Noise Impact Study for the Del Valle Restaurant Drive-Thru Addition in Santa Rosa

Del Valle Restaurant

2000 Sebastopol Road
Santa Rosa, CA 95407

October 2025
Update

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List of Acronyms and Abbreviations

APN	Assessor's Parcel Number
CNEL	Community Noise Equivalent Level
dB	Decibel
dBA	A-Weighted Decibel
DNL	Day Night Average Sound Level
DOT	United States Department of Transportation
FHWA	Federal Highway Administration
ft	Feet
FTA	Federal Transit Administration
HVAC	Heating, Ventilating, and Air Conditioning
Hz	Hertz (cycles per second)
in/sec	Inches per Second
L_{dn}	Day-Night Noise Level
L_{eq}	Equivalent Energy Level
L_{max}	Maximum Level of Noise
OPR	California Office of Planning and Research
PPV	Peak Particle Velocity
RCNM	Roadway Construction Noise Model
RMS	Root Mean Squared
STC	Sound Transmission Class
SUV	Sport Utility Vehicle
TNM	Traffic Noise Model

1.0 INTRODUCTION

1.1 Purpose and Objectives

Yorke Engineering LLC (Yorke) was retained by Del Valle Restaurant to complete a Noise and Vibration Impact Study for the proposed addition of a drive-thru adjacent to the existing restaurant at 2000 Sebastopol Road in Santa Rosa, CA. Yorke has evaluated the potential for undesirable noise and vibration impacts at the nearest sensitive receptors during construction and operation of the proposed Project. This report contains:

- A review of the City of Santa Rosa's General Plan and Municipal Noise Ordinance;
- A noise and vibration impacts analysis for Project construction; and
- A noise impact analysis for operation of the Project.

1.2 Project Description

The Del Valle Restaurant (Applicant) is proposing to construct a drive-thru as an extension of the existing restaurant located at 2000 Sebastopol Road, Santa Rosa. The proposed drive-thru will consist of an 850-square-foot food service building on the western side of the property, and a 12-foot wide drive aisle with a 3-foot tall hedge/fence for screening of the aisle and associated car headlights from Sebastopol Road on the north. Additionally, the Project will provide 14 standard parking spaces and one Americans with Disabilities Act (ADA) compliant space, for a total of 15 new paved parking spaces. A 120-square-foot trash bin enclosure will be located opposite the food service building on the eastern side of the property, adjacent to the drive-thru queue lane entrance.

The drive-thru order board and intercom will be placed on the driver's side, facing Sebastopol Road, designed to attenuate voice communications away from nearby residences. Figure 1-1 shows the Project location, the site plan is shown in Figure 1-2, and Figure 1-3 shows the specific order board location detail from the site plan.

The site plan shows that vehicles will enter the drive-thru from Sebastopol Road and exit onto Kenmore Lane at the alley behind the site. The City has requested from the Applicant a queue management plan in case the drive-thru queue lane approaches or exceeds design capacity, risking overflow onto Sebastopol Road. If that situation occurs, the Applicant plans to block off the drive-thru queue lane and divert customers through the easement that provides access from the Rite Aid parking lot next door.

A traffic study was performed to evaluate the potential morning (a.m.), and evening (p.m.) peak hour impacts associated with operation of the proposed drive-thru (W-Trans 2022). The queue is designed to handle the peak traffic demand with no impact on the surrounding residences. The noise generated by the low-speed drive-thru will be nominal given its adjacency to Sebastopol Road and its proximity to Stony Point Road and State Route 12.

Figure 1-1: Proposed Project Location

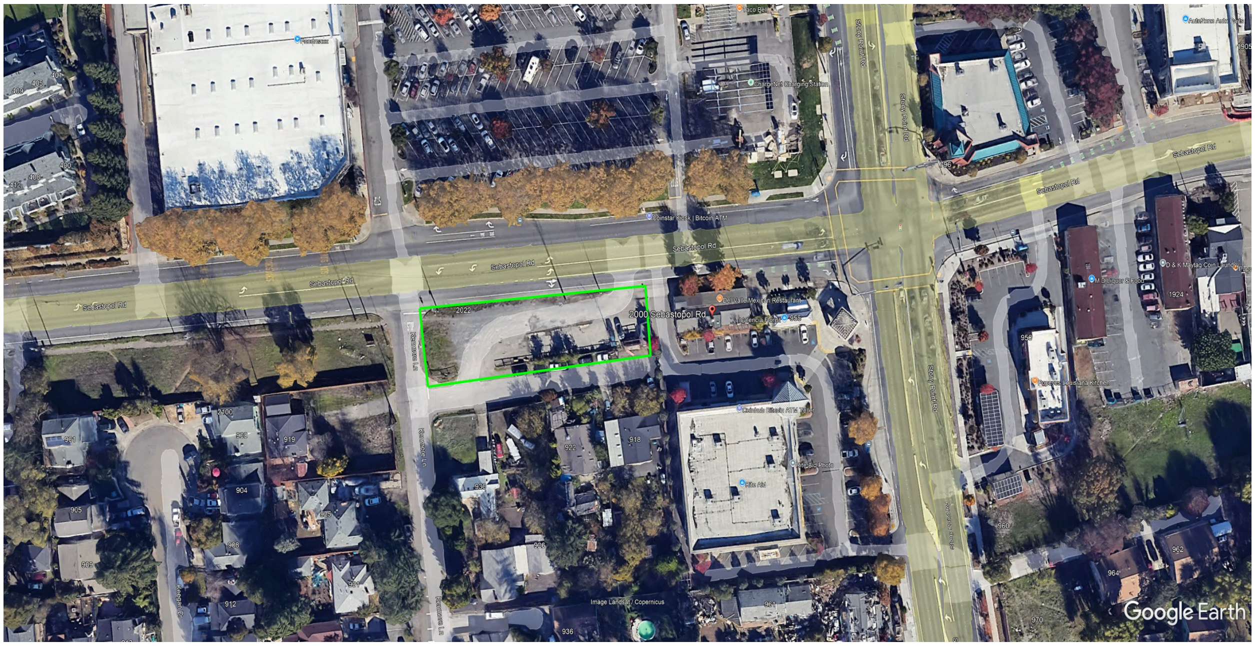


Figure 1-2: Proposed Project Site Plan

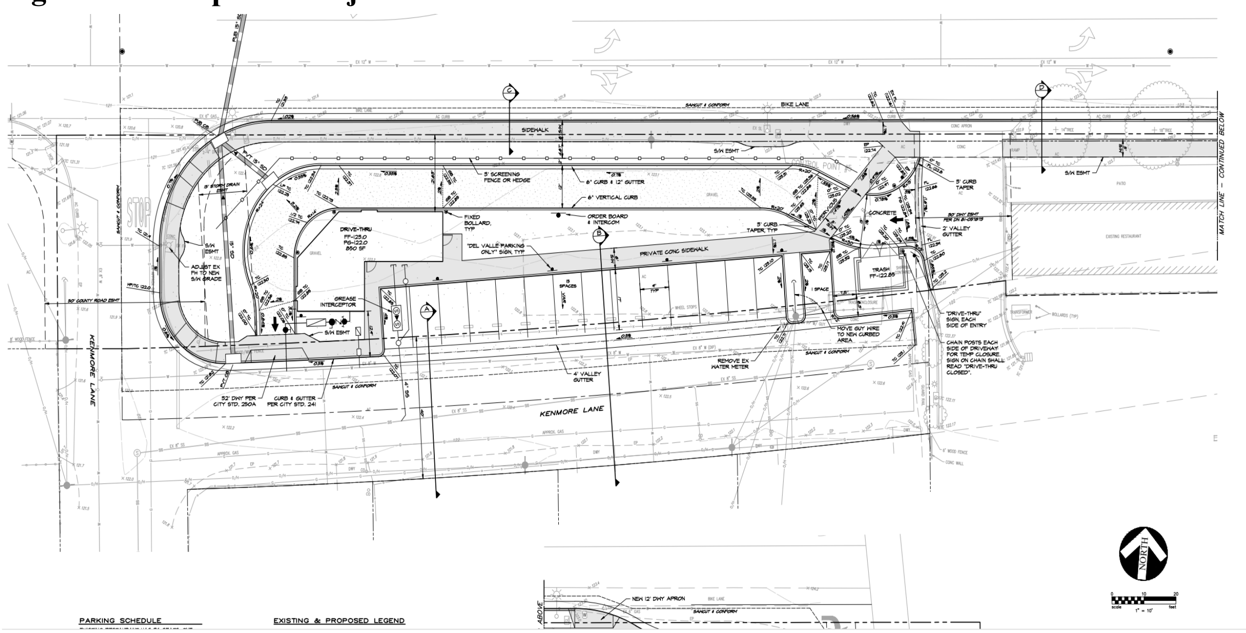
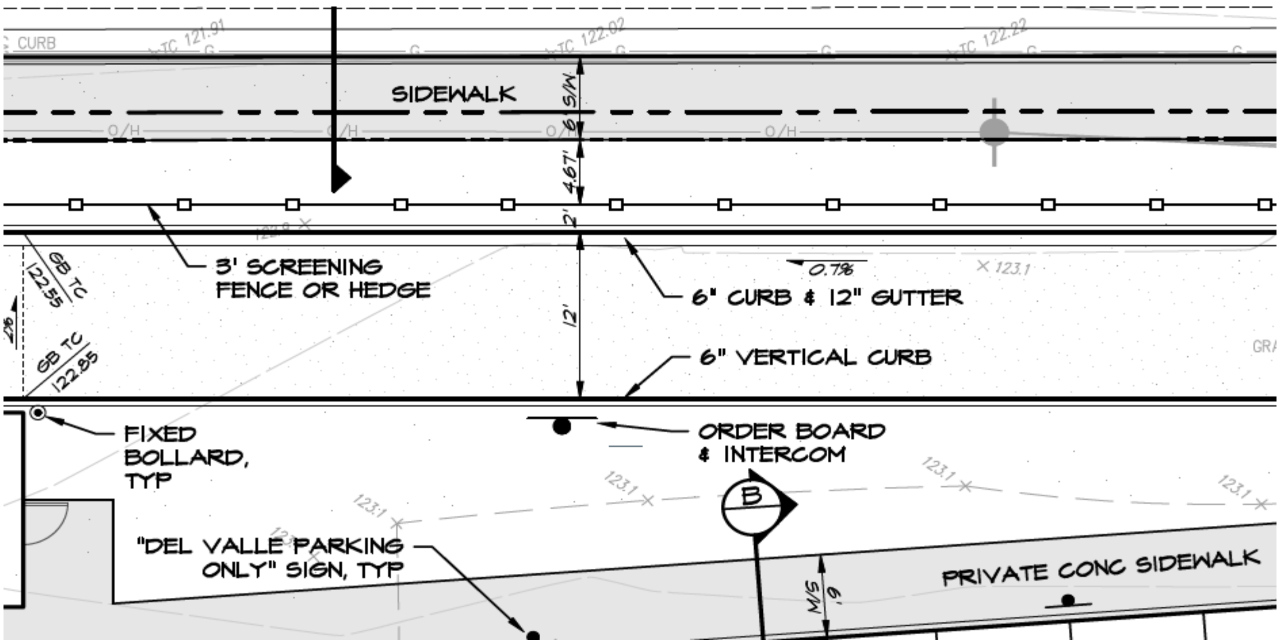


Figure 1-3: Proposed Order Board Location Detail



2.0 NOISE AND VIBRATION FUNDAMENTALS

2.1 Definition and Measurement of Noise

Sound is a pressure wave created by a moving or vibrating source that travels through a fluid medium such as air or water. Noise is defined as a sound or aggregated sounds that are perceived as dissonant, irritating, objectionable, intrusive, and/or disruptive to the quality of daily life. Sound is measured on a logarithmic scale of sound pressure level known as the decibel (dB) scale. A-weighted decibels (dBA) approximate the subjective response of the human ear to broad frequency sound sources by discriminating against very low and very high frequencies of the audible spectrum. The dBA scale is weighted to reflect only those frequencies which are audible to the human ear, generally defined as a range of 20 to 20,000 Hertz (Hz). Figure 2-1 presents a range of noise levels associated with common indoor and outdoor activities.

2.2 Noise Descriptors

Environmental noise descriptors are generally based on time weighted averages. Noise levels emitted by various sources are often expressed as equivalent energy level (L_{eq}). Maximum Level of Noise (L_{max}) is the root mean squared (RMS) maximum level of a noise source or environment measured on a sound level meter during a designated time interval (e.g., 15, 30, or 60 minutes).

Because sound levels at a particular location typically vary over the course of the day and because people tend to be more sensitive to noise in the evening and at night than during the morning and afternoon, sound levels are commonly averaged over a 24-hour period, weighted for night and evening sensitivity by adding a 5 dBA penalty for noise occurring in the evening (7 p.m.-10 p.m.) and a 10 dBA penalty for nighttime noise (10 p.m.-7 a.m.) for the Community Noise Equivalent Level (CNEL) and only a nighttime penalty for the Day-Night Noise Level (DNL, L_{dn}). These two expressions of average sound levels are nearly equivalent, and while this Noise Element usually refers to CNEL, standards cited from certain State and federal regulations may use L_{dn}.

Figure 2-1: Typical Noise Levels and Effects on People

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock band
Jet flyover at 1,000 feet		
	100	
Gas lawnmower at 3 feet		
	90	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	70	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60	
		Large business office
Quiet urban daytime	50	Dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime		
	30	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
	10	
	0	

Source: California Department of Transportation, Technical Noise Supplement, September 2013.

2.3 Sound Range

Decibel scales are logarithmic, such that an increase from 30 to 40 dB represents a tenfold increase in sound level, while an increase from 30 to 50 dB represents a hundredfold increase. Human perception of sound loudness, however, is subjective. Everyday sounds normally range from 30 dBA (very quiet, such as a soft whisper) to 100 dBA (very loud, such as the noise produced by a jet takeoff at a distance of 200 feet).

2.4 Human Response to Changes in Noise Levels

In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz, and it perceives a sound within that range as being more intense than a sound with a higher or lower frequency with the same magnitude. For purposes of this report as well as with most environmental documents, overall sound levels are determined by applying frequency weighted adjustments to spectral sound levels. The A-scale weighting scale is used to mimic human hearing response; therefore, sound is reported in terms of dBA. Typically, the human ear can barely perceive a change in noise level of 3 dBA. A change in noise level of 5 dBA is readily perceptible, and a change of 10 dBA is perceived as being twice or half as loud.

2.5 Sound Propagation

Sound is transmitted in the air by pressure variations from its source to the surroundings. While absorption by air is one of the factors attributing to the weakening of a sound during transmission, distance plays a more important role in noise reduction during transmission. Depending on the source of the sound, for every doubling of distance, the level will be reduced between 3 and 6 dB. The reduction of a sound is called attenuation. Other factors for noise attenuation are terrain absorption (terrain loss) and shielding/obstructions (insertion loss).

To attenuate the line-of-sight noise transmission, sound walls between a noise source and a receiver (receptor) are often used for noise control, e.g., along freeways. Additional barriers such as interceding buildings, rough terrain, hills, and heavy vegetation can also reduce noise levels. Typically, sound walls will reduce noise levels by 5 to 10 dB. The higher the wall is, the greater the noise reduction will be. Effective noise barriers can reduce noise levels by 10 to 15 dB. A sound barrier is most effective when placed close to the noise source or receiver.

2.6 Vibration

Vibration is a form of oscillatory motion within a solid medium, where the amplitude of the motion can be described by displacement, velocity, or acceleration. Typically associated with activities like railroads or vibration-heavy stationary sources such as industrial machinery and heavy trucks, it also arises from certain types of construction equipment such as jackhammers, pile drivers, and hydraulic hammers. Displacement refers to how far a point on a surface moves from its original position, velocity describes the speed at which this point moves, and acceleration measures the rate of change of velocity. These parameters are crucial for assessing human response, building and structure damage, and acceptable vibration levels from equipment.

During construction, equipment operations can induce groundborne vibrations. In the operational phase, receptors may experience vibrations that can cause annoyance due to direct transmission or noise generated by structural vibrations or items within structures. Analysis of such vibrations typically involves measuring velocity and acceleration using test equipment.

Groundborne vibrations propagate in three main wave types: surface or Rayleigh waves, compression or P-waves, and shear or S-waves.

- Surface or Rayleigh waves travel along the ground surface, carrying energy along an expanding cylindrical wave front with particle motion perpendicular to the propagation direction;
- Compression or P-waves are body waves that propagate energy along an expanding spherical wave front with particle motion in a push-pull, longitudinal direction; and
- Shear or S-waves are also body waves, but with particle motion transverse to the direction of propagation along an expanding spherical wave front.

Peak particle velocity (PPV) or root mean square (RMS) velocity are commonly used to quantify vibration amplitudes. PPV measures the maximum instantaneous peak of the vibration signal, which is crucial for assessing potential building damage and human response. Units for PPV velocity are typically inches per second (in/sec), although vibrations are often discussed in vibration decibels (VdB) to simplify the range of values, relative to one microinch per second.

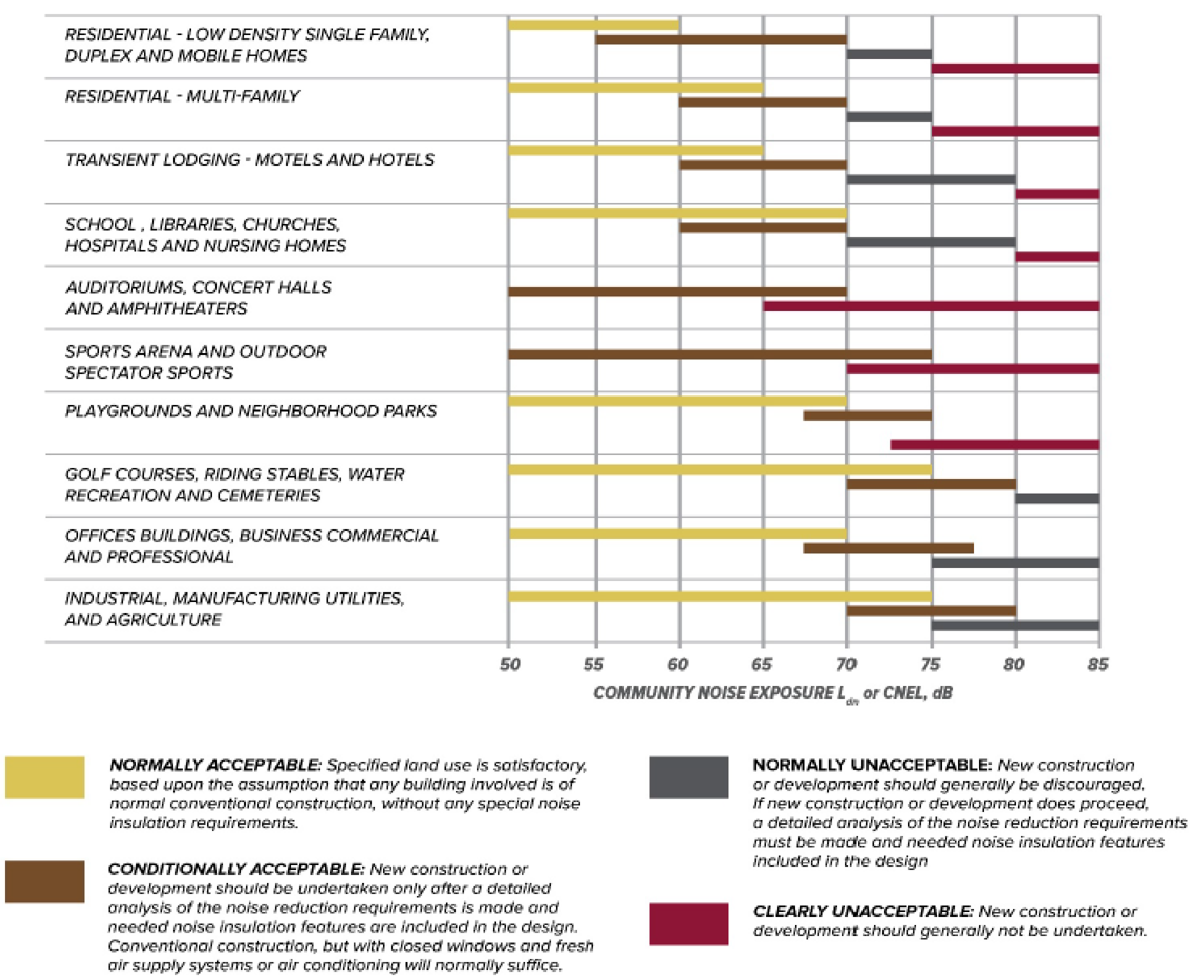
Construction activities, such as hydraulic hammer demolition, typically generate higher levels of groundborne vibrations, particularly in rocky soils. Heavy trucks also contribute, with vibration levels varying based on factors like vehicle type, weight, and pavement conditions. Anomalies such as potholes and pavement joints amplify vibration levels from vehicle traffic. Generally, construction-related vibrations are more concerning than those from normal traffic on well-maintained roads and freeways. Trains, due to their diesel locomotive engines, steel wheels, and heavy loads, can generate substantial vibrations near tracks.

3.0 NOISE AND VIBRATION STANDARDS

3.1 City of Santa Rosa Safety, Climate Resilience, Noise, and Public Services Element

The City of Santa Rosa has included Chapter 5: Safety, Climate Resilience, Noise, and Public Services element within its General Plan 2050 (City 2025) to address noise exposure within the City. Certain land uses are particularly sensitive to noise and vibration, including residential, hotel, school, and open space/recreation areas where quiet environments are necessary for enjoyment, public health, and safety. Excessive noise levels are not only a potential annoyance but can, if high enough, constitute a health threat resulting in temporary or permanent hearing loss and mental distress. The City's Noise Land Use Compatibility Criteria (Chapter 5, Figure 5-13) are shown in Figure 3-1. The Noise Land Use Compatibility Standards specify normally acceptable levels for community noise in various land use areas.

Figure 3-1: Noise Land Use Compatibility Standards



Source: City 2025, Figure 5-13

3.2 City of Santa Rosa Municipal Code

The City regulates noise nuisances under §17-16.010, which addresses methods to determine whether a noise source would potentially result in a violation of the noise limits established within the Municipal Code (City 2024). The most relevant portions of the Municipal Code that address noise that may be generated by the Project are shown below:

§17-16.070. Radios, television sets and similar devices.

(A) Use Restricted. It is unlawful for any person within any residential zone of the City to use or operate any radio receiving set, musical instrument, phonograph, television set or other machine or device for the producing or reproducing of sound in such a manner as to disturb the peace, quiet and comfort of neighboring residents or any reasonable person of normal sensitiveness residing in the area.

(B) Prima Facie Violation. Any noise level exceeding the ambient base level at the property line of any property (or, if a condominium or apartment house, within any adjoining apartment) by more than five decibels shall be deemed to be prima facie evidence of a violation of this section.

§17-16.120. Machinery and equipment.

It is unlawful for any person to operate any machinery, equipment, pump, fan, air-conditioning apparatus or similar mechanical device in any manner so as to create any noise which would cause the noise level at the property line of any property to exceed the ambient base noise level by more than five decibels.

§17-16.125. Leaf blowers.

(A) Offense. It is unlawful for any person to operate any gas-powered leaf blower or lawn broom in a residential district between the hours of eight p.m. and eight a.m. on weekdays or between the hours of eight p.m. and nine a.m. on Saturdays and Sundays.

(B) Penalty. A violation of this section shall constitute an infraction with a maximum penalty of a fine not to exceed $100.00.

§17-16.170. Regulations generally.

The commercial and noncommercial use of sound-amplifying equipment shall be subject to the following regulations.

§17-16.180. Registration—Required.

It is unlawful for any person, other than personnel of law enforcement or governmental agencies, to install, use or operate within the City a loudspeaker or sound-amplifying equipment in a fixed or movable position or mounted upon any sound truck for the purposes of giving instructions, directions, talks, addresses, lectures or transmitting music to any persons or assemblages of person in or upon any street, alley, sidewalk, park, place or public property without first filing a registration statement and obtaining approval thereof as set forth in this article.

(A) The only sounds permitted shall be either music or human speech, or both.

(B) Not Applicable to this Project.

(C) Sound level emanating from sound-amplifying equipment shall not exceed 15 decibels above the ambient base noise level.

(D) Notwithstanding the provisions of subsection (C), sound-amplifying equipment shall not be operated within 200 feet of churches, schools or hospitals (see Section 17-16.100).

(E) In any event, the volume of sound shall be so controlled that it will not be unreasonably loud, raucous, jarring, disturbing or a nuisance to reasonable persons of normal sensitiveness within the area of audibility.

§20-30.090. Performance Standards.

(F) Ground vibration. No ground vibration shall be generated that is perceptible without instruments by a reasonable person at the property lines of the site, except for vibrations from temporary construction or demolition activities, and motor vehicle operations.

3.3 CEQA Checklist Questions

According to Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project will normally have a significant adverse environmental impact related to noise if it would result in:

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

4.0 EXISTING LAND USES AND SENSITIVE RECEPTORS

4.1 Sensitive Receptors

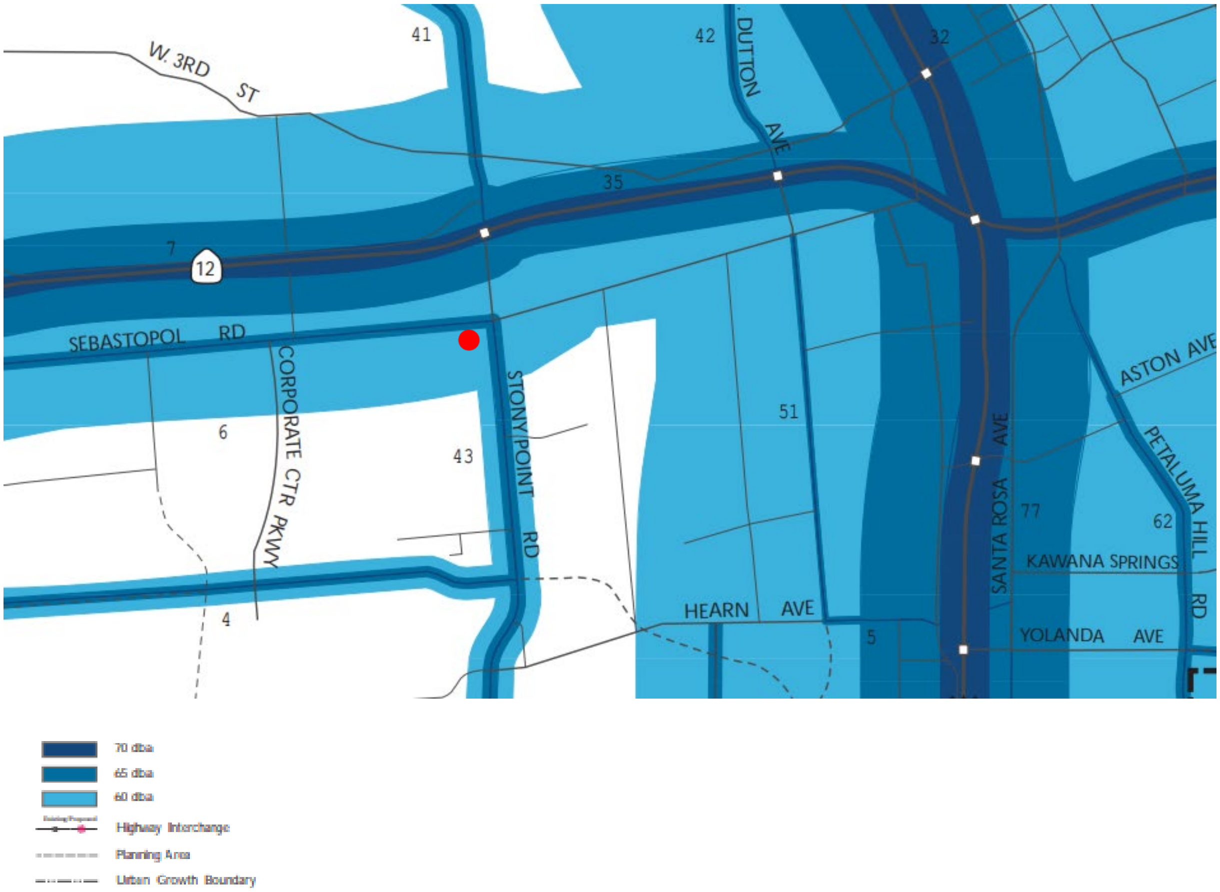
Sensitive noise receptors (receivers) are defined as types of uses that are adversely affected by relatively low levels of noise. Such receptors include residential uses, schools, hospitals, places of worship, and similar uses. Although it is not a noise sensitive land use, the Project site is located near residential land uses, i.e., across Kenmore Lane, which are considered to be noise sensitive land uses.

5.0 EXISTING AMBIENT NOISE ENVIRONMENT

5.1 Background Noise

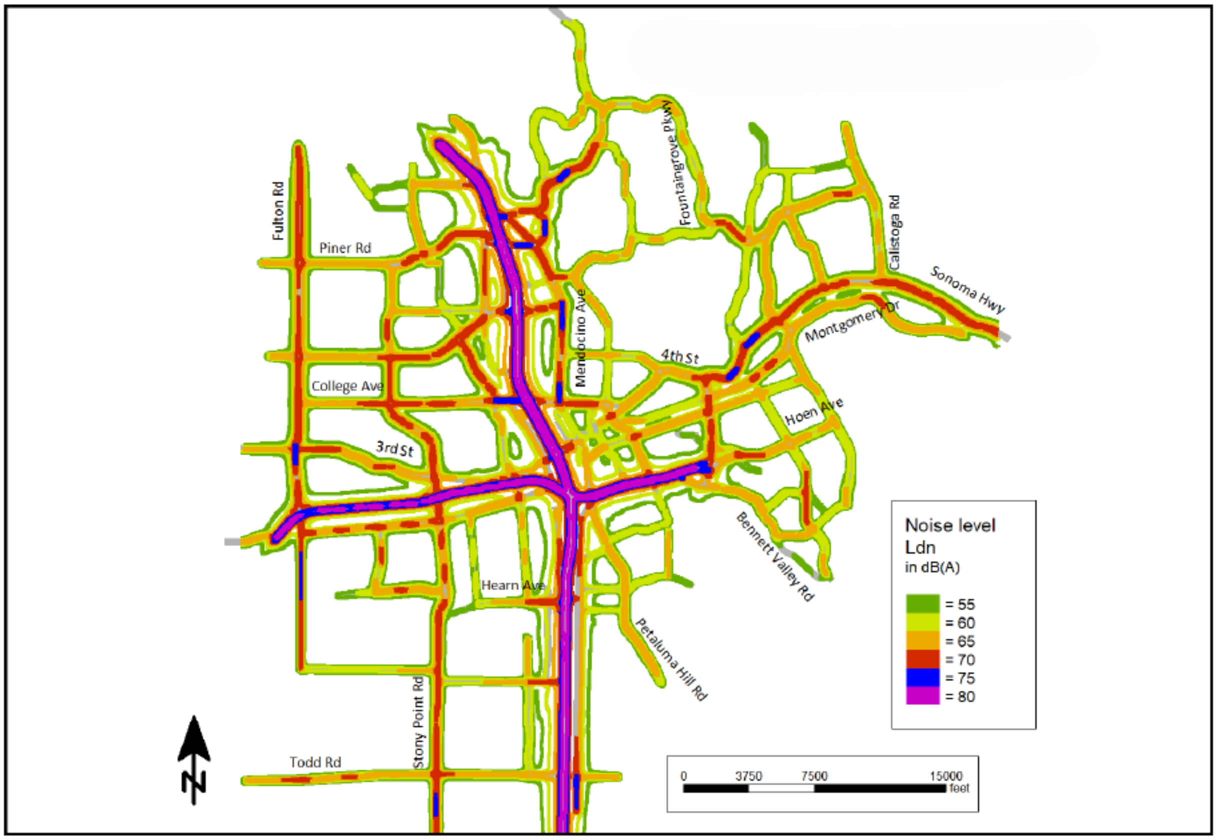
As presented in Figure 5-1, the City's General Plan Noise Element Appendix 2: 2017 and 2018 Noise Data illustrates projected 2020 noise contours (City 2019a, Figure 12-2). The portion of the noise contour map encompassing the Project site and the residences on Kenmore Lane. The Project site (red dot) on the south side of Sebastopol Road, west of Stony Point Road, is within the 60 dBA contour (light blue), adjacent to the 65 dBA contour (dark blue). The Kenmore Lane residences are also located within the 60 dBA contour. Figure 5-2 shows future noise levels accounting for anticipated changes outside the City through 2050, where the corresponding 60 dBA contour is south of Sebastopol Road, west of Stony Point Road (City 2025, Figure 5-17).

Figure 5-1: General Plan Noise Contours at Project Site



Source: City 2019a, Figure 12-2

Figure 5-2: General Plan Cumulative Traffic Noise Levels Through 2050



Source: City 2025, Figure 5-17

6.0 METHODOLOGY

The Project was analyzed for potential noise and vibration impacts from both construction and operations phase activities. Refer to Appendix A – Construction Noise and Vibration Calculations for additional information to support these analyses.

6.1 Construction Noise Analysis Methodology

The noise analysis for Project construction was completed based on methodology developed by the U.S. Department of Transportation Federal Highway Administration (DOT FHWA) at the John A. Volpe National Transportation Systems Center. The Roadway Construction Model (RCNM) methodology uses actual noise measurement data collected during the Boston “Big Dig” project (1991-2006) as reference levels for a wide variety of construction equipment in common use, such as on the proposed Project.

The RCNM noise model provides relatively conservative predictions because it does not account for site-specific geometry, dimensions of nearby structures, and local environmental conditions that can affect sound transmission, reflection, and attenuation. As a result, actual measured sound levels at receptors may vary somewhat from predictions, typically lower. Additionally, the impacts of noise upon receptors (persons) are subjective because of differences in individual sensitivities and perceptions. Noise exposure at offsite land uses were assessed from the center of the Project site to depict “average” conditions.

Noise impacts were evaluated against community noise standards contained in the City General Plan, Municipal Code, or other State or federal agency as applicable to the vicinity of the Project site. Project-generated noise is evaluated in relation to established thresholds of significance. Additionally, the same methods are used to determine noise impacts on the nearest sensitive receptor. There is no numerical standard in the Municipal Code for construction activities; however, the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment provides an 8-hour construction noise level threshold of 80 dBA L_{eq} during the daytime at residential (noise-sensitive) uses. Therefore, noise impacts for the proposed Project were evaluated against the FTA noise standards.

6.2 Construction Vibration Analysis Methodology

During construction activities, the Project would generate noise and vibration due to operation of off-road equipment, portable equipment, and vehicles at or near the Project site. The City prohibits ground vibration that is perceptible without instruments by a reasonable person at the property lines of a project site. The City exempts vibrations from temporary construction or demolition activities, and motor vehicle operations. The FTA has published standard vibration velocities for construction equipment operations. Generally, a PPV vibration threshold of approximately 0.3 in/sec is sufficient to avoid physical damage to engineered structures and 0.2 for non-engineered timber and masonry buildings (FTA 2018). The types of construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time (Caltrans 2020). Building damage can be cosmetic or structural. Table 6-1 provides the FTA construction vibration damage criteria for various types of buildings. Table 6-2 provides the Caltrans human response criteria to continuous vibrations.

Table 6-1: FTA Construction Vibration Damage Criteria

Building/ Structural Category	Threshold PPV at 25 feet (in/sec)
I. Reinforced-concrete, steel or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

Source: FTA 2018

Table 6-2: Caltrans Human Response to Continuous Vibrations

Human Response	PPV (in/sec)
Unpleasant	0.4-0.6
Annoying	0.2
Begins to Annoy	0.1
Readily Perceptible	0.08
Threshold of Perception	0.006-0.019

Source: Caltrans 2020

As shown in Tables 6-1 and 6-2, a "Type III" vibration threshold of 0.2 PPV corresponds to effects on non-engineered timber and masonry buildings and also corresponds to the "Annoying" level for human response. Thus, 0.2 PPV was selected as the vibration significance threshold.

Table 6-3 presents vibration source levels in terms of peak particle velocity (PPV_{ref}) for different types of construction equipment at a reference distance of 25 feet (FTA 2018). The following equation was used to apply the propagation adjustment to the source reference level to account for the distance from the equipment to the receptor:

$$PPV_{equip} = PPV_{ref} \times (\frac{25}{D})^{1.5}$$

where:

PPV_{equip} = the peak particle velocity of the equipment adjusted for distance, in/sec

PPV_{ref} = the source reference vibration level at 25 ft, in/sec

D = distance from the equipment to the receiver, ft

Table 6-3: FTA Vibration Reference Levels for Construction Equipment

Equipment		PPV_{ref} at 25 feet (in/sec)
Pile Driver (Impact)	Upper Range	1.518
	Typical	0.644
Pile Driver (Sonic)	Upper Range	0.734
	Typical	0.170
Clam Shovel Drop (slurry wall)		0.202
Hydromill (slurry wall)	In Soil	0.008
	In Rock	0.017
Vibratory Roller		0.210
Hoe Ram		0.089
Large Bulldozer		0.089
Caisson Drilling		0.089
Loaded Trucks		0.076
Jackhammer		0.035
Small Bulldozer		0.003

Source: FTA 2018

6.3 Traffic Noise Analysis Methodology

The Project's traffic noise analysis was completed based on methodology developed by DOT FHWA for the RD 77-108 Highway Traffic Noise Prediction Model. Traffic noise is dependent on factors such as the volume of traffic, vehicle types, average vehicle speeds, and the distance the roadway is from a receptor.

6.4 On-Site Operational Noise Analysis Methodology

On-site operational noise sources such as landscaping, maintenance, and trash removal, are regulated by the City and limited to daytime hours. These are intermittent mobile sources common to the Project area and are not considered new types of sources attributable solely to the Project.

Project-specific sources include heating, ventilating, and air conditioning (HVAC) equipment on the food service building, passenger and light-duty vehicles idling in queue, and the order board intercom speaker. The intercom would be of sufficient volume to be heard by customers over vehicle idling sounds in queue; however, the order board would face Sebastopol Road, away from the Kenmore Lane residences and feature an acoustic panel as a design feature, which would minimize noise impacts.

The noise analysis for operational impacts follows FHWA and FTA calculation methodologies using typical reference levels for three types of sources: order board sound levels, passenger and light-duty vehicles driven by customers, and heavier trucks used for deliveries and trash removal.

7.0 ANALYSIS OF NOISE IMPACTS

A project would normally have a significant effect on the environment related to noise if it would substantially increase the ambient noise levels for adjoining areas or conflict with adopted environmental plans and goals of the community in which it is located. The applicable noise standards governing the Project site are the criteria in the City's General Plan Noise Element and its Municipal Code.

The following CEQA Appendix G checklist questions, previously listed in Section 3.3, address whether project related noise and vibration impacts would exceed the limits identified within the adopted ordinances, General Plan, or an adopted threshold used by other governmental agencies or industry accepted approaches. Would the project result in:

a) *Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

7.1 Construction Noise Impacts

Local residents may experience increased noise levels at different times due to the operation of construction equipment at the Project site. Construction activities occur in distinct phases, each with its own types of equipment and corresponding noise characteristics. As work progresses, these phases will alter the noise levels around the construction site. Noise levels for the Project were estimated using data from the U.S. Environmental Protection Agency (EPA) *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances* report on noise from construction equipment and operations (EPA 1971). Generally, the highest noise levels from the equipment govern the estimated noise levels. The noise levels for each construction phase (such as excavation, foundation construction, building construction, paving, painting and landscaping and site cleanup) are based on a typical mix of construction equipment for a commercial/retail land use project and exclude the use of unusually loud and vibration-intensive equipment like pile drivers.

The impact of construction noise on noise-sensitive receptors largely depends on their proximity to the construction activities. Table 7-1 shows a comparison of estimated daytime exterior noise impacts for Project construction activities at the nearest receptors with respect to the FTA thresholds. If the thresholds are not exceeded, then a project should be considered to result in less than significant noise impacts.

Table 7-1: Estimated Construction Noise Impacts at Nearest Receptors

Construction Phases	South – Residences	West – Residences	North – Retail	East – Retail
Source-Receptor Distance	60	170	140	125
Excavation	69	60	62	63
Foundation Construction	75	66	68	69
Building Construction	70	61	63	64
Paving and Site Cleanup	72	63	65	66
Maximum Construction Level	**75**	**66**	**68**	**69**
FTA Construction Noise Threshold	**80**	**80**	**85**	**85**
Potentially Significant?	**No**	**No**	**No**	**No**

Source: EPA 1971

The nearest noise sensitive residential uses are adjacent to the Project site to the south and west across Kenmore Lane, with commercial uses located to the north across Sebastopol Road. The main Del Valle Restaurant building is immediately east of the Project site, and a Rite Aid Pharmacy is south of the restaurant at 955 Stony Point Road.

As shown in Table 7-1, the aggregated average construction noise would be below the 80 dBA FTA noise level threshold at nearby noise sensitive receptors. Therefore, temporary impacts on ambient noise levels in excess of applicable standards during construction would be less than significant.

<u>IMPACT</u>: Less than significant

7.2 Operational Noise Impacts

Project-related noise produced during operations would occur from on-site sources as well as off-site from Project related customer vehicle traffic. On-site noise sources attributable to the Project could potentially affect land uses proximate to the Project site whereas Project traffic could potentially affect roadways taken to the Project site. As shown in Figure 5-1, the Project site and the Kenmore Lane residences are within the 60 dBA noise contour of Sebastopol Road.

7.2.1 On-Site Project Noise Sources

Operational noise sources associated with the Project would include but are not limited to HVAC equipment on the food service building, idling customer vehicles, drive-through communication via the order board, parking lot sounds, landscaping and maintenance, and trash removal. These uses would be subject to the noise nuisance regulations discussed under Chapter 17-16 Noise. §17-16.120 - Machinery and equipment provides a limit of 5 dBA above ambient noise levels, which would regulate noise associated with HVAC equipment. Landscaping and maintenance activities are regulated under §17-16.125 - Leaf blowers which restricts use of landscaping equipment from the hours of 8 p.m. and 8 a.m. on weekdays or between the hours of 8 p.m. and 9 a.m. on Saturdays and Sundays. HVAC equipment sound levels emanating from the food service building would be approximately 45 dBA at 50 feet (Lennox 2023), and not quantitatively cumulative within the 60 dBA ambient background level (Figure 5-1).

7.2.1.1 Drive-Thru Order Board Intercom

The Project would use a drive-through intercom as part of the order board. Typical dBA levels for speech at a reference distance of one meter (3.28 feet) are summarized below (Shure 2021):

- Maximum shout = 90 dBA;
- Shout = 84 dBA;
- Very Loud = 78 dBA;
- Loud = 72 dBA;
- Raised = 66 dBA;
- Normal = 60 dBA; and
- Relaxed = 54 dBA.

Using the "Very Loud" reference level of 78 dBA at one meter, sounds associated with customers and restaurant staff speaking at the drive-through menu board intercom and drive-through window are estimated in Table 7-2, where the order board would face Sebastopol Road, away from the Kenmore Lane residences. An acoustic panel mounted behind the order board would provide additional attenuation (8 dBA reduction, FHWA 2006), further reducing impacts. As a design feature, this would not be considered mitigation. No significant cumulative increase would occur.

Table 7-2: Estimated Operational Noise Impacts at Residential Receptors – Order Board

Noise Parameters	West	South A	South B
Ambient Background (dBA)[1]	60	60	60
Receptor Distance from Order Board (feet)	170	120	70
Order Board Source Level (dBA)[2]	78	78	78
Order Board Distance Attenuation Loss (dBA)[3]	(34)	(31)	(27)
Insertion Loss Type[4]	Building	Acoustic Panel	Acoustic Panel
Order Board Insertion Loss (dBA)[4]	(15)	(8)	(8)
Attenuated Order Board Impact (dBA)	29	39	43
Background + Impact Combined (dBA)[5]	**60**	**60**	**60**
Significant Change in Daily Average Noise Level?	**No**	**No**	**No**

Receptors:
West - 919 Kenmore Lane
South A - 930 Kenmore Lane
South B - 918/922 Kenmore Lane
Notes:
[1] From City of Santa Rosa General Plan Noise Element Appendix 2 (City 2019a) - 60 dBA contour
[2] Shure 2021 - very loud speech @ 1m
[3] Inverse Square Law
[4] FHWA 2006 - insertion losses
[5] Logarithmic Addition

7.2.1.2 Drive-Thru Exit

As shown in Figure 1-2, customer vehicles would exit the drive-thru at the intersection of Kenmore Lane and the adjoining ally. Using the FHWA reference level for a pickup truck (78 dBA at one meter), the sounds associated with customer vehicles leaving the Project site are estimated in Table 7-3 against the 60 dBA background ambient noise level (Figure 5-1), where the cumulative increase would be 2 dBA or less. Because the Project site is vacant and used for casual parking with the same exit configuration, these types of impacts would not be attributable solely to the Project.

Table 7-3: Estimated Operational Noise Impacts at Residential Receptors – Exit

Noise Parameters	West	South A	South B
Ambient Background (dBA)[1]	60	60	60
Receptor Distance from Drive Thru Exit (feet)	70	30	90
Drive Thru Exit Source (dBA)[2]	78	78	78
Drive Thru Exit Distance Attenuation Loss (dBA)[3]	(27)	(19)	(29)
Attenuated Drive Thru Exit Impact (dBA)	51	59	49
Background + Impact Combined (dBA)[4]	**61**	**62**	**60**
Significant Change in Daily Average Noise Level?	**No**	**No**	**No**

Receptors:
West - 919 Kenmore Lane
South A - 930 Kenmore Lane
South B - 918/922 Kenmore Lane
Notes:
[1] From City of Santa Rosa General Plan Noise Element Appendix 2 (City 2019a) - 60 dBA contour
[2] FHWA 2006 - pickup truck @ 1m
[3] Inverse Square Law
[4] Logarithmic Addition

7.2.1.3 Daytime Service Trucks

The Project would also require periodic delivery and trash hauling services using large trucks during daytime hours only. Noise associated with service trucks would be intermittent and last only a few minutes on any day. These sources are common in the Project area due to existing mixed commercial and residential uses that make up the surrounding area and are not considered new types of sources attributable solely to the Project. Estimated intermittent noise levels for these common sources emanating from the Project site, e.g., trash trucks, are shown in Table 7-4, where cumulative intermittent noise could range from 70 to 80 dBA.

Table 7-4: Estimated Intermittent Noise Impacts at Residential Receptors – Trucks

Noise Parameters	West	South A	South B
Ambient Background (dBA)[1]	60	60	60
Receptor Distance from Trash Trucks (feet)	260	180	70
Trash Trucks Source (dBA)[2]	107	107	107
Trash Trucks Attenuation Loss (dBA)[3]	(38)	(35)	(27)
Attenuated Trash Trucks Impact (dBA)	69	72	80
Background + Impact Combined (dBA)[4]	**70**	**72**	**80**

Receptors:
West - 919 Kenmore Lane
South A - 930 Kenmore Lane
South B - 918/922 Kenmore Lane
Notes:
[1] From City of Santa Rosa General Plan Noise Element Appendix 2 (City 2019a) - 60 dBA contour
[2] FHWA 2006 - diesel truck @ 1m
[3] Inverse Square Law
[4] Logarithmic Addition

7.2.1.4 Parking Spaces

The Project would also involve the development of 15 parking spaces. Normal random sounds associated with parking space usage includes vehicle travel, radios, occupant voices, engine starts, and car doors opening and closing. Although there could be a potential for accidental activation of car alarms, these would be spontaneous incidents resulting from individual human actions that may or may not occur. Normal random sounds associated with 15 parking spaces would blend with traffic noise from Sebastopol Road because the Project site is within the 60 dBA contour (Figure 5-1). Signs would be posted prohibiting horn honking and loud music, which are also caused by individual human actions that may or may not occur. As a design feature, this would not be considered mitigation.

7.2.1.5 Late Night Operations

Tables 7-5 and 7-6 show estimated late night (9:00 pm to 11:00 pm) operational impacts at nearby receptors considering reduced traffic volumes on Sebastopol Road. For this timeframe, ambient background noise is estimated by subtracting the 10 dBA CNEL nighttime offset from the 60 dBA contour value shown in Figure 5-1 to obtain 50 dBA late night ambient background. As shown, late night operations would not cause impacts to exceed the 60 dBA Normally Acceptable criteria for residential land uses shown in Figure 3-1. (City 2019a, 2025).

Table 7-5: Estimated Late Night Noise Impacts at Residential Receptors – Order Board

Noise Parameters	West	South A	South B
Ambient Background (dBA)[1]	50	50	50
Receptor Distance from Order Board (feet)	170	120	70
Order Board Source Level (dBA)[2]	78	78	78
Order Board Distance Attenuation Loss (dBA)[3]	(34)	(31)	(27)
Insertion Loss Type[4]	Building	Acoustic Panel	Acoustic Panel
Order Board Insertion Loss (dBA)[4]	(15)	(8)	(8)
Attenuated Order Board Impact (dBA)	29	39	43
Background + Impact Combined (dBA)[5]	**50**	**50**	**51**
Exceeds Normally Acceptable Noise Level?	**No**	**No**	**No**

Receptors:
West - 919 Kenmore Lane
South A - 930 Kenmore Lane
South B - 918/922 Kenmore Lane
Notes:
[1] From City of Santa Rosa General Plan Noise Element Appendix 2 (City 2019a) - 60 dBA contour less 10 dBA nighttime offset
[2] Shure 2021 - very loud speech @ 1m
[3] Inverse Square Law
[4] FHWA 2006 - insertion losses
[5] Logarithmic Addition

Table 7-6: Estimated Late Night Noise Impacts at Residential Receptors – Exit

Noise Parameters	West	South A	South B
Ambient Background (dBA)[1]	50	50	50
Receptor Distance from Drive Thru Exit (feet)	70	30	90
Drive Thru Exit Source (dBA)[2]	78	78	78
Drive Thru Exit Distance Attenuation Loss (dBA)[3]	(27)	(19)	(29)
Attenuated Drive Thru Exit Impact (dBA)	51	59	49
Background + Impact Combined (dBA)[4]	**54**	**59**	**53**
Exceeds Normally Acceptable Noise Level?	**No**	**No**	**No**

Receptors:
West - 919 Kenmore Lane
South A - 930 Kenmore Lane
South B - 918/922 Kenmore Lane
Notes:
[1] From City of Santa Rosa General Plan Noise Element Appendix 2 (City 2019a) - 60 dBA contour less 10 dBA nighttime offset
[2] FHWA 2006 - pickup truck @ 1m
[3] Inverse Square Law
[4] Logarithmic Addition

7.2.1.6 Discussion of Onsite Noise

A 3 dBA change in noise levels is considered the minimum change in outdoor noise that is perceptible with human hearing. A 1 dBA change in noise levels is discernable only in laboratory conditions. A 2 dBA change in outdoor noise is generally not discernable. As shown in Tables 7-2 and 7-3, order board and drive-thru exit sounds would characteristically blend with the background traffic noise on Sebastopol Road. As shown in Table 7-4, intermittent service truck sounds lasting only a few minutes on any day, an existing type of noise source in the Project area, would not exceed 80 dBA (the FTA construction noise threshold) at the nearest receptor. Such sources associated with the Project would not result in substantial permanent increases in ambient noise levels. As shown in Tables 7-5 and 7-6, late night operations when traffic volumes on Sebastopol Road are reduced would not cause impacts to exceed the 60 dBA Normally Acceptable criteria for residential land uses shown in Figure 3-1 (City 2025). As such, noise impacts from on-site sources would result in less than significant operational noise impacts and no mitigation is required.

7.2.2 Off-Site Noise Generated by Project Traffic

Project-related off-site noise sources (i.e., roadway traffic noise) have the potential to increase noise levels on local roadways accessing the Project site. The determination of whether traffic related noise impacts would occur is based on whether Project-related off-site noise sources (i.e., roadway traffic noise) cause the ambient noise levels proximate to the local roadways to result in an audible increase (3 dBA).

Based on the trip generation calculated for the proposed Project in the *Preliminary Focused Transportation Study for the Del Valle Restaurant Expansion Project* (W-Trans 2022), operation of the Project under "Option D" would result in 27 morning peak hour trips and 64 evening peak hour trips. Traffic volumes provided within the City's traffic counts (City 2019b) show that Sebastopol Road west of Stony Point Road has over 18,000 Average Daily Trips (ADT). At 420 ADTs[1] on a weekly basis, the Project would represent about a 2.3% increase in daily traffic on Sebastopol Road. Based on the FHWA's RD 77-108 Traffic Noise Prediction Model methodology, the incremental increase in vehicle traffic related to the Project would result in a minimal increase in traffic noise of approximately 0.1 dBA[2] along Sebastopol Road. A 3 dBA change in noise levels is considered the minimum change in outdoor noise that is perceptible with human hearing. As noted above, a 1 dBA change in noise levels is discernable only in laboratory conditions, and a 2 dBA change in outdoor noise is generally not discernable. Consequently, the additive Project related traffic noise increases considered together with existing traffic noise would be inaudible and would result in less than significant noise impacts.

<u>IMPACT</u>: Less than significant

7.3 Vibration Impacts

b) Generation of excessive groundborne vibration or groundborne noise levels?

Potential vibration generated from the Project would mainly occur during the construction phase when heavy equipment is used for demolition and construction activities. Vibration levels for Project related construction activities assumes that equipment would operate at the closest accessible point on the property to the nearest offsite buildings in each cardinal direction. Vibration levels for the equipment shown in Table 7-5 were used in this assessment.

At this point in the planning process, it is unknown whether certain types of equipment would be used and, as such, a conservative approach was taken that includes the most vibration intensive equipment that could be used at the site. Vibration exposure levels at the nearest off-site buildings from construction equipment are shown in Table 7-5. Because these off-site facilities are

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[1] CalEEMod was used to estimate the 7-day weighted average daily trip rates (Weekdays, Saturdays, Sundays).

[2] (10 log 1.023) = 0.1

residential and commercial buildings, it is assumed that they are non-engineered timber and masonry buildings with a construction vibration damage criterion of 0.2 PPV (in/sec).

Table 7-5 shows the vibration levels of construction equipment at the nearest sensitive receptor and compares the values to human annoyance and building damage thresholds. Based on the information presented above and in Table 7-5, the nearest offsite structures would be exposed to a PPV below 0.2 in/sec when construction equipment operate at distances of 30 feet or greater.

The operations phase of the proposed drive-thru is not anticipated to involve substantial sources of vibration due to the nature of the restaurant drive-thru operation designed for light-duty vehicles, such as passenger cars, pickup trucks, vans, and SUVs. As such, vibration associated with Project operations would result in less than significant impacts.

<u>IMPACT</u>: Less than significant

Table 7-7: Estimated Peak Activity Daytime Vibration Impacts in Cardinal Directions

Construction Equipment Type	Reference PPV at 25 feet (in/sec)	North Property Line 140 ft. to Building (PPV)	East Property Line 30 ft. to Building (PPV)	South Property Line 50 ft. to Building (PPV)	West Property Line 120 ft. to Building (PPV)
Vibratory Roller/Compactor	0.210	0.02	0.16	0.07	0.02
Hoe Ram/Hydraulic Breaker	0.089	0.01	0.07	0.03	0.01
Large Bulldozer/Crawler Tractor	0.089	0.01	0.07	0.03	0.01
Loaded Dump Trucks	0.076	0.01	0.06	0.03	0.01
Jackhammer (pneumatic)	0.035	0.00	0.03	0.01	0.00
Small Bulldozer/Excavator/Backhoe	0.003	0.00	0.00	0.00	0.00
Maximum Vibration Exposure Level (in/sec)		**0.02**	**0.16**	**0.07**	**0.02**
Building Damage Threshold (in/sec)		**0.2**	**0.2**	**0.2**	**0.2**
Human Annoyance Threshold (in/sec)		**0.2**	**0.2**	**0.2**	**0.2**
Potentially Significant?		**No**	**No**	**No**	**No**

Sources: FTA 2018 (Chapter 7.2, Tables 7-4 & 7-5, Equation 7-2), Caltrans 2020 (Table 5)
Note: Vibration from vibratory rollers assume implementation of BMP NOI-1 when operating within 30 feet of buildings.

7.4 Aircraft Noise Exposure

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

The Project site is not located within 2 miles of an airport or private airstrip. The nearest airport to the Project site is the Charles M. Schulz – Sonoma County Airport (STS), which is approximately 6 miles northwest of the Project site. The Project site is well outside the existing and projected 65-dBA CNEL noise contour of any airport. Aircraft overflights do not significantly contribute to the noise environment at the Project site, and the commercial Project is not considered to be noise sensitive. Therefore, there would be no impact.

<u>IMPACT</u>: No impact

8.0 CONCLUSIONS

Noise and vibration attributable to the Project was evaluated against applicable noise and vibration limits and those adopted for use by the City. Both the construction and operational phases of the Project were evaluated at the nearest sensitive receptors for excessive noise and vibration exposure. Temporary construction noise would be limited to daylight hours and would permanently cease upon completion of construction. Aggregated average construction noise will be below the FTA noise level threshold. Therefore, construction-related noise was found to result in less than significant noise exposure impacts at the nearest residential noise sensitive uses.

The operations phase of the Project would involve steady-state operation of HVAC equipment on the food service building, drive-thru communications, vehicle travel, random parking lot sounds, and intermittent noise from small utility equipment and service trucks. These sources would not result in substantial increases in noise levels or non-compliance with the City's limits for nuisance noise. Normal daytime and nighttime operations at the Project site, in compliance with City requirements, would result in less than significant noise impacts from on-site sources.

Off-site noise from Project related vehicle trips was also evaluated. The increase in traffic noise levels would not result in an audible change, which generally requires a minimum of 3 dBA. As such, off-site traffic noise increases were found to result in less than significant traffic noise increases.

Vibration was also assessed for construction of the Project and found to not result in excessive exposure to vibration related to building damage or human annoyance at the nearest off-site buildings. The operations phase of the proposed drive-thru would not involve activities that generate substantive levels of vibration that would affect off-site uses.

In conclusion, the Project would not result in excessive levels of noise or vibration at off-site residential receptors, and no mitigation measures are necessary nor recommended. Noise mapping indicates that the Project site itself could be exposed to noise levels of up to 65 dBA DNL (Figure 5-1) from ordinary day- and night-time activities in the area and would require the use of walls, doors, and windows which have sufficient sound transmission class (STC) ratings to meet interior noise standards for commercial uses (addition of the drive-thru). With the use of building materials that meet the necessary STC ratings, the Project will comply with interior noise standards and noise impacts from all aspects of the project, as described above, will be less than significant.

9.0 REFERENCES

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APPENDIX A – CONSTRUCTION NOISE AND VIBRATION CALCULATIONS

Construction Generated Noise

Building Type		Distance (ft)
Construction Noise at 50 Feet (dBA Leq)		50
Construction Phase	**Minimum Required Equipment in Use[1]**	
Excavation	71	
Foundation Construction	77	
Building Construction	72	
Finishing and Site Cleanup	74	
Southern Residences		
Average Construction Noise (dBA Leq)		60
Construction Phase	**Minimum Required Equipment in Use[1]**	
Excavation (Site Preparation)	69	
Foundation Construction	75	
Building Construction	70	
Paving	72	
Western Residences		
Average Construction Noise (dBA Leq)		170
Construction Phase	**Minimum Required Equipment in Use[1]**	
Excavation (Site Preparation)	60	
Foundation Construction	66	
Building Construction	61	
Paving	63	
Northern Retail		
Average Construction Noise (dBA Leq)		140
Construction Phase	**Minimum Required Equipment in Use[1]**	
Excavation (Site Preparation)	62	
Foundation Construction	68	
Building Construction	63	
Paving	65	
Eastern Retail		
Average Construction Noise (dBA Leq)		125
Construction Phase	**Minimum Required Equipment in Use[1]**	
Excavation (Site Preparation)	63	
Foundation Construction	69	
Building Construction	64	
Paving	66	

Source: Bolt, Beranek and Newman, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," prepared for the USEPA, December 31, 1971. Based on analysis for Office Building, Hotel, Hospital, School, and Public Works.

Table 1: FTA Construction Equipment Vibration Reference Levels and Impacts - Common Equipment					
Construction Equipment Type	**Reference PPV at 25 feet (in/sec)**	**North Property Line Distance to Building (ft)**	**East Property Line Distance to Building (ft)**	**South Property Line Distance to Building (ft)**	**West Property Line Distance to Building (ft)**
		140	**30**	**50**	**120**
Vibratory Roller/Compactor	0.210	0.02	0.16	0.07	0.02
Hoe Ram/Hydraulic Breaker	0.089	0.01	0.07	0.03	0.01
Large Bulldozer/Crawler Tractor	0.089	0.01	0.07	0.03	0.01
Caisson Drilling/Boring	0.089	0.01	0.07	0.03	0.01
Loaded Dump Trucks	0.076	0.01	0.06	0.03	0.01
Jackhammer (pneumatic)	0.035	0.00	0.03	0.01	0.00
Small Bulldozer/Excavator/Backhoe	0.003	0.00	0.00	0.00	0.00
Maximum Vibration Exposure Level (in/sec)		**0.02**	**0.16**	**0.07**	**0.02**
Building Damage Threshold (in/sec)		**0.2**	**0.2**	**0.2**	**0.2**
Human Annoyance Threshold (in/sec)		**0.2**	**0.2**	**0.2**	**0.2**
Potentially Significant?		**No**	**No**	**No**	**No**

Sources: FTA 2018 (Chapter 7.2, Tables 7-4 & 7-5, Equation 7-2), Caltrans 2020 (Table 5)