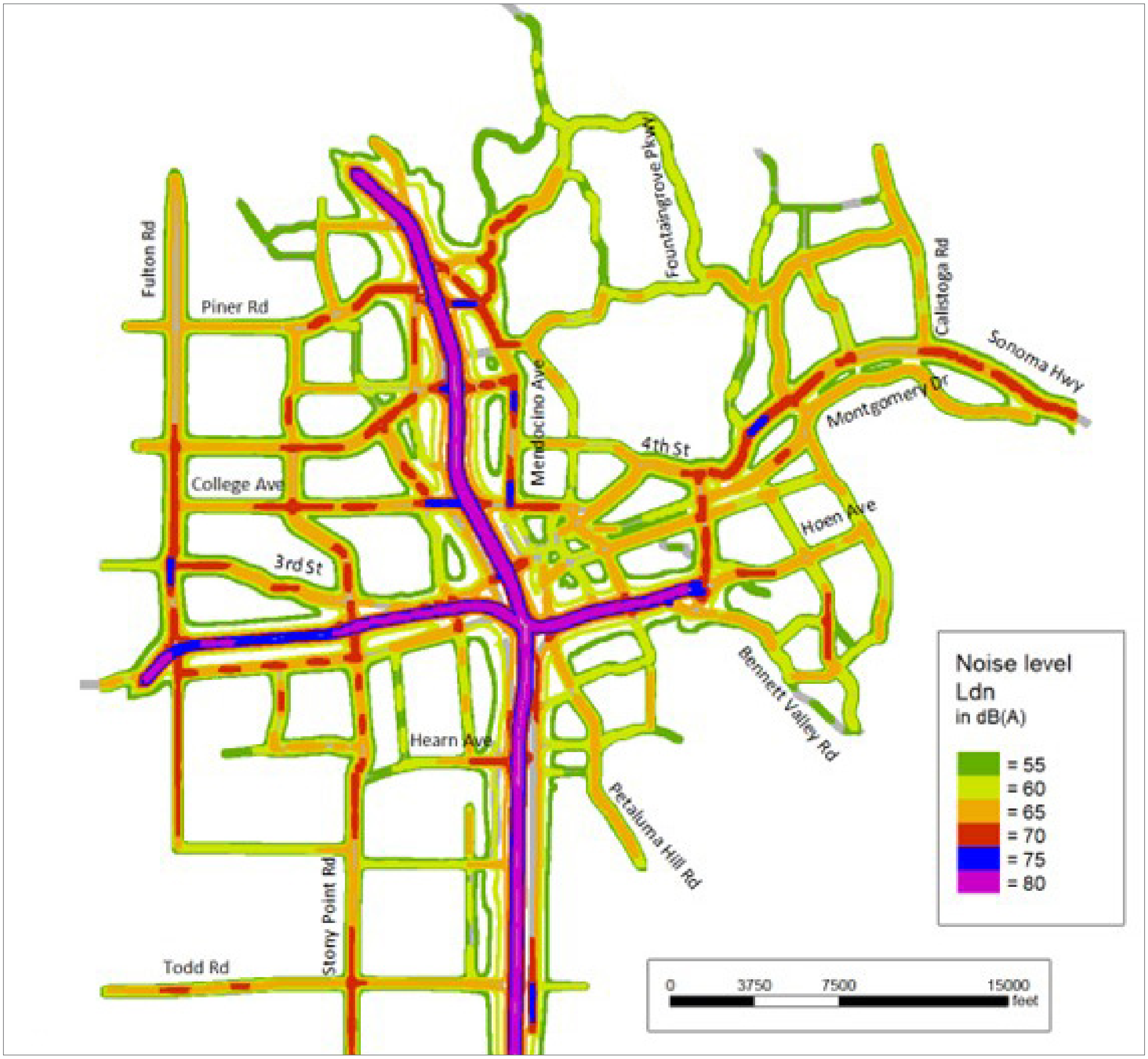
Stationary sources of noise may occur on all types of land uses. Residential uses generate noise from landscaping, maintenance activities, and air conditioning systems. Commercial uses generate noise from HVAC systems, loading docks, and other sources. Industrial uses may generate HVAC systems, loading docks, and possibly machinery. Noise generated by residential or commercial uses are generally short and intermittent. Industrial uses may generate noise on a more continual basis due to the nature of the activities. Nightclubs, outdoor dining areas, gas stations, car washes, fire stations, drive-throughs, swimming pool and hot tub pumps, school playgrounds, athletic and music events, and public parks are other common noise sources. Emergency backup generators are also a common outdoor noise source.

[5] Sonoma-Marin Area Rail Transit Commission, certified *Sonoma-Marin Area Rail Transit Draft Supplemental Environmental Impact Report (Approval of: (1) the Initial Operating Segment (IOS) Project; and (2) the Grade Crossing Improvement Project)*, (July 2008), State Clearinghouse Number 2002112033. Information is from the March 2008 Draft Supplemental EIR.

[6] Sonoma-Marin Area Rail Transit Commission, certified *Sonoma-Marin Area Rail Transit Draft Supplemental Environmental Impact Report (Approval of: (1) the Initial Operating Segment (IOS) Project; and (2) the Grade Crossing Improvement Project)*, (July 2008), State Clearinghouse Number 2002112033. Information is from the March 2008 Draft Supplemental EIR.

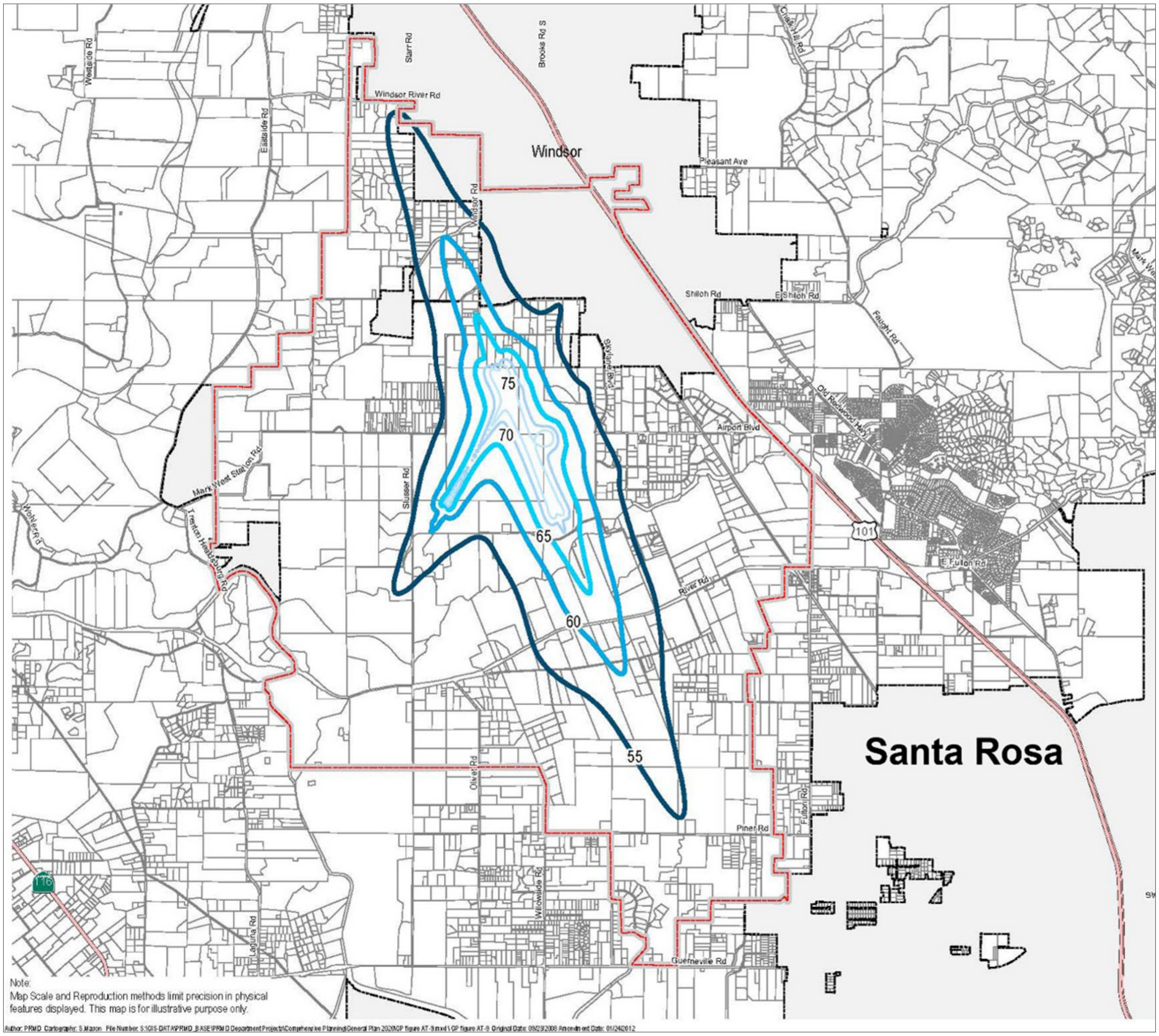
[7] Sonoma-Marin Area Rail Transit Commission, certified *Sonoma-Marin Area Rail Transit Environmental Impact Report* (June 2006), State Clearinghouse Number 2002112033. Information is from the November 2005 Draft EIR.

[8] Quiet Zones are segments of rail lines where crews are exempt from regularly sounding the train horns at grade crossings



Source: Illingworth & Rodkin Inc, 2023.

Figure 4.12-2
Traffic Noise Contours for the Existing (2019) Scenario



Source: Sonoma County, 2012.

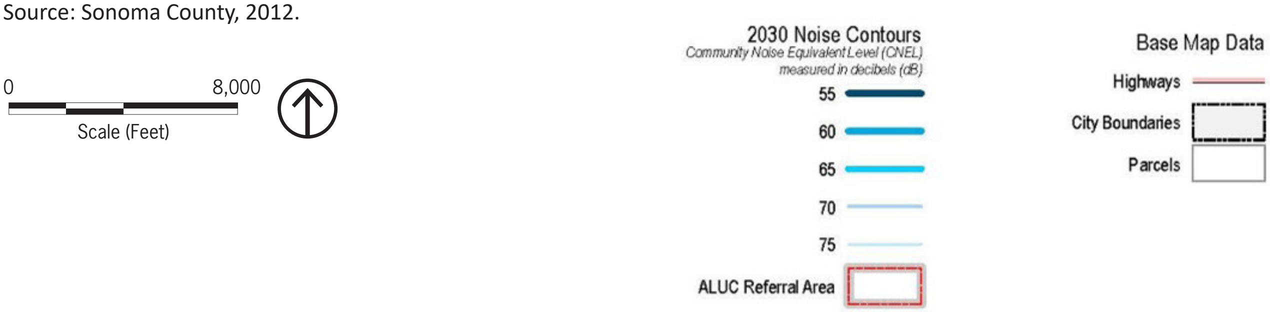


Figure 4.12-3
Charles M. Schulz Sonoma County Airport 2030 Noise Contours

Existing Vibration

Existing sources of operational vibration in the EIR Study Area include vehicle traffic on roadways and the NWPRR and SMART rail. Caltrans has studied the effects of propagation of vehicle vibration on sensitive land uses and notes that "heavy trucks, and quite frequently buses, generate the highest earthborn vibrations of normal traffic." Caltrans further notes that the highest traffic-generated vibrations are along freeways and state routes. The Caltrans study finds that "vibrations measured on freeway shoulders (five meters from the centerline of the nearest lane) have never exceeded 0.08 in/sec, with the worst combinations of heavy trucks and poor roadway conditions (while such trucks were moving at freeway speeds). This level coincides with the maximum recommended safe level for ruins and ancient monuments (and historic buildings)."[9]

4.12.2 STANDARDS OF SIGNIFICANCE

Implementation of the proposed project would result in a significant noise impact if it would:

1. 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.
2. Generate excessive groundborne vibration or groundborne noise levels.
3. For a project located within the vicinity of a private airstrip or an airport land use plan or where such a plan has not been adopted within two miles of a public airport or public use airport, if the project would expose people residing or working in the project area to excessive noise levels.
4. In combination with past, present, and reasonably foreseeable projects, results in a cumulative impact with respect to noise and vibration.

4.12.2.1 CITY OF SANTA ROSA NOISE LIMITS

Construction Noise

As discussed in Section 4.12.1.2, *Regulatory Framework*, under the subheading "Santa Rosa City Code" the SRCC does not define allowable construction hours or establish construction noise thresholds that limit the noise level from construction activity. While the SRCC Section 17-16.120 states that it is unlawful for the operation of machinery and equipment, which could include construction equipment, to exceed 5 dBA over the ambient levels summarized in Table 4.12-5, a daytime limit of 60 dBA at residential uses would not be realistic for most construction activities. Accordingly, the FTA *Transit Noise and Vibration Impact Assessment Manual*, which provides daytime construction noise limits of 80 dBA L_{eq} at residential land uses and 90 dBA L_{eq} at commercial and industrial land uses[10] is the threshold applied to this Draft EIR.

[9] Caltrans, 2013, *Transportation and Construction Vibration Guidance Manual*.

[10] Federal Transit Administration, September 2018, *Transit Noise and Vibration Impact Assessment Manual*, FTA Report No. 0123.

Stationary Noise

SRCC Section 17-16.125 states that noise produced by machinery, equipment, pumps, fans, HVAC, and similar mechanical devices is not to exceed the ambient base noise level (listed in Table 4.12-5) by more than 5 dB at receiving properties. SRCC Section 17-16.170 regulates hours of operation for sound-amplifying equipment and sets a noise level threshold of 15 dB above the ambient base noise level. Additionally, SRCC Section 17-16.040 provides a list of qualitative variables to take into account when determining whether a noise disturbs the peace and quiet of a neighborhood, including background noise levels, proximity to residences, time of day, and duration.

Vehicular Noise

A project will normally have a significant effect on the environment related to mobile noise sources such as traffic if it will substantially increase the ambient noise levels for adjoining areas. Most people can detect changes in sound levels of approximately 3 dBA under normal, quiet conditions, and changes of 1 to 3 dBA are detectable under quiet, controlled conditions. Changes of less than 1 dBA are usually undetectable. A change of 5 dBA is readily audible to most people in an exterior environment. Based on this, the following thresholds of significance are used to assess mobile noise impacts from traffic at sensitive receptor locations:

- Greater than 1.5 dBA increase for ambient noise environments of 65 dBA L_{dn} and higher
- Greater than 3 dBA increase for ambient noise environments of 60 to 64 dBA L_{dn}
- Greater than 5 dBA increase for ambient noise environments of less than 60 dBA L_{dn}

4.12.2.2 FEDERAL TRANSIT ADMINISTRATION VIBRATION LIMITS

As described in Section 4.12.1.1, *Noise and Vibration Fundamentals*, there are two types of vibration-related impacts: vibration annoyance to people (human reaction) and vibration damage to buildings (effects on buildings). The City does not have specific limits or thresholds for vibration. Therefore, the FTA standards described herein are applied to this analysis.

Vibration Damage

The FTA provides criteria for acceptable levels of groundborne vibration for various types of buildings identified as Category I, II, and III buildings based on the type of materials they are constructed from. These criteria, used for this analysis, are shown in Table 4.12-9, *Groundborne Vibration Criteria: Architectural Damage*. For Category III, nonengineered timber and masonry buildings (typical residential structures), a threshold of 0.20 in/sec PPV would apply.

TABLE 4.12-9 GROUNDBORNE VIBRATION CRITERIA: ARCHITECTURAL DAMAGE

Building Category	PPV (in/sec)
I. Reinforced concrete, steel, or timber (no plaster)	0.50
II. Engineered concrete and masonry (no plaster)	0.30
III. Nonengineered timber and masonry buildings	0.20
IV. Buildings extremely susceptible to vibration damage	0.12

Note: PPV = peak particle velocity; in/sec = inches per second.
Source: Federal Transit Administration (FTA) 2018. *Transit Noise and Vibration Impact Assessment Manual*.

Vibration Annoyance

For vibration annoyance from operational sources, the FTA recommends the criteria shown in Table 4.12-10, *FTA Groundborne Vibration Impact Criteria*, for frequent events.

TABLE 4.12-10 FTA GROUNDBORNE VIBRATION IMPACT CRITERIA

	Impact Levels (VdB re 1 micro-inch/sec)		
Land Use Category	Frequent Events [a]	Occasional Events [b]	Infrequent Events [c]
I. Buildings where vibration would interfere with interior operations	65 VdB [d]	65 VdB [d]	65 VdB [d]
II. Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB [e]
III. Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB

Notes:
a. "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.
b. "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.
c. "Infrequent Events" is defined as fewer than 30 vibration events per day. This category includes most commuter rail systems.
d. This limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.
e. The 80 VdB equivalent to the FTA impact significance criteria of 0.01 inches per second root-mean square vibration velocity.
Source: United States Department of Transportation Federal Transit Administration, September 2018, *Transit Noise and Vibration Impact Assessment Manual*.

4.12.3 IMPACT DISCUSSION

As described in Chapter 4.0, *Environmental Analysis*, of this Draft EIR, some proposed General Plan 2050 policies and actions are required as means to mitigate environmental impacts under CEQA. These policies and actions are fully enforceable at the discretion of the decision-maker through permit conditions, agreements, or other legally binding instruments. These mitigating policies and actions use the imperative "shall," include performance criteria, and are marked with an asterisk (*). Note that all actions are required to be implemented by the City and therefore the imperative "shall," if not explicitly stated, is implied.

NOI-1	Implementation of the proposed project could generate a substantial temporary but not a 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.

Construction

Since this is a programmatic EIR, project-level conclusions of construction noise would be speculative and are therefore not presented in this analysis. Potential future impacts from construction noise are addressed qualitatively and include program-level mitigating policies.

Noise impacts resulting from construction depend on the noise generated by various pieces of construction equipment, the timing and duration of noise-generating activities, and the distance between construction noise sources and noise-sensitive receptors. Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (early morning, evening, or nighttime hours), when construction occurs in areas immediately adjoining noise-sensitive land uses, or when construction durations last over extended periods of time.

Major noise-generating construction activities associated with new projects would include removal of existing pavement and structures, site grading and excavation, installation of utilities, the construction of building foundations, cores, and shells, paving, and landscaping. The highest noise levels are typically generated during the demolition of existing structures when impact tools are used (e.g., jackhammers, hoe rams) and during the construction of building foundations when impact pile driving may be required to support the structure. Site grading and excavation activities would also generate high noise levels, as these phases often require the simultaneous use of multiple pieces of heavy equipment, such as dozers, excavators, scrapers, and loaders. Lower noise levels result from building construction activities when these activities move indoors and require less heavy equipment to complete the tasks.

Construction equipment would typically include, but would not be limited to, earth-moving equipment and trucks, pile-driving rigs, mobile cranes, compressors, pumps, generators, paving equipment, and pneumatic, hydraulic, and electric tools. Construction noise levels would vary by phase and vary within phases based on the amount of equipment in operation and the location of operational equipment. Typical construction noise levels at a distance of 50 feet are shown in Table 4.12-11, *Typical Ranges of Noise Levels at 50 feet from Construction Sites (dBA L_{eq})*, and Table 4.12-12, *Construction Equipment 50-foot Noise Emission Limits*.

TABLE 4.12-11 TYPICAL RANGES OF NOISE LEVELS AT 50 FEET FROM CONSTRUCTION SITES (DBA L_{EQ})

	Domestic Housing		Office Building, Hotel, Hospital, School, Public Works		Industrial Parking Garage, Religious Amusement & Recreations, Store, Service Station		Public Works Roads & Highways, Sewers, and Trenches	
	I	II	I	II	I	II	I	II
Ground Clearing	83	83	84	84	84	83	84	84
Excavation	88	75	89	79	89	71	88	78
Foundations	81	81	78	78	77	77	88	88
Erection	81	65	87	75	84	72	79	78
Finishing	88	72	89	75	89	74	84	84

Notes:
I – All pertinent equipment present at site.
II – Minimum required equipment present at site.
Source: United States Environmental Protection Agency, 1973, Legal Compilation on Noise, Vol. 1, p. 2-104.

TABLE 4.12-12 CONSTRUCTION EQUIPMENT 50-FOOT NOISE EMISSION LIMITS

Equipment Category	Lmax Level (dBA) [a, b]	Impact/Continuous
Arc Welder	73	Continuous
Auger Drill Rig	85	Continuous
Backhoe	80	Continuous
Bar Bender	80	Continuous
Boring Jack Power Unit	80	Continuous
Chain Saw	85	Continuous
Compressor [c]	70	Continuous
Compressor (other)	80	Continuous
Concrete Mixer	85	Continuous
Concrete Pump	82	Continuous
Concrete Saw	90	Continuous
Concrete Vibrator	80	Continuous
Crane	85	Continuous
Dozer	85	Continuous
Excavator	85	Continuous
Front End Loader	80	Continuous
Generator	82	Continuous
Generator (25 KVA or less)	70	Continuous
Gradall	85	Continuous
Grader	85	Continuous

TABLE 4.12-12 CONSTRUCTION EQUIPMENT 50-FOOT NOISE EMISSION LIMITS

Equipment Category	Lmax Level (dBA) [a, b]	Impact/Continuous
Grinder Saw	90	Impact
Horizontal Boring Hydro Jack	90	Impact
Hydra Break Ram	105	Impact
Impact Pile Driver	84	Continuous
In-situ Soil Sampling Rig	85	Impact
Jackhammer	90	Impact
Mounted Impact Hammer (hoe ram)	85	Impact
Paver	85	Continuous
Pneumatic Tools	77	Continuous
Pumps	85	Continuous
Rock Drill	85	Continuous
Scraper	82	Continuous
Slurry Trenching Machine	80	Continuous
Soil Mix Drill Rig	80	Continuous
Street Sweeper	80	Continuous
Tractor	84	Continuous
Truck (dump, delivery)	84	Continuous
Vacuum Excavator Truck (vac-truck)	85	Continuous
Vibratory Compactor	80	Continuous
Vibratory Pile Driver	95	Continuous
All other equipment with engines larger than 5 horsepower	85	Continuous

Notes:
a. Measured at 50 feet from the construction equipment, with a “slow” (1 sec.) time constant.
b. Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.
c. Portable air compressor rated at 75 cfm or greater and that operates at greater than 50 psi.
Source: Illingworth and Rodkin, 2023.

Table 4.12-11 shows the average noise level range by construction phase and Table 4.12-12 shows the maximum noise level range for different construction equipment. Noise levels included in Table 4.12-11 are consistent with construction noise levels calculated for the project in the FHWA Roadway Construction Noise Model, including the anticipated equipment that would be used for each phase of the project. Typical hourly average construction-generated noise levels are about 77 to 89 dBA L_{eq} measured at a distance of 50 feet from the site during busy construction periods. Large pieces of earth-moving equipment, such as graders, scrapers, and dozers, generate maximum noise levels of 85 to 90 dBA L_{max} at a distance of 50 feet. During each stage of construction, there would be a different mix of equipment operating, and noise levels would vary based on the amount of equipment on site and the location of the activity. Construction noise levels drop off at a rate of about 6 dBA per doubling of distance between the noise source and receptor. Intervening structures or terrain would result in lower noise levels at distant receptors.

Implementation of the proposed project anticipates an increase in development intensity to accommodate new population and employment growth. As described, construction noise levels are highly variable and dependent on the specific locations, site plans, and construction details of individual projects. Significant noise impacts may occur from operation of heavy earth-moving equipment and truck haul operations associated with construction of individual development projects, particularly if construction techniques such as impact or vibratory pile driving are proposed. The time of day that construction activity is conducted would also determine the significance of each project, particularly during the more sensitive nighttime hours. However, construction would be localized and would occur intermittently for varying periods of time.

In most cases, construction of individual developments associated with implementation of the proposed project would temporarily increase the ambient noise environment in the vicinity of each individual project, potentially affecting existing and future nearby sensitive uses. The implementation of construction best management practices throughout the entire active construction period would also help to ensure that construction noise is minimized to the extent feasible. Some common construction best management practices include requiring individual projects to implement the following:

- Construction activities shall be limited to the hours between 7:00 a.m. and 7:00 p.m., Monday through Friday, unless permission is granted with a development permit or other planning approval.
- Utilize the best-available noise suppression devices and techniques during construction activities.
- Equip all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
- Unnecessary idling of internal combustion engines shall be strictly prohibited.
- Locate stationary noise-generating equipment, such as air compressors or portable power generators, as far as possible from sensitive receptors. Construct temporary noise barriers to screen stationary noise-generating equipment when located near adjoining sensitive land uses.
- Utilize “quiet” air compressors and other stationary noise sources where technology exists.
- Construction staging areas shall be established at locations that would create the greatest distance between the construction-related noise source and noise-sensitive receptors nearest the project site during all project construction.
- Limit construction traffic—to the extent feasible—to haul routes approved in advance of issuing building permits by the City.
- Locate material stockpiles, as well as maintenance/equipment staging and parking areas, as far as feasible from residential receptors.
- Prohibit construction workers’ music/radios or other unnecessary exterior noise sources at the construction site.
- Notify all adjacent business, residences, and other noise-sensitive land uses of the construction schedule, in writing, and provide a written schedule of “noisy” construction activities to the adjacent land uses and nearby residences.

- For larger projects, generally over one acre, designate a "disturbance coordinator" who shall be responsible for responding to any complaints about construction noise. The disturbance coordinator shall determine the cause of the noise complaint (e.g., bad muffler or the like) and require that reasonable measures be implemented to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.
- If receptors adjoin the project site, construct a solid plywood fence along the shared property line, where feasible. A temporary noise barrier tall enough to block direct line-of-sight with ground-level receptors would provide about 5 dBA attenuation for adjacent noise-sensitive receptors when construction activities occur at the ground level.
- To reduce vibration impacts from paving, use a static roller in lieu of a vibratory roller; for grading and earthwork activities, use off-road equipment limited to 100 horsepower or less; and if impact pile driving is proposed, implement one or more of the following alternate methods:
  - Use caisson drilling (drill piles), vibratory pile drivers, oscillating or rotating pile installation methods, pile pressing, "silent" piling, and jetting or partial jetting of piles into place using a water injection at the tip of the pile, or if geological conditions permit, cast-in-drilled-hole foundation systems shall be used instead of impact pile driving.
  - Foundation pile holes shall be pre-drilled to minimize the number of impacts required to seat the pile. Pre-drilling foundation pile holes is a standard construction noise-control technique. Pre-drilling reduces the number of blows required to seat the pile.
  - Temporary noise-control blanket barriers shall shroud pile drivers or be erected in a manner to shield the adjacent land uses. Such noise-control blanket barriers can be rented and quickly erected. If the hammer is shrouded, about 3 to 5 dBA of noise reduction could be expected, and more reduction could be achieved with the inclusion of a property line barrier. If a noise-control blanket is erected on the receiving buildings, 5 to 10 dB of noise reduction could be achieved depending on how much shielding can be reasonably achieved.

Chapter 5, *Safety, Climate Resilience, Noise, and Public Services and Facilities*, of the proposed General Plan 2050 contains goals, policies, and actions that require local planning and development decisions to consider noise-related impacts, including during construction. The following proposed General Plan 2050 goal, policy, and actions would minimize potential adverse construction noise-related impacts:

- Goal 5-7: Protect the community from adverse noise impacts that can decrease quality of life.
  - Policy 5-7.1: Maintain and enforce the City's Noise Ordinance to protect the health and comfort of people living, working, going to school, and recreating in Santa Rosa.
    - ***Action 5-7.1:** Continue to require acoustical studies prepared by qualified acoustical consultants in accordance with Municipal Code standards.
    - ***Action 5-7.2:** Use the Federal Transit Administration's construction noise and vibration thresholds as applicable to assess impacts to surrounding land uses and identify mitigation during the project approval process.

- ***Action 5-7.10:** Update the Noise Ordinance to incorporate construction best management practices to minimize construction noise.

Due to the unknown nature of project-level details and the combination of construction equipment used, the temporary program-level construction noise impacts associated with implementation of the proposed project are considered potentially *significant.*

Impact NOI-1a: Construction activities associated with potential future development could expose sensitive receptors to excessive noise from construction equipment.

> **Significance with Mitigation:** Significant and unavoidable. In most cases, construction of individual developments associated with implementation of the proposed project would temporarily increase the ambient noise environment in the vicinity of each individual project, potentially affecting existing and future nearby sensitive uses. The policies and actions of the proposed General Plan 2050 would minimize the effects of construction noise. Specifically, proposed *Action 5-7.1 requires the preparation of acoustical studies prepared by qualified acoustical consultants to evaluate and mitigate impacts, and *Action 5-7.2 and *Action 5-7.10 would mitigate noise impacts by requiring the City to use the noise and vibration thresholds based on the Federal Transit Administration's criteria for acceptable levels of construction noise and vibration to evaluate and mitigate impacts, and adopt construction best management practices, respectively. However, because construction activities associated with any individual development may occur near noise-sensitive receptors and because—depending on the project type, equipment list, time of day, phasing, and overall construction durations—noise disturbances may occur for prolonged periods of time, during the more sensitive nighttime hours, or may exceed 80 dBA L_{eq} at residential land uses even with future project-level mitigation, construction noise impacts associated with implementation of the proposed project are considered *significant and unavoidable*. Due to the programmatic nature of this EIR, project-level conclusions of construction noise would be speculative; however, the identification of this program-level impact does not preclude the finding of less-than-significant impacts for subsequent projects analyzed at the project level that do not exceed the noise thresholds.

Operational

Vehicular Noise

Potential future development over the 2050 buildout horizon would cause increases in vehicle traffic along local roadways. As described in Section 4.12.1.3, *Existing Conditions*, the traffic noise contours were calculated for the Existing (2019), Existing (2019) plus Project, and Future plus Project (2050 with proposed project) traffic conditions specific to the proposed project along major roadways in the EIR Study Area were estimated using the SoundPLAN Version 8.2, a three-dimensional ray-tracing computer program. Existing (2019), Existing (2019) plus Project, and Future plus Project (2050) peak-hour traffic data and traffic speeds provided by the traffic consultants (W-Trans) were input into the model for local roadways and expressways. A truck mix of 1 percent was used along the local roadways, while the truck mix along US Highway 101 and SR 12 were obtained from the Caltrans website.[11] Through Santa Rosa, heavy and medium trucks consist of 3 percent each along US Highway 101 and consist of 1 percent and 2 percent, respectively, along SR 12. Figure 4.12-4, *Traffic Noise Contours for the Existing Plus Project Scenario*, and Figure 4.12-5, *Traffic Noise Contours for the Future Plus Project (2050) Scenario*, provide the traffic contours for Existing plus Project and Future plus Project (2050) scenarios, respectively.

Table 4.12-13, *Existing, Existing Plus Project, and Future Plus Project Noise Levels in the EIR Study Area*, summarizes the Existing, Existing plus Project, and Future plus Project L_{dn} noise levels, as measured at a distance of 75 feet from the centerline of the roadway. For all receptors along US Highway 101 and SR 12, 75-foot distances were measured from the centerline of the nearest through lane.

TABLE 4.12-13 EXISTING, EXISTING PLUS PROJECT, AND FUTURE PLUS PROJECT NOISE LEVELS IN THE EIR STUDY AREA

		L_{dn} at 75 feet, dBA			Change over Existing (2019)	
Roadway	Segment	Existing (2019)	Existing Plus Project [a]	Future Plus Project (2050)	Existing Plus Project [a]	Future Plus Project (2050) [b]
US Highway 101	South of Todd Rd	81	81	82	0	1
	Todd Rd to Yolanda Ave	81	81	82	0	1
	Yolanda Ave to Baker Ave	81	82	82	1	1
	Baker Ave to SR 12	82	82	82	0	0
	SR 12 to 3rd St	81	81	82	0	1
	3rd St to College Ave	82	82	82	0	0
	College Ave to Steele Ln/ Guerneville Rd	82	82	82	0	0
	Steele Ln/Guerneville Rd to Bicentennial Way	82	82	82	0	0
	North of Bicentennial Way	80	80	81	0	1
SR 12	Farmers Ln to Brookwood Ave	78	79	79	1	1
	Brookwood Ave to Hwy 101	79	79	79	0	0
	Hwy 101 to Dutton Ave	79	79	79	0	0
	Dutton Ave to Stony Point Rd	78	78	78	0	0
	West of Stony Point Rd	75	76	76	1	1
3rd St	Brookwood Ave to E St	57	59	58	2	1
	E St to Santa Rosa Ave	60	60	60	0	0
	Santa Rosa Ave to B St	64	64	64	0	0
	B St to Hwy 101	72	73	73	1	1
	Hwy 101 to Olive St/ Railroad St /Wilson St	73	74	74	1	1
	Olive St/Railroad St/ Wilson St to Dutton Ave	65	65	65	0	0
	Dutton Ave to Stony Point Rd	65	65	65	0	0
	Stony Point Rd to Fulton Rd	67	67	67	0	0

[11] Caltrans Traffic Census Program. https://dot.ca.gov/programs/traffic-operations/census

TABLE 4.12-13 EXISTING, EXISTING PLUS PROJECT, AND FUTURE PLUS PROJECT NOISE LEVELS IN THE EIR STUDY AREA

		L_{dn} at 75 feet, dBA			Change over Existing (2019)	
Roadway	Segment	Existing (2019)	Existing Plus Project [a]	Future Plus Project (2050)	Existing Plus Project [a]	Future Plus Project (2050) [b]
Administration Dr	West of Mendocino Ave	59	61	61	1	1
Aston Ave/ Allan Way	Petaluma Hill Rd to Brookwood Ave	61	62	62	1	1
B St	South of 3rd St	64	64	64	0	0
	3rd St to Healdsburg Ave/Mendocino Ave	62	63	63	1	1
Badger Rd	Calistoga Rd to Wallace Rd	55	56	57	1	2
Bellevue Ave	East of Dutton Ave	65	68	68	3	**3**
	Dutton Ave to Stony Point Rd	62	64	65	2	**3**
Bennett Valley Rd	Santa Rosa Ave to E St	73	73	73	0	0
	E St to Brookwood Ave	73	74	74	1	1
	Brookwood Ave to Farmers Lane	71	70	70	-1	-1
	Farmers Lane to Tachevah Dr	67	67	67	0	0
	Tachevah Dr to Bethards Dr	64	64	64	0	0
	Bethards Dr to Yulupa Ave	53	54	54	1	1
	East of Yulupa Ave	55	54	55	-1	0
Bethards Dr	Bennett Valley Rd to Yulupa Ave	63	63	63	0	0
	Yulupa Ave to Creekside Rd	59	60	60	1	1
	Creekside Rd to Summerfield Rd	61	62	62	1	1
Bicentennial Way	Fountaingrove Parkway to Mendocino Ave	68	69	69	1	1
	Mendocino Ave to Hwy 101	70	71	71	1	1
	Hwy 101 to Range Ave	72	73	73	1	1
Brookwood Ave	Kawana Springs Rd to Linwood Ave	57	57	57	0	0
	Aston Ave to SR 12	62	61	61	-1	-1
	SR 12 to Sonoma Ave	67	68	68	1	1
	Sonoma Ave to 3rd St	66	67	67	1	1
	3rd St to College Ave	67	68	68	1	1
Brush Creek Rd	Sonoma Hwy to Fountaingrove Parkway	60	61	62	1	2
	Fountaingrove Parkway to Badger Rd	61	62	61	1	0
Bryden Ln	4th St to Montecito Ave	65	65	65	0	0
Burbank Ave	Hearn Ave to Sebastopol Rd	59	60	61	1	2
Calistoga Rd	Sonoma Hwy to Montecito Boulevard	64	65	65	1	1
	Montecito Boulevard to Badger Rd	67	67	67	0	0
	North of Badger Rd	66	67	67	1	1

TABLE 4.12-13 EXISTING, EXISTING PLUS PROJECT, AND FUTURE PLUS PROJECT NOISE LEVELS IN THE EIR STUDY AREA

		L_{dn} at 75 feet, dBA			Change over Existing (2019)	
Roadway	Segment	Existing (2019)	Existing Plus Project [a]	Future Plus Project (2050)	Existing Plus Project [a]	Future Plus Project (2050) [b]
Chanate Rd	Mendocino Ave to Franklin Ave	66	66	66	0	0
	Franklin Ave to Parker Hill Rd	66	66	66	0	0
	Parker Hill Rd to Fountaingrove Parkway	63	64	64	1	1
Cleveland Ave	9th St to College Ave	67	68	68	1	1
	College Ave to Frances St/Range Ave	71	71	72	0	1
	Frances St/Range Ave to Guerneville Rd	73	73	73	0	0
	Guerneville Rd to Bicentennial Way	71	71	71	0	0
	Bicentennial Way to Piner Rd	74	74	75	0	1
	Piner Rd to Hopper Ave	68	69	69	1	1
Coffey Ln	Guerneville Rd to Steele Lane	59	60	61	1	2
	Steele Lane to Piner Rd	59	59	59	0	0
	Piner Rd to Pine Meadows Dr/Barnes Rd	66	67	67	1	1
	Pine Meadows Dr/Barnes Rd to Hopper Ave	60	61	61	1	1
	North of Hopper Ave	58	59	59	1	1
Colgan Ave	Santa Rosa Ave to Petaluma Hill Rd	61	62	62	1	1
College Ave	4th St to Brookwood Ave	65	66	65	1	0
	Brookwood Ave to E St	68	68	68	0	0
	E St to Mendocino Ave	69	69	69	0	0
	Mendocino Ave to Hwy 101	71	71	71	0	0
	Hwy 101 to Cleveland Ave	74	75	75	1	1
	Cleveland Ave to Dutton Ave	72	73	72	1	0
	Dutton Ave to Stony Point Rd	68	68	68	0	0
	Stony Point Rd to Fulton Rd	66	67	67	1	1
Corby Ave	Bellevue Ave to Hwy 101 southbound ramps	78	79	79	1	1
	Hwy 101 southbound ramps to Hearn Ave	69	70	70	1	1
	North of Hearn Ave	67	68	69	1	2
Corporate Center Parkway	Northpoint Parkway to Sebastopol Rd	65	65	65	0	0
Cross Creek Rd	North of Thomas Lake Harris Dr	59	63	63	4	**4**
Cypress Way	Hoen Ave to Creekside Rd	58	59	59	1	1

TABLE 4.12-13 EXISTING, EXISTING PLUS PROJECT, AND FUTURE PLUS PROJECT NOISE LEVELS IN THE EIR STUDY AREA

		L_{dn} at 75 feet, dBA			Change over Existing (2019)	
Roadway	Segment	Existing (2019)	Existing Plus Project [a]	Future Plus Project (2050)	Existing Plus Project [a]	Future Plus Project (2050) [b]
Dutton Ave	South of Bellevue Ave	60	65	65	5	**5**
	North of Bellevue Ave	57	60	60	3	**3**
	Hearn Ave to Sebastopol Rd	62	62	62	0	0
	Sebastopol Rd to SR 12	68	68	68	0	0
	SR 12 to 3rd St	72	72	72	0	0
	3rd St to College Ave	62	64	64	2	2
	College Ave to Guerneville Rd	69	70	70	1	1
E St	Maple Ave to Sonoma Ave	62	63	63	1	1
	Sonoma Ave to 3rd St	62	62	62	0	0
	3rd St to 4th St	65	65	65	0	0
	4th St to College Ave	62	63	63	1	1
Farmers Ln	Bennett Valley Rd to SR 12	68	68	68	0	0
	SR 12 to Hoen Ave	70	71	71	1	1
	Hoen Ave to Sonoma Ave	70	70	70	0	0
	Sonoma Ave to Montgomery Dr	69	70	69	1	0
	Montgomery Dr to 4th St	69	69	69	0	0
Fountaingrove Parkway	Brush Creek Rd to Chanate Rd	66	67	67	1	1
	Chanate Rd to Thomas Lake Harris Dr	61	64	64	3	**3**
	Thomas Lake Harris Dr to Stagecoach Rd/Parker Hill Rd	63	65	65	2	2
	Stagecoach Rd/Parker Hill Rd to Bicentennial Way	67	70	70	3	**3**
	Bicentennial Way to Old Redwood Hwy	67	70	70	3	**3**
	Old Redwood Hwy to Hwy 101	74	75	75	1	1
Frances St/ Range Ave	Cleveland Ave to Guerneville Rd	61	61	61	0	0
	Guerneville Rd to Steele Lane	65	66	66	1	1
	Steele Lane to Bicentennial Way	68	69	69	1	1
	Bicentennial Way to Piner Rd	70	70	70	0	0
Franklin Ave/ Humboldt St	Poppy Dr to Chanate Rd	64	65	65	1	1
Fulton Rd	SR 12 to Occidental Rd	72	73	74	1	2
	Occidental Rd to 3rd St	70	71	71	1	1
	3rd St to College Ave	71	71	72	0	1
	College Ave to Guerneville Rd	71	71	72	0	1
	Guerneville Rd to Piner Rd	70	71	71	1	1
	Piner Rd to Wood Rd/ Francisco Ave	71	72	73	1	2
	North of Wood Rd/Francisco Ave	71	71	72	0	1

TABLE 4.12-13 EXISTING, EXISTING PLUS PROJECT, AND FUTURE PLUS PROJECT NOISE LEVELS IN THE EIR STUDY AREA

		L_{dn} at 75 feet, dBA			Change over Existing (2019)	
Roadway	Segment	Existing (2019)	Existing Plus Project [a]	Future Plus Project (2050)	Existing Plus Project [a]	Future Plus Project (2050) [b]
Guerneville Rd	Steele Lane to Range Ave	67	68	68	1	1
	Range Ave to Coffey Lane	69	70	70	1	1
	Coffey Lane to Dutton Ave	70	72	72	2	2
	Dutton Ave to Marlow Rd	69	70	70	1	1
	Marlow Rd to Fulton Rd	67	67	67	0	0
	West of Fulton Rd	67	68	68	1	1
Hall Rd	West of Fulton Rd	60	61	64	1	**3**
Healdsburg Ave	B St to Mendocino Ave	61	62	61	1	0
Hearn Ave	Santa Rosa Ave to Corby Ave	73	73	74	0	1
	Corby Ave to Dowd Dr	70	71	71	1	1
	Dowd Dr to Dutton Ave	67	68	68	1	1
	Dutton Ave to Burbank Ave	63	64	64	1	1
	Burbank Ave to Stony Point Rd	58	55	55	-3	-3
Hoen Ave	Summerfield Rd to Yulupa Ave	65	65	65	0	0
	Yulupa Ave to Cypress Way	67	67	67	0	0
	Cypress Way to Farmers Lane	60	62	62	2	2
	Farmers Lane to Sonoma Ave	53	54	54	1	1
Hoen Frontage Rd	Farmers Lane to Hoen Ave	67	68	68	1	1
Hopper Ave	Cleveland Ave to Coffey Lane	66	68	68	2	2
	Coffey Lane to Barnes Rd	56	58	58	2	2
Kawana Springs Rd	Santa Rosa Ave to Petaluma Hill Rd	62	63	63	1	1
	Petaluma Hill Rd to Brookwood Ave	62	62	62	0	0
	East of Brookwood Ave	57	57	57	0	0
Ludwig Ave	Stony Point Rd to Wright Rd	62	63	63	1	1
Maple Ave	Brookwood Ave to E St	73	73	73	0	0
	E St to Santa Rosa Ave	72	72	72	0	0
Marlow Rd	College Ave to Guerneville Rd	68	69	69	1	1
	Guerneville Rd to Steele Lane	65	66	66	1	1
	Steele Lane to Piner Rd	65	66	66	1	1

TABLE 4.12-13 EXISTING, EXISTING PLUS PROJECT, AND FUTURE PLUS PROJECT NOISE LEVELS IN THE EIR STUDY AREA

		L_{dn} at 75 feet, dBA			Change over Existing (2019)	
Roadway	Segment	Existing (2019)	Existing Plus Project [a]	Future Plus Project (2050)	Existing Plus Project [a]	Future Plus Project (2050) [b]
Mendocino Ave	4th St to College Ave	59	61	62	2	3
	College Ave to Pacific Ave	70	70	70	0	0
	Pacific Ave to Steele Lane	70	71	71	1	1
	Steele Lane to Chanate Rd	67	69	69	2	2
	Chanate Rd to Bicentennial Way	70	71	71	1	1
	Bicentennial Way to Fountaingrove Parkway	68	69	69	1	1
Middle Rincon Rd	Sonoma Hwy to Montecito Boulevard	65	65	66	0	1
	Montecito Boulevard to Badger Rd	60	61	62	1	2
Mission Boulevard	Montgomery Dr to Sonoma Hwy	65	66	66	1	1
	Sonoma Hwy to Montecito Boulevard	66	67	67	1	1
Montecito Boulevard	Calistoga Rd to Middle Rincon Rd	67	67	67	0	0
	Middle Rincon Rd to Mission Boulevard	67	68	68	1	1
	Mission Boulevard to Brush Creek Rd	66	67	67	1	1
Montgomery Dr	East of Mission Boulevard	67	68	68	1	1
	Mission Boulevard to Summerfield Rd	68	68	69	0	1
	Summerfield Rd to Farmers Lane	68	68	68	0	0
	Farmers Lane to 3rd St	60	62	62	2	2
North St	College Ave to Pacific Ave	61	62	63	1	2
	North of Pacific Ave	56	57	57	1	1
Northpoint Parkway	Stony Point Rd to Corporate Center Parkway	66	67	67	1	1
	West of Corporate Center Parkway	58	59	60	1	2
Occidental Rd	Stony Point Rd to Wright Rd	71	71	71	0	0
	West of Wright Rd	65	65	66	0	1
Old Redwood Hwy	North of Fountaingrove Parkway	72	73	73	1	1
Olive St/Railroad St	South of Sebastopol Rd	68	68	68	0	0
	North of Sebastopol Rd	66	68	68	2	2
Pacific Ave	Montecito Ave to North St	65	65	65	0	0
	North St to King St	61	61	61	0	0
	King St to Mendocino Ave	63	63	63	0	0
Parker Hill Rd	Chanate Rd to Fountaingrove Parkway	59	61	61	2	2

TABLE 4.12-13 EXISTING, EXISTING PLUS PROJECT, AND FUTURE PLUS PROJECT NOISE LEVELS IN THE EIR STUDY AREA

		L_{dn} at 75 feet, dBA			Change over Existing (2019)	
Roadway	Segment	Existing (2019)	Existing Plus Project [a]	Future Plus Project (2050)	Existing Plus Project [a]	Future Plus Project (2050) [b]
Petaluma Hill Rd	South of Yolanda Ave	64	65	66	1	2
	Yolanda Ave to Kawana Springs Rd	65	65	65	0	0
	Kawana Springs Rd to Colgan Ave	66	66	66	0	0
	Colgan Ave to Santa Rosa Ave	65	66	66	1	1
Pine Meadows Dr/ Barnes Rd	Coffey Lane to Hopper Ave	54	55	56	1	2
	North of Hopper Ave	58	59	60	1	2
Piner Rd	Cleveland Ave to Range Ave	69	70	70	1	1
	Range Ave to Coffey Lane	69	70	69	1	0
	Coffey Lane to Marlow Rd	70	71	71	1	1
	Marlow Rd to Fulton Rd	66	67	67	1	1
	West of Fulton Rd	65	65	66	0	1
Santa Rosa Ave	South of Todd Rd	69	69	70	0	1
	Todd Rd to Bellevue Ave	68	68	68	0	0
	Bellevue Ave to Yolanda Ave	69	70	70	1	1
	Yolanda Ave to Hearn Ave	69	69	69	0	0
	Hearn Ave to Kawana Springs Rd	68	68	68	0	0
	Kawana Springs Rd to Colgan Ave	68	68	68	0	0
	Colgan Ave to Petaluma Hill Rd	70	70	70	0	0
	Petaluma Hill Rd to SR 12	71	72	72	1	1
	SR 12 to Sonoma Ave	66	66	66	0	0
	Sonoma Ave to 3rd St	63	63	63	0	0
Sebastopol Rd	Olive St to Dutton Ave	62	65	65	3	**3**
	Dutton Ave to Burbank Ave	68	68	68	0	0
	Burbank Ave to Stony Point Rd	65	65	65	0	0
	Stony Point Rd to Corporate Center Parkway	69	69	69	0	0
	Corporate Center Parkway to Wright Rd	67	67	67	0	0
Sonoma Ave	Summerfield Rd to Yulupa Ave	63	64	64	1	1
	Yulupa Ave to Farmers Lane	65	65	66	0	1
	Farmers Lane to Brookwood Ave	66	67	67	1	1
	Brookwood Ave to E St	64	65	65	1	1
	E St to Santa Rosa Ave	65	66	66	1	1

TABLE 4.12-13 EXISTING, EXISTING PLUS PROJECT, AND FUTURE PLUS PROJECT NOISE LEVELS IN THE EIR STUDY AREA

		L_{dn} at 75 feet, dBA			Change over Existing (2019)	
Roadway	Segment	Existing (2019)	Existing Plus Project [a]	Future Plus Project (2050)	Existing Plus Project [a]	Future Plus Project (2050) [b]
Sonoma Hwy/4th St	East of Calistoga Rd	70	71	71	1	1
	Calistoga Rd to Middle Rincon Rd	70	70	71	0	1
	Middle Rincon Rd to Mission Boulevard	70	70	70	0	0
	Mission Boulevard to Brush Creek Rd	71	71	71	0	0
	Brush Creek Rd to Farmers Lane	71	72	72	1	1
	Farmers Lane to Bryden Lane	68	69	69	1	1
	Bryden Lane to College Ave	67	67	67	0	0
	College Ave to Brookwood Ave	65	65	65	0	0
	Brookwood Ave to E St	64	64	64	0	0
	E St to Mendocino Ave	56	57	58	1	2
	Mendocino Ave to B St	59	60	60	1	1
Standish Ave	Todd Rd to Robles Ave	62	63	63	1	1
Steele Ln	Mendocino Ave to Hwy 101	70	70	70	0	0
	Hwy 101 to Guerneville Rd	74	74	74	0	0
	Guerneville Rd to Coffey Lane	64	64	64	0	0
	Coffey Lane to Marlow Rd	62	62	62	0	0
Stony Point Rd	South of Todd Rd	69	70	71	1	2
	Todd Rd to Bellevue Ave	69	70	71	1	2
	Bellevue Ave to Hearn Ave	69	69	70	0	1
	Hearn Ave to Northpoint Parkway	69	68	69	-1	0
	Northpoint Parkway to Sebastopol Rd	67	68	69	1	2
	Sebastopol Rd to SR 12	71	71	71	0	0
	SR 12 to 3rd St	69	70	70	1	1
	3rd St to College Ave	69	70	70	1	1
Summerfield Rd	Bethards Dr to Horseshoe Dr/Santa Rosita Court	64	64	64	0	0
	Horseshoe Dr/Santa Rosita Court to Hoen Ave	64	64	64	0	0
	Hoen Ave to Sonoma Ave	63	64	64	1	1
	Sonoma Ave to Montgomery Dr	64	65	65	1	1
Tachevah Dr	Bennett Valley Rd to Yulupa Ave	62	62	62	0	0
	Yulupa Ave to Bethards Dr	56	56	56	0	0
Thomas Lake Harris Dr	East of Cross Creek Rd	61	63	64	2	3
	West of Cross Creek Rd	57	63	63	6	6

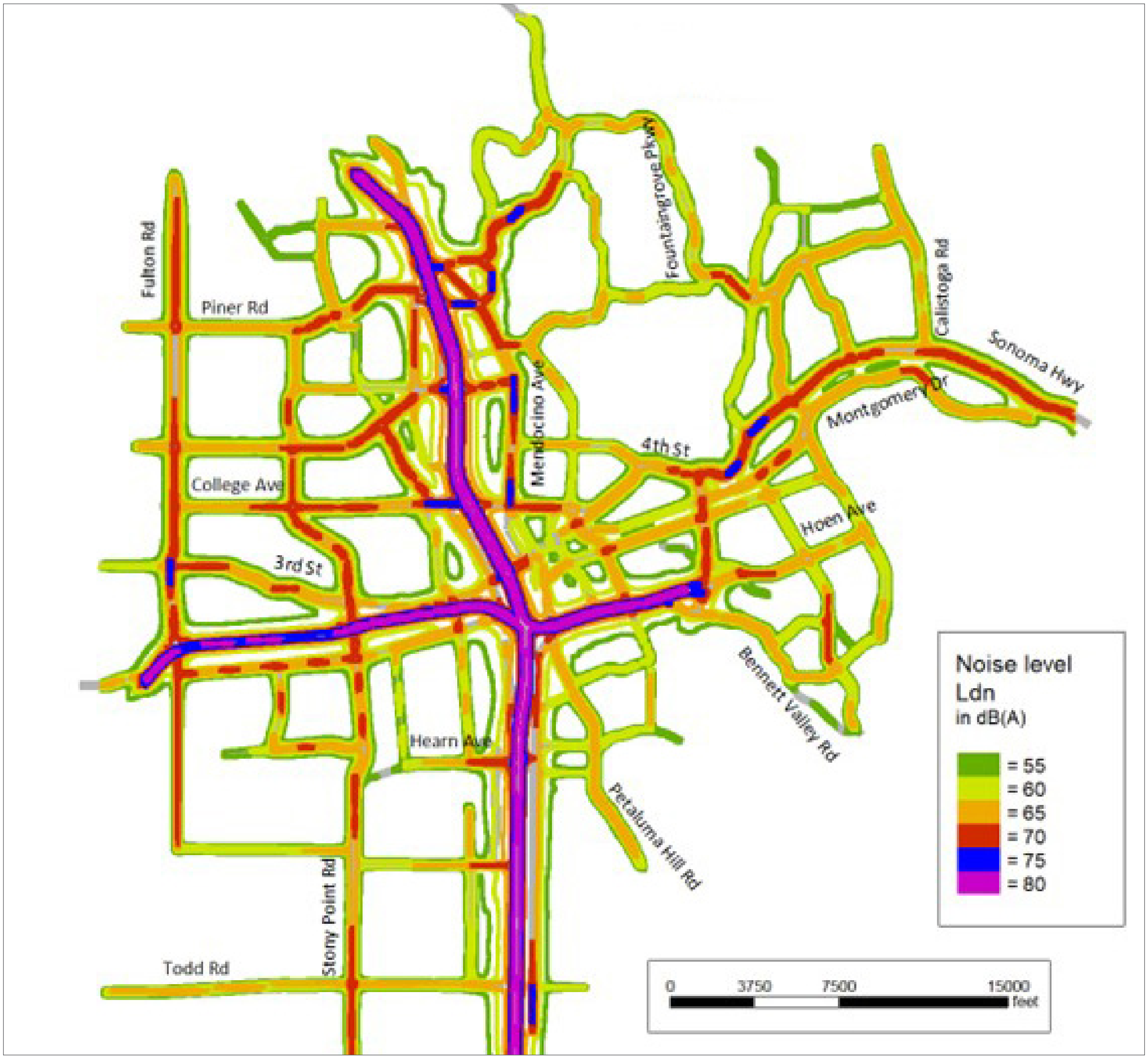
TABLE 4.12-13 EXISTING, EXISTING PLUS PROJECT, AND FUTURE PLUS PROJECT NOISE LEVELS IN THE EIR STUDY AREA

		L_{dn} at 75 feet, dBA			Change over Existing (2019)	
Roadway	Segment	Existing (2019)	Existing Plus Project [a]	Future Plus Project (2050)	Existing Plus Project [a]	Future Plus Project (2050) [b]
Todd Rd	Stony Point Rd to Standish Ave	67	66	68	-1	1
	Standish Ave to Hwy 101	69	69	69	0	0
	Hwy 101 to Santa Rosa Ave	68	68	68	0	0
	East of Santa Rosa Ave	59	59	66	0	**7**
Wallace Rd	North of Badger Rd	57	58	60	1	**3**
Wiljan Court/ Dowd Dr	Bellevue Ave to Hearn Ave	61	62	62	1	1
Wilson St	3rd St to 9th St	66	67	67	1	1
Wright Rd	Ludwig Ave to Sebastopol Rd	63	65	66	2	**3**
	Sebastopol Rd to SR 12	69	69	70	0	1
Yolanda Ave	Hwy 101 to Petaluma Hill Rd	61	62	62	1	1
Yulupa Ave	Bennett Valley Rd to Bethards Dr	64	64	64	0	0
	Bethards Dr to Tachevah Dr	66	67	67	1	1
	Tachevah Dr to Creekside Rd	65	65	65	0	0
	Creekside Rd to Hoen Ave	65	65	64	0	-1
	Hoen Ave to Sonoma Ave	63	63	63	0	0
	Sonoma Ave to Montgomery Dr	59	60	60	1	1
	North of Montgomery Dr	64	64	64	0	0

Notes.
a. The Existing plus Project scenario assumes the full buildout of the project would occur in the year 2019 and is therefore shown for informational purposes only.
b. Impact assumptions are based on the Future plus Project scenario. Text shown in bold represents a significant impact.
Source: Illingworth and Rodkin, 2023.

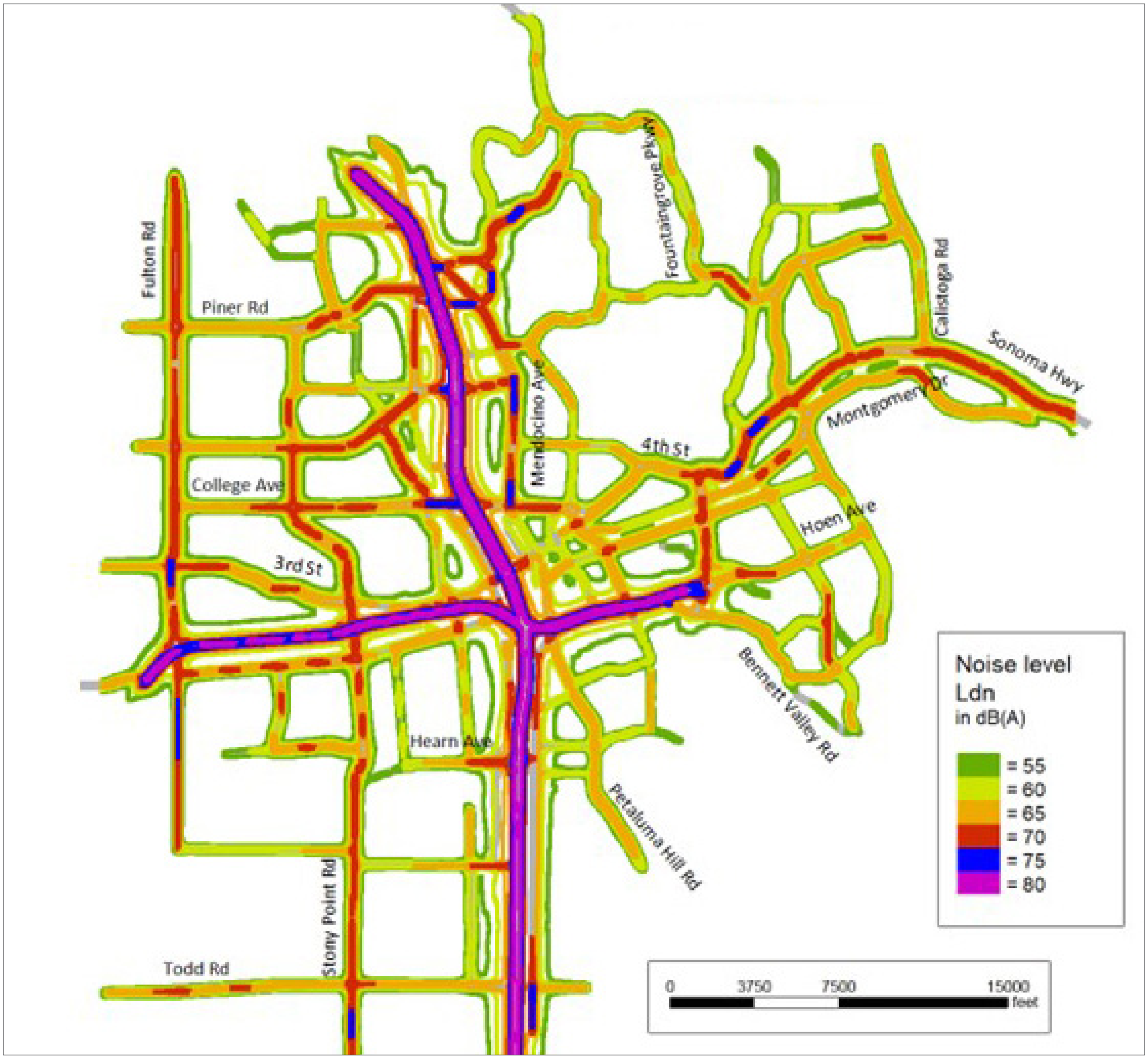
Chapter 5, *Safety, Climate Resilience, Noise, and Public Services and Facilities*, of proposed General Plan 2050 contains goals, policies, and actions that require local planning and development decisions to consider noise-related impacts from transportation. In addition to the goal, policies, and actions identified under impact discussion NOI-1, the following goal, policy, and actions would further minimize potential adverse noise-related impacts from traffic:

- **Goal 5-7:** Protect the community from adverse noise impacts that can decrease quality of life.
  - **Policy 5-7.1:** Maintain and enforce the City's Noise Ordinance to protect the health and comfort of people living, working, going to school, and recreating in Santa Rosa.
    - ***Action 5-7.3:** Require conditions of approval or mitigation to reduce noise exceeding normally acceptable levels as identified in Figure 5-13, unless the activities are specifically exempted by the City Council, on the basis of community health, safety, and welfare, such as emergency medical vehicles, helicopters, and sirens.



Source: Illingworth & Rodkin Inc, 2023.

Figure 4.12-4
Traffic Noise Contours for the Existing Plus Project Scenario



Source: Illingworth & Rodkin Inc, 2023.

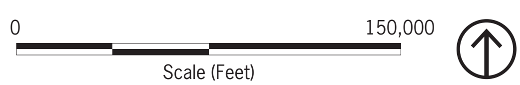


Figure 4.12-5
Traffic Noise Contours for the Future Plus Project (2050) Scenario

- Action 5-7.4: Work with private parties to reduce or eliminate noise exceeding allowed levels from industrial and commercial sources that impact nearby residential areas.
- Action 5-7.5: Consider ways to reduce roadway noise to normally acceptable levels in areas where noise standards may otherwise be exceeded (e.g., where homes front regional/arterial streets and in areas of mixed-use development).
- Action 5-7.6: Consider updating the Municipal Code to require new development to provide buffers other than sound walls and allow sound walls only when other techniques would not prevent projected noise levels from exceeding adopted land use compatibility standards.
- ***Action 5-7.7:** Work with Caltrans to evaluate and develop traffic noise mitigation programs along Highway 101 and State Route 12.
- ***Action 5-7.9:** Use conditions of approval to achieve measures to reduce noise and vibration impacts primarily through site planning, and avoid engineering solutions for noise and vibration mitigation, such as sound walls, if possible.

As shown in Table 4.12-13, traffic noise increases along some roadway segments would exceed the increase thresholds of greater than 1.5 dBA increase for ambient noise environments of 65 dBA L_{dn} and higher; greater than 3 dBA increase for ambient noise environments of 60 to 64 dBA L_{dn}; and greater than 5 dBA increase for ambient noise environments of less than 60 dBA L_{dn}. As a result, the traffic noise increase associated with implementation of the proposed project would result in a potentially *significant* impact.

Impact NOI-1b: Operational vehicle traffic noise increases could exceed the City's significance thresholds with implementation of the proposed project.

Significance with Mitigation: Significant and unavoidable. Implementation of proposed General Plan 2050 *Action 5-7.1 requires the preparation of acoustical studies prepared by qualified acoustical consultants to evaluate and mitigate impacts. Proposed *Action 5-7.2 requires the City to apply the Federal Transit Administration's vibration thresholds to assess impacts to surrounding land uses. Proposed *Action 5-7.3 requires conditions of approval or mitigation to reduce noise exceeding normally acceptable levels unless the activities are specifically exempted by the City Council on the basis of community health, safety, and welfare, such as emergency medical vehicles, helicopters, and sirens. Proposed *Action 5-7.7 requires the City to work with Caltrans to evaluate and develop traffic noise mitigation programs along US Highway 101 and State Route 12. Furthermore, proposed *Action 5-7.9 requires conditions of approval to achieve measures to reduce noise impacts primarily through site planning and avoid engineering solutions for noise mitigation, such as sound walls, if possible. Since project-specific details are unknown and future conditions of approval may not be feasible or reduce vehicle traffic noise below significance thresholds in all cases, this impact is conservatively considered *significant and unavoidable*. The identification of this program-level impact does not preclude the finding of less-than-significant impacts for subsequent projects analyzed at the project level that do not exceed the noise thresholds.

Railroad Noise

As described in Section 4.12.1.3, *Existing Conditions*, to the west of US Highway 101, the NWPRR rail line runs north to south through the EIR Study Area and these tracks currently and will continue to carry freight and SMART trains under future conditions. There are no plans for an increase in freight traffic on this line as a result of the proposed project or otherwise. Therefore, future rail noise levels are anticipated to be similar to those under existing conditions, and impacts would be *less than significant*.

Stationary Source Noise

Stationary sources of noise may occur on all types of land uses. Residential uses generate noise from landscaping, maintenance activities, and air conditioning systems. Commercial uses generate noise from HVAC systems, loading docks, and other sources. Industrial uses may generate noise from HVAC systems, loading docks, and possibly machinery. Noise generated by residential or commercial uses is generally short and intermittent. Industrial uses may generate noise on a more continual basis. Nightclubs, outdoor dining areas, gas stations, car washes, fire stations, drive-throughs, swimming pool pumps, school playgrounds, athletic and music events, and public parks are other common noise sources. The proposed General Plan 2050 includes proposed Action 5-8.2 that addresses impacts from stationary sources and requires the City to consider updates to the Noise Ordinance to identify noise mitigation measures and other strategies to allow the establishment, growth, and/or continuation of music, sports, and entertainment venues. Proposed Action 5-8.2 also encourages and allows these uses with appropriate noise thresholds. Some operational noise sources used for emergency purposes shall be exempt from City noise limits. Such activities would include emergency vehicle sirens, emergency medical helicopter operations, operation of emergency generators during emergency power outages, etc. Stationary noise sources are controlled by SRCC Chapter 17-16, which would ensure that potential future projects would not exceed the City's established thresholds (see Table 4.12-5). Accordingly, impacts would be *less than significant*.

Land Use Compatibility

Chapter 5, *Safety, Climate Resilience, Noise, and Public Services and Facilities*, of the proposed General Plan 2050 aims to limit the exposure of the community to excessive noise levels by guiding decisions concerning land use in relation to substantial noise sources. While the City has not adopted its own noise and land use compatibility guidelines, it uses the State of California's guidelines, previously shown in Table 4.12-4 in Section 4.12.1.4, *Regulatory Framework*, as a tool to gauge the compatibility of land uses relative to existing and future noise level.

As a result of the Supreme Court decision regarding the assessment of the environment's impacts on projects (*California Building Industry Association v. Bay Area Air Quality Management District*, 62 Cal. 4th 369 (No. S 213478), December 17, 2015), it is generally no longer the purview of the CEQA process to evaluate the impact of existing environmental conditions on any given project. As a result, though the noise from existing sources is taken into account as part of the baseline, the direct effects of exterior noise from nearby noise sources on land use compatibility as a result of the proposed General Plan 2050 buildout is typically no longer a required topic for impact evaluation under CEQA. Generally, no determination of significance is required with the exception of certain school projects, projects affected by airport noise, and projects that would exacerbate existing conditions (i.e., projects that would have a significant operational impact). However, over the course of the buildout horizon there is the potential for proposed development to increase noise beyond the City's established thresholds and to generate noise that would be incompatible with existing uses in the vicinity of the proposed development; thus impacts could be potentially significant.

Impact NOI-1c: Operational noise increases could exceed the City's significance thresholds and could be incompatible with existing uses.

> Significance with Mitigation: Less than Significant. Chapter 5, *Safety, Climate Resilience, Noise, and Public Services and Facilities*, of the proposed General Plan 2050, requires local planning and development decisions to consider noise and land use compatibility. Specifically, proposed Policy 5-7.1 requires the City to maintain and enforce the City's Noise Ordinance to protect the health and comfort of people living, working, going to school, and recreating in Santa Rosa. Proposed *Action 5-7.1 directs the City to continue to require acoustical studies prepared by qualified acoustical consultants in accordance with Santa Rosa City Code standards. Proposed *Action 5-7.3 requires conditions of approval or mitigation to reduce noise exceeding normally acceptable levels unless the activities are specifically exempted by the City Council on the basis of community health, safety, and welfare, such as emergency medical vehicles, helicopters, and sirens. Proposed Action 5-7.5 requires the City to consider ways to reduce roadway noise to normally acceptable levels in areas where noise standards may otherwise be exceeded (e.g., where homes front regional/arterial streets and in areas of mixed-use development). Proposed Action 5-7.6 requires the City to consider updating the Municipal Code to require new development to provide buffers other than sound walls and allow sound walls only when other techniques would not prevent projected noise levels from exceeding adopted land use compatibility standards. Proposed *Action 5-7.9 requires the City to use conditions of approval to achieve measures to reduce noise impacts primarily through site planning and avoid engineering solutions for noise mitigation, such as sound walls, if possible. Accordingly, implementation of the proposed policies and actions of the General Plan 2050, noise and land use compatibility would be a factor in project approval decisions, to verify that the proposed development would not increase noise beyond the City's established thresholds and that it would not generate noise that would be incompatible with existing uses in the vicinity of the proposed development. Accordingly, impacts associated with land use compatibility would be *less than significant.*

NOI-2 Implementation of the proposed project could result in the generation of excessive groundborne vibration or groundborne noise levels.

Construction

Construction of future projects in the EIR Study Area would generate varying degrees of ground vibration that may cause human reactions (annoyance) and effects on buildings (damage), depending on the construction procedures and equipment. The use of construction equipment generates vibration that spreads through the ground and diminishes with distance from the source. The effect on sensitive buildings in the vicinity of a construction site varies depending on soil type, ground strata, and the type of construction equipment used. The effects of vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibrations at moderate levels, to slight structural damage at the highest levels. Vibration from construction activities rarely reaches the levels that can damage structures but can achieve the audible and perceptible ranges in buildings close to a construction site. Table 4.12-14, *Reference Vibration Source Levels for Construction Equipment*, lists typical vibration levels for construction equipment in PPV and VdB.

TABLE 4.12-14 REFERENCE VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment		Approximate Vibration Level at 25 feet (PPV in/sec) [a]	Approximate Vibration Level at 25 feet, VdB re 1 micro-in/sec [b]
Pile Driver (impact)	upper range	1.158	112
	typical	0.644	104
Pile Driver (sonic)	upper range	0.734	105
	typical	0.170	93
Clam Shovel Drop		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large Bulldozer		0.089	87
Caisson Drilling		0.089	87
Loaded Trucks		0.076	86
Jackhammer		0.035	79
Small Bulldozer		0.003	58

Notes:
a. Peak Particle Velocity (PPV) = The peak rate of speed at which soil particles move (e.g., inches per second) due to ground vibration.
b. Vibration Decibel (VdB) = A unitless measure of vibration, expressed on a logarithmic scale and with respect to a defined reference vibration velocity. In the U.S., the standard reference velocity is one microinch per second ($1x10^{-6}$ in/sec).
Source: United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, October 2018, *Transit Noise and Vibration Impact Assessment*.

As described in Section 4.12.2.2, *Federal Transit Administration Vibration Limits,* the City does not have established thresholds for construction groundborne vibration and the FTA vibration thresholds of significance were applied to this analysis for architectural damage or for buildings where vibration could interfere with interior operations of off-site receptors. As shown in Table 4.12-14, vibration generated by construction equipment has the potential to be substantial, since it has the potential to exceed the FTA criteria for architectural damage (i.e., 0.12 in/sec PPV for fragile or historical resources, 0.20 in/sec PPV for nonengineered timber and masonry buildings, and 0.30 in/sec PPV for engineered concrete and masonry).

Potential future development over the buildout horizon of the proposed General Plan 2050 could cause vibration induced impacts and the temporary program-level construction vibration impacts associated with implementation of the proposed General Plan 2050 are considered potentially *significant.*

Impact NOI-2a: Construction activities associated with potential future development under the proposed General Plan 2050 could generate excessive short-term vibration levels during project construction.

Significance with Mitigation: Less than significant. As described under impact discussion NOI-1, Chapter 5, *Safety, Climate Resilience, Noise, and Public Services and Facilities,* of the proposed General Plan 2050 contains goals, policies, and actions that require local planning and development decisions to consider noise impacts, including those from vibration. Specifically, proposed *Action 5-7.1 requires the preparation of acoustical studies prepared by qualified acoustical consultants to evaluate and mitigate impacts. Proposed *Action 5-7.2 requires the City to use the Federal Transit Administration's (FTA) construction and noise vibration thresholds to assess impacts to surrounding land uses. Proposed *Action 5-7.10 requires the City to adopt construction best management practices to reduce vibration caused from construction equipment. In most cases of individual developments associated with implementation of the proposed project, construction that requires the use of vibration-causing construction equipment, such as pile driving, caisson drilling, vibratory roller, or a large bulldozer, would temporarily increase the ambient noise environment in the vicinity of the individual project, potentially affecting existing and future nearby sensitive users. The use of alternate methods/equipment for construction required in proposed *Action 5-7.10 throughout the entire active construction period would help to ensure that construction noise from vibration is minimized to the extent feasible. Some common alternate methods/equipment used for construction include, but are not limited to:

- For pile driving, the use of caisson drilling (drill piles), vibratory pile drivers, oscillating or rotating pile installation methods, pile pressing, "silent" piling, and jetting or partial jetting of piles into place using a water injection at the tip of the pile.
- For paving, use of a static roller in lieu of a vibratory roller.
- For grading and earthwork activities, off-road equipment limited to 100 horsepower or less.

Proposed *Action 5-7.1 requires the preparation of acoustical studies prepared by qualified acoustical consultants to evaluate and mitigate impacts and proposed *Action 5-7.2 requires the City to use vibration thresholds based on the FTA criteria for acceptable levels of groundborne vibration for various types of construction equipment. Should the FTA criteria be exceeded, a list of alternate methods/equipment can be used, as provided above. This would ensure that construction vibration impacts would remain less than significant because alternate methods/equipment with less or no vibration, such as those shown in Table 4.12-14, *Reference Vibration Source Levels for Construction Equipment*, would meet the thresholds. The potential vibration impacts associated with demolition and construction activities would be reduced to a *less-than-significant* level by establishing safe limits to protect structures from potential damage and would minimize vibration impacts.

Operational

Commercial and industrial operations in the EIR Study Area would generate varying degrees of ground vibration, depending on the operational procedures and equipment. Such equipment-generated vibrations would spread through the ground and diminish with distance from the source. The effect on buildings in the vicinity of the vibration source varies depending on soil type, ground strata, and receptor-building construction. The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibrations at moderate levels, to slight structural damage at the highest levels. In addition, future sensitive receptors could be placed within close proximity to the existing railroad line through buildout in the EIR Study Area.

According to the SMART Project Draft EIR,[12] "groundborne noise and vibration levels at distances greater than approximately 100 feet from the tracks, would be lower than the level generally perceptible to humans. At distances between 20 feet and 100 feet from the tracks, vibration levels may be perceptible; however, they are expected to be less than the applicable FTA impact significance criteria of 0.01 inches per second root-mean square (RMS) vibration velocity." Vibration levels of 0.01 in/sec RMS velocity is equivalent to 80 VdB. Based on worst-case future usage of the NWPRR tracks, fewer than 30 train events per day are assumed along the tracks through the EIR Study Area, and the proposed project would not increase the number of train events. The 30 train events per day fall within the infrequent usage category for the FTA thresholds. Depending on the type of noise-sensitive receptor, thresholds range from 65 to 83 VdB.

Potential future development over the buildout horizon of the General Plan 2050 could cause vibration induced impacts, and the long-term program-level vibration impacts associated with implementation of the proposed General Plan 2050 are considered potentially *significant.*

Impact NOI-2b: Operational activities associated with potential future development under the proposed General Plan 2050 could generate excessive long-term vibration levels.

> **Significance with Mitigation:** Less than significant. Implementation of proposed General Plan 2050 *Action 5-7.1 requires the preparation of acoustical studies prepared by qualified acoustical consultants to evaluate and mitigate impacts and *Action 5-7.2 requires the City to use vibration thresholds based on the Federal Transit Administration's (FTA) groundborne vibration for various types of construction equipment. As described in Section 4.12.2.2, *Federal Transit Administration Vibration Limits*, the FTA establishes vibration limits from operational activities for impacts to be less than significant on a project-by-project basis. For vibration annoyance from operational sources, the FTA recommends criteria for frequent, occasional, and infrequent events. Furthermore, proposed *Action 5-7.9 requires conditions of approval to achieve measures to reduce noise impacts primarily through site planning, and avoid engineering solutions for noise mitigation, such as sound walls, if possible. As part of the project approval process, future project applicants would be required to comply with the FTA thresholds and the City would review all development proposals to verify that the proposed development would not significantly increase noise beyond the City's established thresholds. Therefore, with implementation of the proposed General Plan 2050 *Action 5-7.1, *Action 5-7.2, and *Action 5-7.9, vibration impacts from operation are considered *less than significant*.

[12] Sonoma-Marin Area Rail Transit Commission, June 2006, *Sonoma-Marin Area Rail Transit Environmental Impact Report*, State Clearinghouse Number 2002112033. Information is from the November 2005 Draft EIR.

NOI-3 Implementation of the proposed project would not expose people residing or working within two miles of a private airstrip or airport to excessive noise levels.

The Charles M. Schulz-Sonoma County Airport is a public-use airport located more than two miles northwest of the city of Santa Rosa. As discussed in Section 4.12.1.3, *Existing Conditions*, the city boundaries lie outside the 55 dBA CNEL/L_{dn} contour line (see Figure 4.12-3). Because the proposed project would not cause a direct increase in flights and all residences are outside of the 55 dBA L_{dn} noise contours, impacts from future potential projects in the EIR Study Area would be *less than significant*.

Significance without Mitigation: Less than significant.

NOI-4 Implementation of the proposed project could result in cumulative noise impacts in the area in combination with past, present, and reasonably foreseeable projects.

The analysis of the proposed project addresses cumulative impacts with regard to noise, groundborne noise, and vibration. Although multiple simultaneous nearby noise sources may, in combination, result in higher overall noise levels, this effect is captured and accounted for by the ambient noise level metrics that form the basis of the thresholds of significance for noise analysis. Any measurement of sound or ambient noise, whether for the purpose of evaluating land use compatibility, establishing compliance with exterior and interior noise standards, or determining point-source violations of a noise ordinance, necessarily will incorporate noise from all other nearby perceptible sources.

Additionally, although noise attenuation is influenced by a variety of topographical, meteorological, and other factors, noise levels decrease rapidly with distance, and vibration impacts decrease even more rapidly. Therefore, site-level cumulative noise or vibration impacts across city boundaries occur only infrequently. Santa Rosa shares borders with other development in unincorporated Sonoma County, which makes cross-border cumulative noise and vibration impacts possible. Nevertheless, given the proposed General Plan 2050 goals, policies, and actions and SRCC requirements, it is unlikely that stationary source noise would, in combination with noise sources from adjacent communities, result in cumulative noise impacts. Additionally, because any noise measurements taken in conjunction with the proposed General Plan 2050 goals, policies, and actions or SRCC requirements would necessarily account for noises received from outside the boundaries of Santa Rosa, the ongoing implementation of these goals, policies, actions, and regulations under the proposed project would prevent site-based cumulative noise impacts.

Similarly, the noise contours and traffic-related noise levels developed for the proposed project include and account for regional travel patterns as they affect traffic levels in Santa Rosa. Noise contours were based on both existing and projected future traffic volumes that incorporate cumulative regional effects and trends. Existing noise contours were derived from traffic volumes based on counts of current traffic, and these traffic counts inherently include cumulative traffic, as generated by regional trips. With regard to future noise, projected noise contours were determined using projected 2050 traffic volumes; these data account for growth in Santa Rosa under the proposed project as well as anticipated regional growth. The future noise modeling that served as the foundation for the overall project analysis was therefore based on future, cumulative conditions. As described under impact discussion NOI-1, construction activities may occur near noise-sensitive receptors and because noise disturbances may occur for prolonged periods of time, during the more sensitive nighttime hours, or may exceed the applicable FTA thresholds even with implementation of proposed General Plan 2050 *Action 5.7-2. Further, operational vehicle traffic noise increases could exceed the City's significance thresholds even with implementation of proposed *Action 5-7.1, *Action 5-7.2, *Action 5-7.3, *Action 5-7.7, and *Action 5-7.9 Therefore, cumulative impacts with respect to construction and transportation related noise would be potentially *significant*.

Impact NOI-4: Implementation of the proposed project, in combination with past, present, and reasonably foreseeable projects, could result in cumulative noise impacts, with respect to generation of construction- and transportation related noise.

Significance with Mitigation: Significant and unavoidable. Construction activities associated with potential future development could expose sensitive receptors in close proximity to a construction site to excessive noise from construction equipment (see Impact NOI-1a). Implementation of proposed General Plan 2050 *Action 5-7.1, *Action 5.7-2, and *Action 5-7.10 would help reduce construction-related noise impacts. In addition, operational vehicle traffic noise increases could exceed the City's significance thresholds with implementation of the proposed project and expose sensitive receptors in close proximity to new development-generated roadway noise to excessive levels (see Impact NOI-1b). As with construction noise, implementation of proposed *Action 5-7.1, *Action 5.7-2, and *Action 5-7.10 would help reduce transportation-related noise impacts along with *Action 5-7.3, *Action 5-7.7, and *Action 5-7.9. However, due to the programmatic nature of the proposed project, no additional mitigation measures are available. As such, the cumulative noise impact is considered *significant and unavoidable* at the program level.

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