ROTTEN ROBBIE SERVICE STATION PROJECT ENVIRONMENTAL NOISE AND VIBRATION ASSESSMENT

Manteca, California

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Prepared for:

Roman Acosta, MPA
J.B. Anderson Land Use Planning
139 South Stockton Avenue
Ripon, CA 95366

Prepared by:

Carrie J. Janello
Michael S. Thill

ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality
429 East Cotati Avenue
Cotati, CA 94931
(707) 794-0400

I&R Job No.: 19-235

INTRODUCTION

A Rotten Robbie service station is proposed at 1014 South Airport Way in Manteca, California. The project site is approximately 2.02 acres and is bordered by existing single-family residences to the west, across Airport Way, to the north, across Wawona Street, and to the east and southeast. Adjoining the project site to the south is an existing Mister Car Wash facility.

This report evaluates the project's potential to result in significant impacts with respect to applicable California Environmental Quality Act (CEQA) guidelines. The report is divided into two sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise and groundborne vibration, summarizes applicable regulatory criteria, and discusses the results of the ambient noise monitoring survey completed to document existing noise conditions; and 2) the Impacts and Mitigation Measures Section describes the significance criteria used to evaluate project impacts, provides a discussion of each project impact, and presents mitigation measures, where necessary, to mitigate the identified impacts to a less-than-significant level.

SETTING

Fundamentals of Environmental Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its *loudness*. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (*frequency*) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level (dBA).* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an

average level that has the same acoustical energy as the summation of all the time-varying events. This *energy-equivalent sound/noise descriptor* is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level* (*CNEL*) is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level* (*DNL* or L_{dn}) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12 to 17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57 to 62 dBA L_{dn} with open windows and 65 to 70 dBA L_{dn} if the windows are closed. Levels of 55 to 60 dBA are common along collector streets and secondary arterials, while 65 to 70 dBA is a typical value for a primary/major arterial. Levels of 75 to 80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed, those facing major roadways and freeways typically need special glass windows.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes

for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 50 dBA L_{dn}. At a L_{dn} of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the L_{dn} increases to 70 dBA, the percentage of the population highly annoyed increases to about 25 to 30 percent of the population. There is, therefore, an increase of about 2 percent per dBA between a L_{dn} of 60 to 70 dBA. Between a DNL of 70 to 80 dBA, each decibel increase increases by about 3 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the DNL is 60 dBA, approximately 30 to 35 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 3 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 4 percent increase in the percentage of the population highly annoyed.

TABLE 1 Definition of Acoustical Terms Used in this Report

Term	Definition
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e. g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

TABLE 2 Typical Noise Levels in the Environment

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

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

Fundamentals of Groundborne Vibration

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One method is the Peak Particle Velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. In this report, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction generated vibration for building damage and human complaints. Table 3 displays the reactions of people and the effects on buildings that continuous or frequent intermittent vibration levels produce. The guidelines in Table 3 represent syntheses of vibration criteria for human response and potential damage to buildings resulting from construction vibration.

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile driving and vibratory compaction equipment typically generates the highest construction related groundborne vibration levels. Because of the impulsive nature of such activities, the use of the PPV descriptor has been routinely used to measure and assess groundborne vibration and almost exclusively to assess the potential of vibration to cause damage and the degree of annoyance for humans.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life, are evaluated against different vibration limits. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels, such as people in an urban environment, may tolerate a higher vibration level.

Structural damage can be classified as cosmetic only, such as paint flaking or minimal extension of cracks in building surfaces; minor, including limited surface cracking; or major, that may threaten the structural integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher. The damage criteria presented in Table 3 include several categories for ancient, fragile, and historic structures, the types of structures most at risk to damage. Most buildings are included within the categories ranging from “Historic and some old buildings” to “Modern industrial/commercial buildings”. Construction-induced vibration that can be detrimental to the building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity occurs immediately adjacent to the structure.

The annoyance levels shown in Table 3 should be interpreted with care since vibration may be found to be annoying at lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage.

TABLE 3 Reactions of People and Damage to Buildings from Continuous or Frequent Intermittent Vibration Levels

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.01	Barely perceptible	No effect
0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Virtually no risk of damage to normal buildings
0.25	Strongly perceptible to severe	Threshold at which there is a risk of damage to historic and some old buildings.
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential dwellings such as plastered walls or ceilings
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to newer residential structures

Source: Transportation and Construction Vibration Guidance Manual, California Department of Transportation, September 2013.

Regulatory Background

This section describes the relevant guidelines, policies, and standards established by State Agencies and the City of Manteca. The State CEQA Guidelines, Appendix G, are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. A summary of the applicable regulatory criteria is provided below.

State of California

State CEQA Guidelines. The California Environmental Quality Act (CEQA) contains guidelines to evaluate the significance of effects of environmental noise attributable to a proposed project. Under CEQA, noise impacts would be considered significant if the project would 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;

(b) Generation of excessive groundborne vibration or groundborne noise levels;

(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, if the project would expose people residing or working in the project area to excessive noise levels.

City of Manteca

City of Manteca General Plan 2023. The Noise Element in the City of Manteca General Plan 2023 sets forth goals and policies with the fundamental objective to avoid creating new noise-

generating conditions that would degrade the existing community environment or to place a sensitive land use where it would be adversely affected by an existing noise source. The following goals and policies are applicable to the proposed project:

Goal N-1. Protect the residents of Manteca from the harmful and annoying effects of exposure to excessive noise.

Goal N-2. Protect the quality of life in the community and the tourism economy from noise generated by incompatible land uses.

Goal N-3. Ensure that the downtown core noise levels remain acceptable and compatible with commercial and higher density residential land uses.

Goal N-4. Protect public health and welfare by eliminating existing noise problems where feasible, by establishing standards for acceptable indoor and outdoor noise, and by preventing significant increases in noise levels.

Goal N-5. Incorporate noise considerations into land use planning decisions and guide the location and design of transportation facilities to minimize the effects of noise on adjacent land uses.

Policy N-P-1: Areas within Manteca exposed to existing or projected exterior noise levels from mobile noise sources exceeding the performance standards in Table 9-1 shall be designated as noise-impacted areas.

Policy N-P-4: The City shall require stationary noise sources proposed adjacent to noise-sensitive uses to be mitigated so as to not exceed the noise level performance standards in Table 9-2.

Policy N-P-5: In accord with the Table 9-2 standards, the City shall regulate construction-related noise impacts on adjacent uses.

Policy N-P-7: Noise level criteria applied to land uses other than residential or other noise-sensitive uses shall be consistent with noise performance levels of Table 9-1 and Table 9-2.

The Noise Element also includes the following applicable implementation action items that would apply to proposed project:

N-I-3: In making a determination of impact under the California Environmental Quality Act (CEQA), a substantial increase will occur if ambient noise levels are increased by 10 dB or more. An increase of 5 to 10 dB may be substantial. Factors to be considered in determining the significance of increases from 5 to 10 dB include:

- The resulting noise levels

- The duration and frequency of the noise
- The number of people affected
- The land use designation of the affected receptors sites
- Public reactions or controversy as demonstrated at workshops or hearings, or by correspondence
- Prior CEQA determinations by other agencies specific to the project

N-I-4: Control noise at the source through use of insulation, berms, building design and orientation, buffer space, staggered operating hours, and other techniques. Use noise barriers to attenuate noise to acceptable levels.

TABLE 9-1

MAXIMUM ALLOWABLE NOISE EXPOSURE MOBILE NOISE SOURCES

Land Use[4]	Outdoor Activity Areas[1]	Interior Spaces	
		Ldn/CNEL, dB	Leq, dB[3]
Residential	60[2]	45	
Transient Lodging	60[2]	45	
Hospitals, Nursing Homes	60[2]	45	
Theaters, Auditoriums, Music Halls			35
Churches, Music Halls	60[2]		40
Office Buildings	65		45
Schools, Libraries, Museums			45
Playgrounds, Neighborhood Parks	70		

[1]Outdoor activity areas for residential development are considered to be backyard patios or decks of single family dwellings, and the common areas where people generally congregate for multi-family developments. Outdoor activity areas for non-residential developments are considered to be those common areas where people generally congregate, including pedestrian plazas, seating areas, and outside lunch facilities. Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use.

[2]In areas where it is not possible to reduce exterior noise levels to 60 dB L_{dn} or below using a practical application of the best noise-reduction technology, an exterior noise level of up to 65 L_{dn} will be allowed.

[3]Determined for a typical worst-case hour during periods of use.

[4]Where a proposed use is not specifically listed on the table, the use shall comply with the noise exposure standards for the nearest similar use as determined by the City.

TABLE 9-2

PERFORMANCE STANDARDS FOR STATIONARY NOISE SOURCES OR PROJECTS AFFECTED BY STATIONARY NOISE SOURCES[1,2]

Noise Level Descriptor	Daytime	Nighttime
	7 a.m. to 10 p.m.	10 p.m. to 7 a.m.
Hourly Leq, dB	50	45
Maximum Level, dB	70	65

[1]Each of the noise levels specified above should be lowered by five (5) dB for simple noise tones, noises consisting primarily of speech or music, or recurring impulsive noises. Such noises are generally considered by residents to be particularly annoying and are a primary source of noise complaints.

[2]No standards have been included for interior noise levels. Standard construction practices should, with the exterior noise levels identified, result in acceptable interior noise levels.

City of Manteca Municipal Code. Chapters 9 and 17 of the City of Manteca Municipal Code include prohibited noises and noise performance standards to be enforced in the city. The sections applicable to the proposed project include the following:

Section 9.52.040 Specific prohibited noises. Notwithstanding any other provisions of this chapter, the following acts and the causing or permitting thereof, are declared and deemed to be in violation of this chapter:

D. Engines, Motors and Mechanical Devices Near Residential District. The sustained, continuous or repeated operation or use between the hours of ten p.m. and eight a.m. (10:00 p.m. and 8:00 a.m.) of any motor or engine or the repair, modification, reconstruction, testing or operation of any automobile, motorcycle, machine, contrivance, or mechanical device or other contrivance or facility unless such motor, engine, automobile, motorcycle, machine or mechanical device is enclosed within a sound insulated structure so as to prevent noise and sound from being plainly audible at the property line of the property from which the sound is emanating.

F. Loading and Unloading. Loading, unloading, opening, closing or other handling of boxes, crates, containers, building materials, garbage cans or similar objects between the hours of ten p.m. and eight a.m. in such a manner as to cause noise disturbance, except for solid waste collection.

J. Commercial Establishments Adjacent to Residential Property. Notwithstanding any provision of this code to the contrary, continuous, repeated or sustained noise from the premises of any commercial establishment which is adjacent to one or more residential dwelling units, including any outdoor area part of or under the control of the establishment, between the hours of ten p.m. and eight a.m. (10:00 p.m. and 8:00 a.m.) that is plainly audible from the residential dwelling unit's property line.

K. Construction Equipment. The use or operation of any construction equipment between the hours of eight p.m. and seven a.m. (8:00 p.m. and 7:00 a.m.) and is sufficiently loud as to be plainly audible at the property line of the property from which the sound is emanating. (Ord. 1374 § 1, 2007)

Section 17.58.050 Noise Standards.

B. Noise Standards. The maximum sound level generated by any use or activity as measured at the point of measurement as defined in Section 17.58.030 (Points of Measurement) shall not exceed the levels established in Table 17.58.050-1 (Maximum Permissible Sound Pressure Levels) based on the use that is receiving the noise (e.g., residential use receiving noise generated by an industrial use).

TABLE 17.58.050-1 Maximum Permissible Sound Pressure Levels

Receiving Land Use Category	Time Period	Maximum Allowable Noise Levels (L_{dn}/CNEL[a], dB)
Single-Family and Limited Multiple-Family	10:00 p.m. – 7:00 a.m.	50
	7:00 a.m. – 10:00 p.m.	60
Multiple-Family, Public Institution, and Neighborhood Commercial	10:00 p.m. – 7:00 a.m.	55
	7:00 a.m. – 10:00 p.m.	60
Medium and Heavy Commercial	10:00 p.m. – 7:00 a.m.	60
	7:00 a.m. – 10:00 p.m.	65
Light Industrial	Anytime	70
Heavy Industrial	Anytime	75

[a] A day-night average noise level (L_{dn}) or community noise equivalent level (CNEL) are 24-hour averages, with 10 dBA penalties applied during nighttime hours and 5 dBA penalties applied to evening hours for the CNEL. Therefore, it is not possible to have different daytime and nighttime noise levels. For purposes of this assessment, it is conservatively assumed that the noise level thresholds in this table are intended to be in terms of hourly average noise levels (L_{eq}), consistent with many communities in the Bay Area and Central Valley.

C. Calculation. Exterior noise levels shall be measured with a sound level meter and associated octave band analyzer meeting the American National Standards Institute's standards S1.4-1971 for Type 1 or Type 2 sound level meters or an instrument and the associated recording and analyzing equipment that will provide equivalent data. When measuring the noise level, the corrections provided in Table 17.58.050-2 (Noise Level Corrections) shall be applied.

TABLE 17.58.050-2 Noise Level Corrections

Category	Correction (decibels)
Daytime operation only (7:00 a.m. – 7:00 p.m.)	+5
Noise source operates less than	
20% of any one-hour period	+5
5% of any one-hour period	+10
1% of any one-hour period	+15
Noise of impulsive character (e.g., hammering)	-5
Noise rising or falling in pitch or volume (e.g., hum, screech)	-5

D. Exempt Activities. The following are not subject to the noise limitations of this Chapter:

1.Emergency Exemption. The emission of sound for the purpose of alerting persons to the existence of an emergency, or the emission of sound in the performance of emergency work.

2.Warning Device. Warning devices necessary for the protection of public safety (e.g., police, fire and ambulance sirens, properly operating home and car burglar alarms, and train horns).

3. Railroad Activities. The operation of locomotives, rail cars, and facilities by a railroad that is regulated by the California Public Utilities Commission.

4. State or Federal Preempted Activities. Any activity, to the extent the regulation of it has been preempted by state or federal law.

5. Public health and safety activities, including, but not limited to: all transportation, flood control, and utility company maintenance and construction operation at any time on public rights-of-way, public property and those situations that may occur on private property deemed necessary to serve the best interest of the public and to protect the public's health and well-being, including debris and limb removal, removal of damaged poles and vehicles, removal of downed wires, repair of traffic signals, repair of water hydrants and mains, gas lines, oil lines, and sewers, restoration of electrical service, street sweeping, unplugging sewers, vacuuming catch basins, municipal well borehole drilling, municipal well casing installation. The regular testing of motorized equipment and pumps shall not be exempt.

6. Solid Waste Collection. Noise sources associated with the authorized collection of solid waste (e.g., refuse and garbage).

7. Maintenance of Residential Real Property. Noise sources associated with the minor maintenance of residential real property, provided the activities take place between the hours of 7:00 a.m. and 10:00 p.m.

8. Construction activities when conducted as part of an approved Building Permit, except as prohibited in subsection (E)(1) (Prohibited Activities) of this section.

9. Emergency Generators. Sound resulting from the operation of any stationary emergency generator in any zoning district shall be considered restoration of electrical service and are exempt from the sound rating values set forth in Table 17.58.050-1 (Maximum Permissible Sound Pressure Levels). This exemption only applies when operated during power outages; provided however, the generator motor must be enclosed in a sound absorbing encasement and in no event shall the sound rating value of generators in any district exceed 76 dBA at 23 feet or 7 meters. Stationary emergency generators operating in all districts may be operated for testing purposes one time for a period not to exceed thirty minutes in any seven-day period. Testing of stationary emergency generators in all districts is permitted between the hours of 11:00 a.m. through 8:00 p.m. Monday through Saturday.

a. For purposes of this subsection, stationary emergency generator means any stationary or nonportable internal combustion engine located at a facility or residential home/development that serves solely as a secondary source of mechanical or electrical power when the primary source is disrupted or discontinued during a period of emergency due to a situation beyond the control of the owner/operator of the facility or residential home/development. A stationary emergency generator shall operate only during emergency situations or for standard performance testing procedures as required by law or by the engine manufacturer. A stationary emergency generator that serves as an energy or power source in circumstances other than emergency situations or for standard testing, such as load shedding or peak shaving, shall not be considered a stationary emergency generator.

b. Emergency situation is defined as loss of primary power due to power outage, on site disaster, area-wide natural disaster, or circumstances beyond the control of the owner/operator. Emergency situation shall not include power interruptions pursuant to an interruptible power service agreement, engine testing or scheduled maintenance.

E. Prohibited Activities. The following acts shall be a violation of this Chapter:

1. Construction Noise. Operating or causing the operation of tools or equipment on private property used in alteration, construction, demolition, drilling, or repair work daily between the hours of 7:00 p.m. and 7:00 a.m., so that the sound creates a noise disturbance across a residential property line, except for emergency work of public service utilities.

2.Loading and Unloading Activities. Loading, unloading, opening, closing, or other handling of boxes, crates, containers, building materials, garbage cans, or similar objects on private property between the hours of 10:00 p.m. and 7:00 a.m. in a manner to cause a noise disturbance.

3.Sweepers and Associated Equipment. Operating or allowing the operation of sweepers or associated sweeping equipment (e.g., blowers) on private property between the hours of 10:00 p.m. and 7:00 a.m. the following day in, or adjacent to, a Residential Zoning District.

Existing Noise Environment

The project site is located at the southeast corner of the Airport Way/Wawona Street intersection in Manteca, California. Existing single-family residences are located approximately 45 feet to the east of the site, as well as to the north, opposite Wawona Street, and to the west, opposite Airport Way. Adjoining the project site to the south is the Mister Car Wash.

The existing noise environment at the site results primarily from operational noise from the adjacent carwash. Secondary sources include local vehicular traffic along the surrounding roadways. Aircraft associated with the Stockton Metropolitan Airport also contribute to the noise environment at the site and in surrounding areas.

A noise monitoring survey was performed to quantify ambient noise levels in the project vicinity beginning on Wednesday, March 4, 2020 and concluding on Friday, March 6, 2020. The monitoring survey included two long-term noise measurement (LT-1 and LT-2) and three short-term noise measurements (ST-1 through ST-3), as shown in Figure 1.

Long-term noise measurement LT-1 was made along the northern boundary of the project site, at a distance of approximately 25 feet from the centerline of Wawona Street and approximately 225 feet from the centerline of Airport Way. LT-1 was positioned on a light pole approximately 15 feet above the ground. Hourly average noise levels typically ranged from 62 to 68 dBA L_{eq} during the day and from 55 to 65 dBA L_{eq} at night. The day-night average noise level on Thursday, March 5, 2020 was 69 dBA L_{dn}. The daily trends in noise levels at LT-1 are shown in Figures 2 through 4.

LT-2 was made at the end of Gylen Lane, on the residential side of the noise barrier that separates the residences and the carwash. The noise barrier shielding the residences from the carwash is approximately 8 feet tall, and LT-2 was positioned above the wall, approximately 15 feet above the ground, on a light pole. Hourly average noise levels typically ranged from 54 to 64 dBA L_{eq} during the day and from 48 to 62 dBA L_{eq} at night. The day-night average noise level on Thursday, March 5, 2020 was 64 dBA L_{dn}. The daily trends in noise levels at LT-2 are shown in Figures 5 through 7.

The short-term noise measurements (ST-1 through ST-3) were made over 10-minute periods, concurrent with the long-term measurements, on Friday, March 6, 2020, between 7:40 a.m. and 8:30 a.m. All short-term measurement results are summarized in Table 4.

Short-term noise measurement ST-1 was made near LT-2. While LT-2 was made above the barrier and had direct line-of-sight to the carwash, ST-1 was made behind the wall to estimate the attenuated noise levels at the residences. Noisy vehicular traffic, which includes cars and heavy trucks, generated noise levels ranging from 50 to 59 dBA. Typical carwash operations

generated noise levels of 49 to 57 dBA, while the loudspeaker from the carwash reached noise levels up to 58 dBA at ST-1. Other noise sources, which were observed during this 10-minute measurement, include distant hammering (51 dBA) and a train whistle (52 dBA).

ST-2 was made along the property line of the residences east of the project site. ST-2 was set back from the centerline of Wawona Street by approximately 195 feet. Traffic noise from Wawona Street ranged from 52 to 57 dBA, while traffic noise from Airport Way ranged from 55 to 59 dBA. Operations from the carwash, including the loudspeaker, produced noise levels that ranged from 51 to 53 dBA.

ST-3 was made approximately 70 feet from the centerline along Airport Way. Traffic along Airport Way was the primary noise source, with noise levels typically ranging from 71 to 78 dBA for heavy trucks, from 65 to 77 dBA for cars, and from 71 to 73 dBA for buses. Carwash operations generated noise levels of about 52 dBA at ST-3.

FIGURE 1 Noise Measurement Locations

Source: Google Earth, 2020.

TABLE 4 Summary of Short-Term Noise Measurement Data

Noise Measurement Location	Date, Time	L_{max}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	$L_{eq(10\text{-}min)}$
ST-1: End of Gylen Lane	3/6/2020, 7:40-7:50	60	58	54	50	48	51
ST-2: Property line of residences to the east	3/6/2020, 8:00-8:10	60	58	56	55	53	55
ST-3: ~70 feet east of the centerline of Airport Way	3/6/2020, 8:20-8:30	79	76	73	67	56	69

FIGURE 2 Daily Trend in Noise Levels at LT-1, Wednesday, March 4, 2020

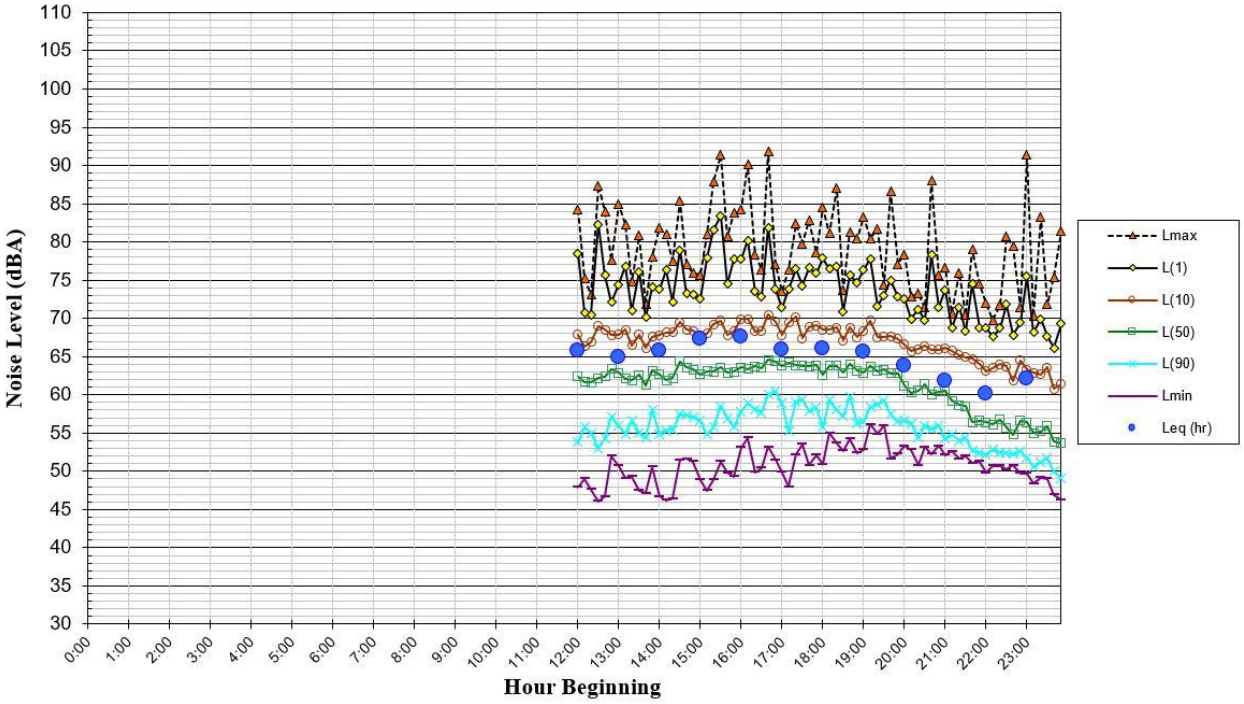


FIGURE 3 Daily Trend in Noise Levels at LT-1, Thursday, March 5, 2020

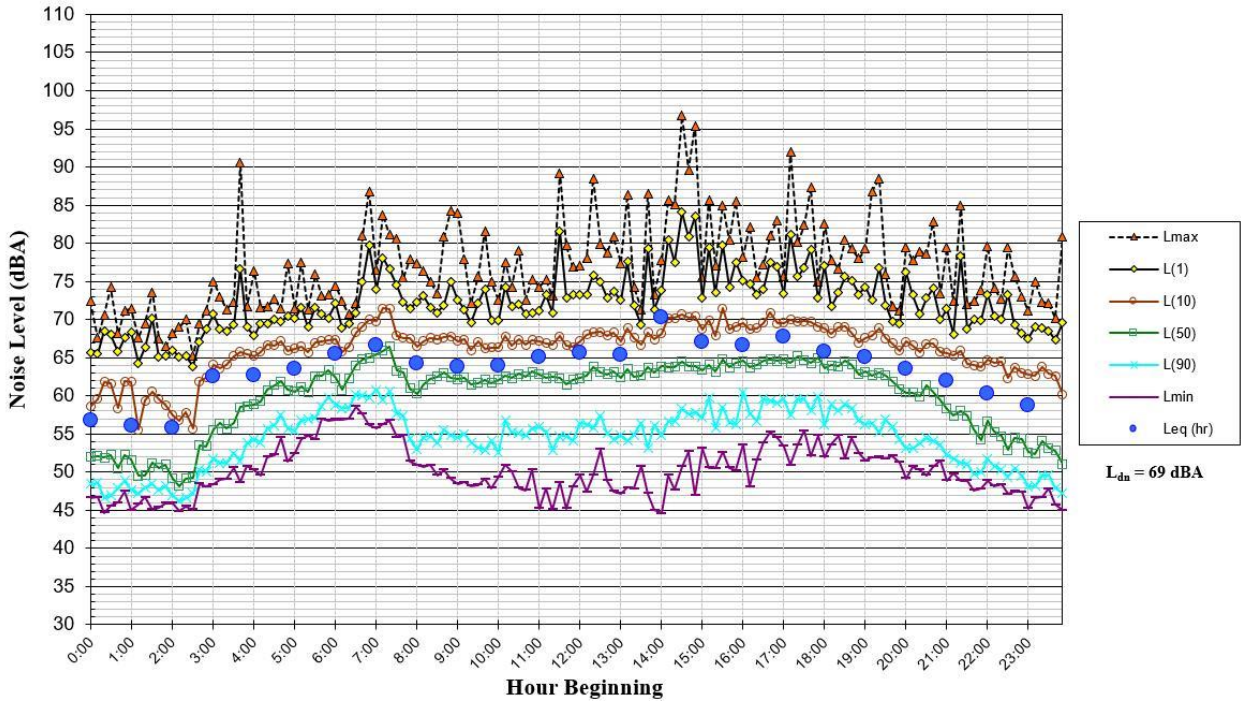


FIGURE 4 Daily Trend in Noise Levels at LT-1, Friday, March 6, 2020

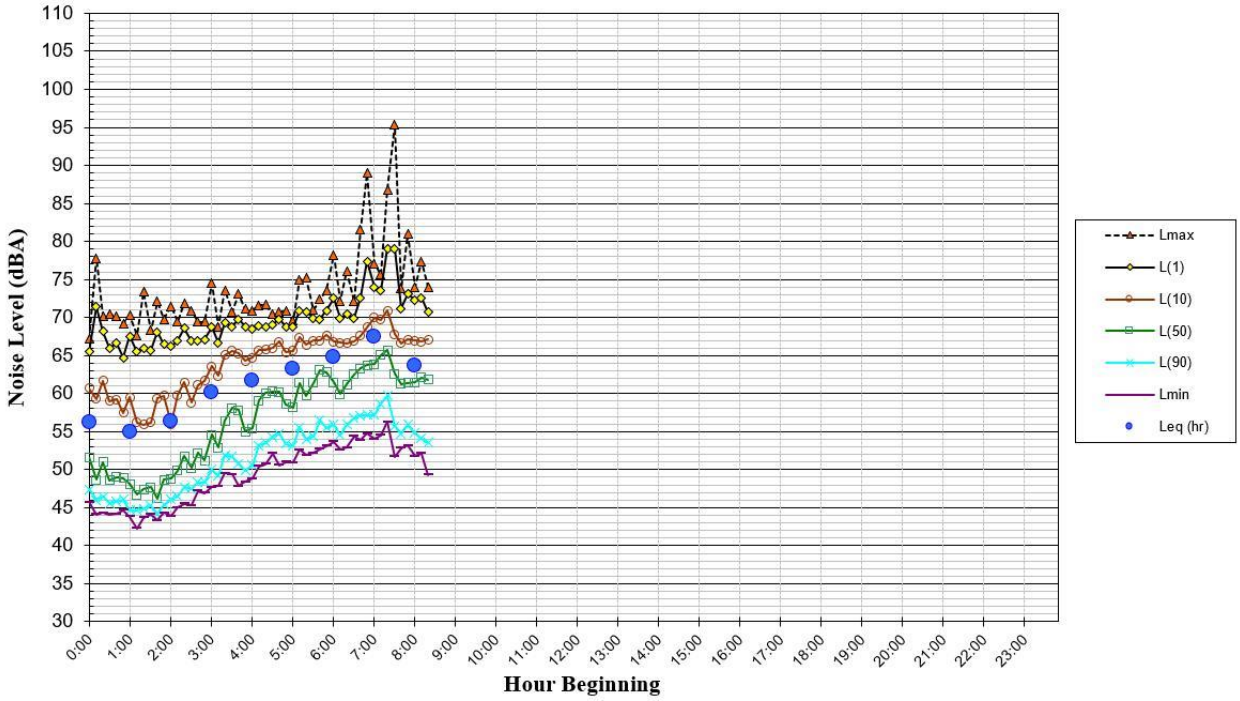


FIGURE 5 Daily Trend in Noise Levels at LT-2, Wednesday, March 4, 2020

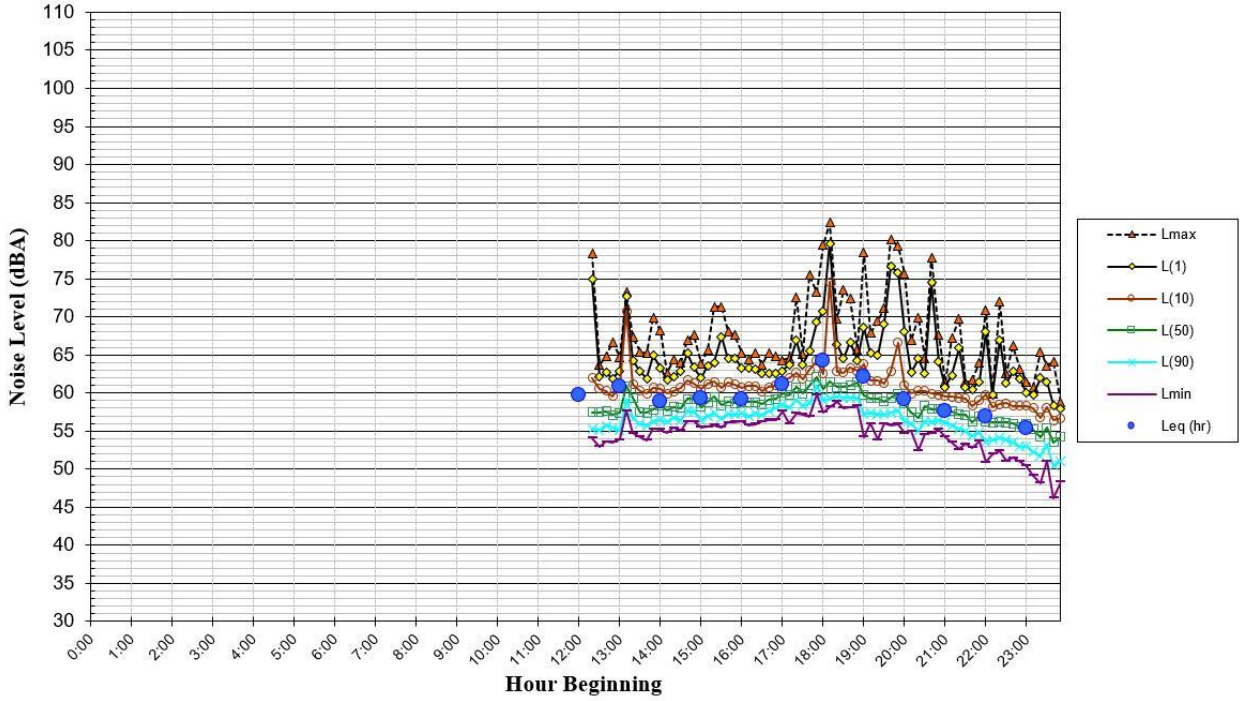


FIGURE 6 Daily Trend in Noise Levels at LT-2, Thursday, March 5, 2020

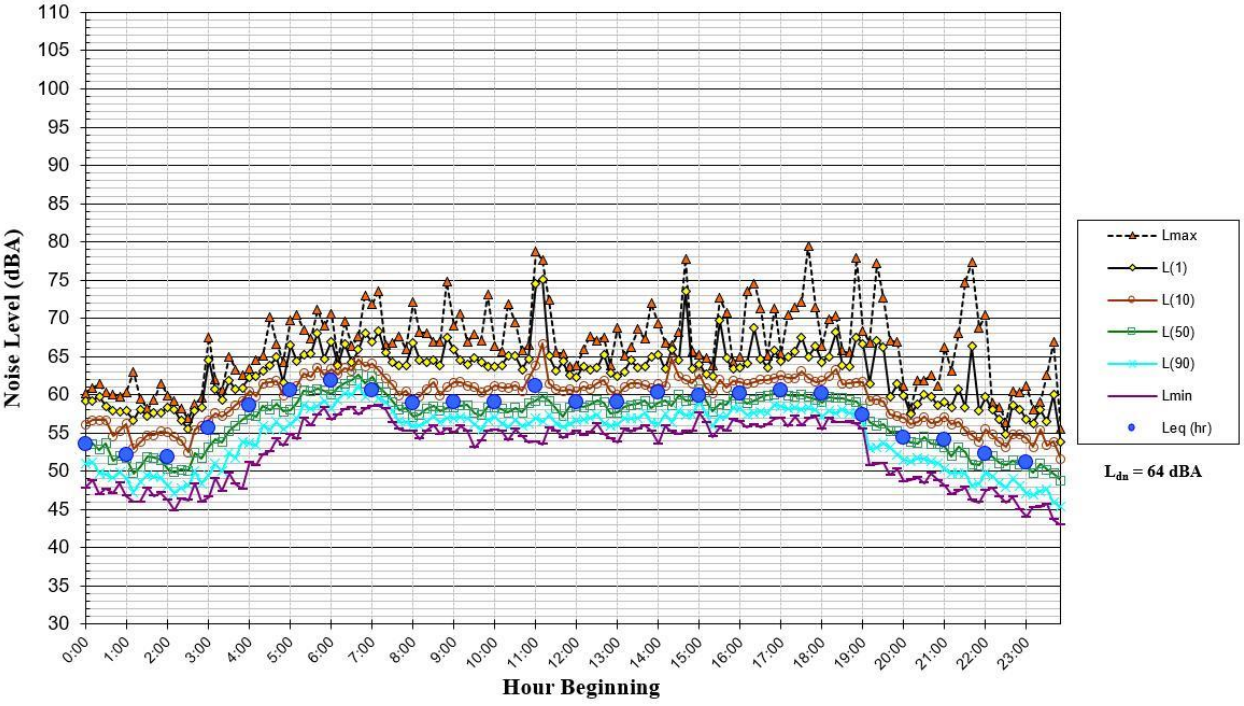
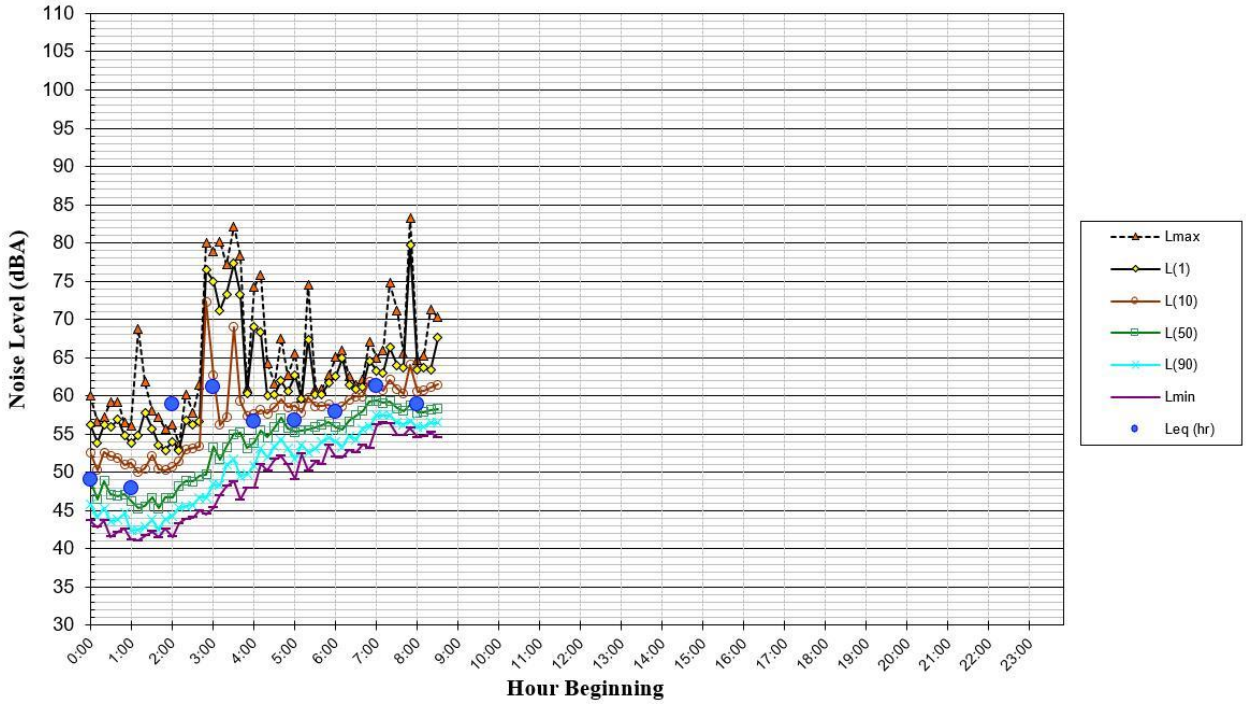


FIGURE 7 Daily Trend in Noise Levels at LT-2, Friday, March 6, 2020



NOISE IMPACTS AND MITIGATION MEASURES

This section describes the significance criteria used to evaluate project impacts under CEQA, provides a discussion of each project impact, and presents mitigation measures, where necessary, to reduce project impacts to less-than-significant levels.

Significance Criteria

The following criteria were used to evaluate the significance of environmental noise resulting from the project:

- A significant noise impact would be identified if the project would generate a substantial temporary or permanent noise level increase over ambient noise levels at existing noise-sensitive receptors surrounding the project site and that would exceed applicable noise standards presented in the General Plan or Municipal Code at existing noise-sensitive receptors surrounding the project site.

    - A temporary construction noise impact would occur if hourly average noise levels and maximum instantaneous noise levels due to construction activities exceed 50 dBA L_{eq} and 70 dBA L_{max}, respectively, during daytime hours between 7:00 a.m. and 10:00 p.m. at adjacent uses, according to Policy N-P-5 of the City's General Plan. Implementation N-I-3 states that a 5 to 10 dBA or more increase over ambient noise levels would be considered a significant CEQA impact. Due to the numerous noise-sensitive receptors surrounding the project site, a conservative

increase of 5 dBA would be considered significant for temporary project construction. Further, Section 17.58.050(E) of the Municipal Code limits construction activities to the hours between 7:00 a.m. and 7:00 p.m.

- A significant permanent noise level increase would occur if the project would result in a noise level increase of 5 dBA L_{dn} or greater, according to Implementation N-I-3 of the City of Manteca General Plan.

- A significant noise impact would be identified if the project would expose persons to or generate noise levels that would exceed applicable noise standards presented in the General Plan or Municipal Code.

- A significant impact would be identified if the construction of the project would generate excessive vibration levels surrounding receptors. Groundborne vibration levels exceeding 0.08 in/sec PPV would have the potential to result in cosmetic damage to historic buildings, and groundborne vibration levels exceeding 0.25 in/sec PPV would have the potential to result in cosmetic damage to normal buildings.

- A significant noise impact would be identified if the project would expose people residing or working in the project area to excessive aircraft noise levels.

Impact 1a: **Temporary Construction Noise.** Existing noise-sensitive land uses would be exposed to a temporary increase in ambient noise levels due to project construction activities. The incorporation of construction best management practices as project conditions of approval would result in a **less-than-significant** temporary noise impact.

Noise impacts resulting from construction depend upon 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 areas. Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (e.g., early morning, evening, or nighttime hours), the construction occurs in areas immediately adjoining noise-sensitive land uses, or when construction lasts over extended periods of time.

Policy N-P-5 of the City's General Plan limits hourly average noise levels and maximum instantaneous noise levels due to construction activities to 50 dBA L_{eq} and 70 dBA L_{max}, respectively, during daytime hours between 7:00 a.m. and 10:00 p.m. Additionally, Implementation N-I-3 states that a 5 to 10 dBA or more increase over ambient noise levels would be considered a significant CEQA impact. Due to the numerous noise-sensitive receptors surrounding the project site, a conservative increase of 5 dBA would be considered significant for temporary project construction. Further, Section 17.58.050(E) of the City's Municipal Code limits allowable construction hours to between 7:00 a.m. and 7:00 p.m.

The ambient noise environment at the residences south of the project site and carwash would be represented by ST-1 and LT-2, which range from 51 to 64 dBA L_{eq} during daytime hours. Residences east of the project site would be represented by ST-2, with a daytime noise level of

55 dBA L_{eq}. Residences located to the north of the project site, along Wawona Street, would be represented by LT-1, which range from 62 to 70 dBA L_{eq} during daytime hours. Residences and commercial uses located along Airport Way would be represented by ST-3, which was 69 dBA dBA L_{eq} during daytime hours.

The typical range of maximum instantaneous noise levels for the proposed project, based on the equipment list provided, would be 70 to 90 dBA L_{max} at a distance of 50 feet (see Table 5). Table 6 shows the hourly average noise level ranges, by construction phase, for various types of construction projects. Hourly average noise levels generated by construction are about 71 to 89 dBA L_{eq} for service and gas stations, measured at a distance of 50 feet from the center of a busy construction site. Construction-generated noise levels drop off at a rate of about 6 dBA per doubling of the distance between the source and receptor. Shielding by buildings or terrain often result in lower construction noise levels at distant receptors.

Table 7 summarizes the equipment expected to be used during each phase of construction and the duration for each phase. For each phase, the equipment shown in Table 7 was used as inputs into the Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM) to predict the combined average noise level. To model worst-case conditions, it was assumed that all equipment per phase would be operating simultaneously. For construction noise, the use of multiple pieces of equipment simultaneously would add together as a collective noise source. While every piece of equipment per phase would likely be scattered throughout the site, the noise-sensitive receptors surrounding the site would be subject to the collective noise source generated by all equipment operating at once. Therefore, to assess construction noise impacts at the receiving property lines of noise-sensitive receptors, the collective worst-case hourly average noise level for each phase was centered at the geometrical center of the site and propagated to the nearest property line of the surrounding land uses. These noise level estimates are also shown in Table 7. These levels do not assume reductions due to intervening buildings or existing barriers.

The highest noise levels would be generated during the grading and paving phases; however, these phases are only expected to last for up to 10 days. Total project construction would last for just under one year. Construction-generated noise levels drop off at a rate of about 6 dBA per doubling of the distance between the source and receptor. Shielding by buildings or terrain can provide an additional 5 to 10 dBA noise reduction at distant receptors.

TABLE 5 Construction Equipment 50-Foot Noise Emission Limits

Equipment Category	L_{max} Level (dBA)[1,2]	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[3]	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
Grinder Saw	85	Continuous
Horizontal Boring Hydro Jack	80	Continuous
Hydra Break Ram	90	Impact
Impact Pile Driver	105	Impact
Insitu Soil Sampling Rig	84	Continuous
Jackhammer	85	Impact
Mounted Impact Hammer (hoe ram)	90	Impact
Paver	85	Continuous
Pneumatic Tools	85	Continuous
Pumps	77	Continuous
Rock Drill	85	Continuous
Scraper	85	Continuous
Slurry Trenching Machine	82	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 HP	85	Continuous

Notes:

[1] Measured at 50 feet from the construction equipment, with a "slow" (1 sec.) time constant.

[2] Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.

[3] Portable Air Compressor rated at 75 cfm or greater and that operates at greater than 50 psi.

TABLE 6 Typical Ranges of Construction Noise Levels at 50 Feet, L_{eq} (dBA)

	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

I - All pertinent equipment present at site.
II - Minimum required equipment present at site.

Source: U.S.E.P.A., Legal Compilation on Noise, Vol. 1, p. 2-104, 1973.

TABLE 7 Estimated Construction Noise Levels at Nearby Land Uses

Phase of Construction	Time Duration	Construction Equipment (Quantity)	Calculated Hourly Average Noise Levels, L_{eq} (dBA)				
			East Res. (270ft)	South Carwash (175ft)	South Res. (325ft)	West Res. (200ft)	North Res. (245ft)
Site Preparation	1/1/2021-1/5/2021	Grader (1) Scraper (1) Tractor/Loader/Backhoe (2)	70 dBA	74 dBA	69 dBA	73 dBA	71 dBA
Grading/Excavation	1/6/2021-1/13/2021	Grader (1) Rubber-Tired Dozer (1) Tractor/Loader/Backhoe (2)	71 dBA	75 dBA	70 dBA	74 dBA	72 dBA
Trenching	1/14/2021-2/10/2021	Excavator (1) Tractor/Loader/Backhoe (1)	67 dBA	71 dBA	65 dBA	70 dBA	68 dBA
Building Exterior	1/14/2021-11/17/2021	Crane (1) Forklift (2) Tractor/Loader/Backhoe (1) Welder (3)	67-70 dBA[a]	71-74 dBA[a]	66-69 dBA[a]	70-73 dBA[a]	68-71 dBA[a]
Paving	11/18/2021-12/1/2021	Paving Equipment (1) Cement and Mortar Mixer (1) Paver (1) Roller (2) Tractor/Loader/Backhoe (1)	71 dBA	75 dBA	70 dBA	74 dBA	72 dBA
Building Interior/Architectural Coating	12/2/2021-12/15/2021	Air Compressor (1)	59 dBA	63 dBA	57 dBA	62 dBA	60 dBA

[a] Range of hourly average noise levels reflects the equipment in the Building Exterior phase only and when overlapped with the Trenching phase.

As shown in Table 7, the City's hourly average threshold of 50 dBA L_{eq} and maximum instantaneous threshold of 70 dBA L_{max} would be exceeded at the surrounding land uses during daytime hours at various times throughout project construction. Additionally, ambient noise levels at the surrounding uses would potentially be exceeded by 5 dBA L_{eq} or more at various times throughout construction. This would be a significant temporary noise impact.

Mitigation Measure 1a:

Reasonable regulation of the hours of construction, as well as regulation of the arrival and operation of heavy equipment and the delivery of construction material, are necessary to protect the health and safety of persons, promote the general welfare of the community, and maintain the quality of life. Construction activities will be conducted in accordance with the provisions of the City's Municipal Code, which limits temporary construction work to between 7:00 a.m. and 7:00 p.m.

Prior to the issuance of any grading permits, the project proponent shall submit and implement a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting and notification of construction schedules, equipment to be used, and designation of a noise disturbance coordinator. The noise disturbance coordinator shall respond to neighborhood complaints and shall be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses. The noise logistic plan shall be submitted to the Community Development Department Director or Director's designee of the Director of the Community Development Department prior to the issuance of any grading permits.

As a part of the construction noise logistic plan and project, construction activities for the proposed project shall include, but is not limited to, the following construction best management practices:

- Utilize the best available noise suppression devices and techniques during construction activities.

- Construction activities shall be limited to the hours between 7:00 a.m. and 7:00 p.m., unless permission is granted with a development permit or other planning approval. Avoid construction activities on weekends and holidays, where feasible.

- 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.

- Locate material stockpiles, as well as maintenance/equipment staging and parking areas, as far as feasible from residential receptors.

- Control noise from construction workers' radios to a point where they are not audible at existing residences bordering the project 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.

- 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, etc.) 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.

With the implementation of the applicable General Plan policies, Municipal Code requirements, and the above measures, the temporary construction noise impact would be reduced to a less-than-significant level.

Impact 1b: **Permanent Noise Level Increase.** The proposed project is not expected to cause a substantial permanent traffic noise level increase at the existing residential land uses in the project vicinity. **This is a less-than-significant impact.**

According to Implementation N-I-3 of the City's General Plan, a significant permanent noise increase would occur if the project would increase noise levels at noise-sensitive receptors by 5 dBA L_{dn} or more. For reference, a 5 dBA L_{dn} noise increase would be expected if the project would triple existing traffic volumes along a roadway.

The traffic study included peak hour turning movements for the existing traffic volumes and existing plus project traffic volumes at five intersections in the vicinity of the project site. By comparing the existing plus project traffic scenario to the existing scenario, the project's contribution to the overall noise level increase was determined to be less than 1 dBA L_{dn} along each roadway segment in the project vicinity. Therefore, the project would not result in a permanent noise increase of 5 dBA L_{dn} or more at noise-sensitive receptors in the project vicinity. This is a less-than-significant impact.

Mitigation Measure 1b: **None required.**

Impact 1c: **Noise Levels in Excess of Standards.** The proposed project would potentially generate noise levels in excess of standards established in the City's General Plan and Municipal Code at the nearby residential receptors. With an evaluation of the selected of mechanical equipment and/or the noise control features to reduce noise levels from stationary sources as project conditions of approval, the City's thresholds shall be met, reducing this to a **less-than-significant** impact.

Policy N-P-4 of the City's General Plan establishes the noise level requirements of Table 9-2 as thresholds for stationary noise sources. Table 9-2 limits hourly average noise levels to 50 dBA L_{eq} between the hours of 7:00 a.m. and 10:00 p.m. and to 45 dBA L_{eq} between the hours of 10:00 p.m. and 7:00 a.m. Further, maximum instantaneous noise levels shall not exceed 70 dBA L_{max} between the hours of 7:00 a.m. and 10:00 p.m. and 65 dBA L_{max} between the hours of 10:00 p.m. and 7:00 a.m. These thresholds shall be enforced on the property lines of the adjacent receiving uses. Further, Table 17.58.050-1 of the City's Municipal Code limits hourly average noise levels to 60 dBA L_{eq} between the hours of 7:00 a.m. and 10:00 p.m. and to 50 dBA L_{eq} between the hours of 10:00 p.m. and 7:00 a.m. at single-family residential land uses. At commercial uses, such as the carwash, noise levels are limited to 65 dBA L_{eq} between the hours of 7:00 a.m. and 10:00 p.m. and to 60 dBA L_{eq} between the hours of 10:00 p.m. and 7:00 a.m. Table 17.58.050-2 of the Municipal Code provides noise level corrections for Table 17.58.050-1, which include adding 15 dB to the Municipal Code thresholds for noises occurring for less than 1% of any one-hour, adding 10 dB for sources occurring less than 5% of any one-hour, and adding 5 dB for source occurring less than 20% of any hour.

Mechanical Equipment

The proposed project would include a 4,800 square-foot convenience store. Eight gas canopies associated with the convenience store will feature 16 standard fuel pumps and four diesel pumps. Each fuel island would be covered by a fuel canopy. The fuel will be stored in four underground storage tanks, located on the southerly portion of the project site. The fueling stations and convenience store will be open 24 hours a day, with a maximum of three on-site employees at all times.

Mechanical equipment, such as heating, ventilation and air conditioning (HVAC) units are expected to be located at the convenience store; however, the number of units, specifications, and location of these units are not available at this time. For the purpose of this study, it is assumed that all HVAC equipment would be located on the roof of the convenience store. Typical HVAC equipment for a convenience store typically generates noise levels in the range of 50 to 60 dBA at a distance of 50 feet from the equipment. Assuming worst-case conditions, no screening or other shielding is taken into account in this analysis.

It is assumed that the HVAC units would be set back at least five feet from the edge of the convenience store roof. For all the immediate receptors surrounding the site, the rooftop equipment noise was propagated to the property line of the surrounding land uses. The estimated noise levels are summarized in Table 8. Typically, HVAC units cycle on and off throughout a 24-hour period. Therefore, the estimated noise levels in Table 8 would represent hourly average noise attributable to mechanical equipment during daytime and nighttime hours. From the results in Table 8, the

City's General Plan threshold of 50 dBA L_{eq} during daytime hours would potentially be exceeded at the residences to the north and to the west, while the nighttime threshold of 45 dBA L_{eq} would potentially be exceeded at the residences to the east, to the north, and to the west, as well as at the carwash to the south. Further, the nighttime threshold of 50 dBA L_{eq} established in the Municipal Code would be exceeded at the north residence and the west residence.

TABLE 8 Estimated Stationary Equipment Noise Levels for HVAC Units on the Rooftop of the Convenience Store

Receptor	Distance to Receiving Property Line	Estimated Noise Levels
East Residence	250 feet	36 to 46 dBA
North Residence	100 feet	44 to 54 dBA
South Residence	395 feet	32 to 42 dBA
West Residence	150 feet	41 to 51 dBA
South Carwash	255 feet	36 to 46 dBA

While the mechanical equipment noise associated with the gas station would potentially exceed the City's thresholds established in the General Plan and Municipal Code at surrounding noise-sensitive receptors, the estimated mechanical equipment noise would fall within the range of ambient noise levels at these receptors. This would be a potentially significant impact.

Parking Lot and Gas Station Activities

According to the site plan, 21 parking spaces are proposed as part of the project. Six of the 21 parking spaces would be located to the east of the convenience store, facing the existing residences. The remaining spaces would be to the south of the convenience store. Additionally, 16 standard fuel pumps and four diesel pumps would also include similar noise sources as parking spaces, which would include vehicular circulation, louder engines, car alarms, door slams, and human voices. These sources typically generate noise levels ranging from 53 to 63 dBA L_{max} at a distance of 50 feet.

These are isolated, maximum instantaneous noise sources, which would be compared to the General Plan's 70 dBA L_{max} daytime and 65 dBA L_{max} nighttime thresholds, as well as the Municipal Code thresholds for noises occurring less than 5% of any one-hour, which would be 70 dBA during the daytime and 60 dBA at night at single-family residences and 75 dBA during the daytime and 70 dBA at night at commercial uses. Assuming worst-case conditions, the nearest parking space or fueling station to each surrounding land use was used as the noise source, and noise levels were propagated to the nearest property lines. Table 9 summarizes the results. Note, an existing eight-foot sound wall would provide shielding for the residences to the south, and an existing six- to eight-foot wall would provide shielding for the residences to the east. Additionally, a proposed six-foot concrete masonry unit (CMU) wall is shown in the site plan along the eastern boundary of the project site. A conservative 5 dBA reduction was applied to the noise levels in Table 9 to account for partial shielding.

TABLE 9 Estimated Parking Lot and Gas Station Activity Noise Levels

Receptor	Distance to Receiving Property Line	Estimated Noise Levels
East Residence	195 feet	36 to 46 dBA[a]
North Residence	105 feet	47 to 57 dBA
South Residence	195 feet	36 to 46 dBA[a]
West Residence	110 feet	46 to 56 dBA
South Carwash	20 feet	61 to 71 dBA

[a] Includes a conservative 5 dBA reduction for existing or proposed sound walls.

The maximum instantaneous noise levels due to parking lot and gas station activities would be below the City's General Plan and Municipal Code standards during daytime and nighttime hours at all nearby residential land uses. The General Plan thresholds for daytime and nighttime and Municipal Code threshold for nighttime would potentially be exceeded at the adjacent carwash. However, this would not be considered a noise-sensitive receptor. In fact, carwash facilities are considered noise-generating sources. Compared to the noise generated at the carwash, the proposed gas station would not be considered a substantial noise source. This would be a less-than-significant impact.

Truck Deliveries

Gas stations would also require heavy truck deliveries for fuel deposits. The proposed project estimates approximately 13,000 gallons of fuel, which includes diesel fuel, to be sold daily. The typical fuel truck carries about 9,000 gallons, which would result in about 1.5 truck deliveries per day. Therefore, on the worst day, two fuel truck deliveries would be assumed. Additionally, smaller vender truck deliveries would occur at the convenience store. For purposes of this analysis, two heavy fuel truck deliveries and one vender truck delivery is assumed in one day. This would represent the worst-case scenario.

The fuel tanks would be located underground along the southern portion of the project site. It is assumed that these trucks would access the site from Airport Way, park at the southern portion of the site, and dispense the fuel into tanks. While a loading zone for the vender trucks is not shown on the site plan, the most likely location for a loading zone would be in the parking spaces to the west of the convenience store. Depositing the fuel into the tanks would not generate measurable noise levels; however, noise due to low speed truck maneuvering results from a combination of engine, exhaust, and tire noise, as well as the intermittent sounds of back-up alarms and releases of compressed air associated with truck/trailer air brakes. For the heavy fuel trucks, maximum instantaneous noise levels would typically range from 70 to 75 dBA L_{max} at a distance of 50 feet. Smaller vender trucks typically generate maximum noise levels of 60 to 65 dBA L_{max} at the same distance. While the length of time to dispense the fuel in the tanks or unload supplies could take as long as one hour or so, typically, delivery trucks are stationary during this time with the engine off. The total time when these maximum noise levels would occur would typically be for less than 3 minutes in any one hour.

Section 17.58.050(E) of the City's Municipal Code prohibits loading and unloading activities during nighttime hours between 10:00 p.m. and 7:00 a.m. It is assumed that the proposed project would include daytime deliveries only and would, therefore, only be compared to the City's

daytime noise thresholds. In addition to the General Plan maximum daytime threshold of 70 dBA L_{max}, the delivery trucks would need to meet the Municipal Code daytime thresholds for events occurring less than 5% in any hour, which would be 70 dBA at single-family residences and 75 dBA at for commercial uses.

Table 10 summarizes the noise levels generated by truck deliveries, as estimated at the property of the receiving land uses surrounding the site. As shown in the table, for the fuel truck deliveries, a conservative 5 dBA reduction was assumed for the residences to the east, to the south, and to the north. Existing and proposed sound walls, as well as the intervening convenience store building, would provide at least 5 dBA of shielding. For the vender truck deliveries, the north residences would have a direct line-of-sight, while the eastern, southern, and western residences would receive at least 5 dBA reduction. The assumed reductions are applied to the estimated noise levels in Table 10.

TABLE 10 Estimated Truck Delivery Noise Levels

Receptor	Fuel Truck Deliveries		Vender Truck Deliveries	
	Distance to Receiving Property Line	Estimated Noise Levels	Distance to Receiving Property Line	Estimated Noise Levels
East Residence	315 feet	49 to 54 dBA[a]	180 feet	44 to 49 dBA[a]
North Residence	385 feet	47 to 52 dBA[a]	130 feet	52 to 57 dBA
South Residence	260 feet	51 to 56 dBA[a]	410 feet	37 to 42 dBA[a]
West Residence	175 feet	59 to 64 dBA	300 feet	39 to 44 dBA[a]
South Carwash	20 feet	78 to 83 dBA	280 feet	45 to 50 dBA

[a] Includes a conservative 5 dBA reduction for existing or proposed sound walls and intervening buildings.

Truck deliveries would not exceed the General Plan or Municipal Code daytime thresholds at the nearest residential land uses; however, both General Plan and Municipal Code daytime thresholds would be exceeded at the adjacent carwash during deliveries of fuel. However, as stated above, the carwash would be considered a noise-generating land use, and noise due to heavy truck deliveries would not exceed noise generated by carwash operations. This would be a less-than-significant impact.

Mitigation Measure 1c:

Mechanical equipment should be carefully selected in order to keep the effective noise level due to mechanical equipment below 50 dBA L_{eq} during daytime hours and below 45 dBA L_{eq} at night. A detailed acoustical study shall be prepared during building design to evaluate the potential noise generated by building mechanical equipment and to identify the necessary noise controls that shall be included in the design to meet the 50 dBA L_{eq} daytime noise limit and 45 dBA L_{eq} nighttime noise limits at the property lines of adjacent noise-sensitive uses. The study shall evaluate the noise from the equipment and predict noise levels at noise-sensitive locations. Noise control features, such as sound attenuators, baffles, and barriers shall be identified and evaluated to demonstrate that mechanical equipment noise would not exceed the appropriate noise limits at nearby residences.

Impact 2: **Exposure to Excessive Groundborne Vibration.** Construction-related vibration levels are not expected to exceed applicable vibration thresholds at nearby sensitive land uses. **This is a less-than-significant impact.**

The construction of the project may generate perceptible vibration when heavy equipment or impact tools (e.g. jackhammers, hoe rams) are used. Construction activities would include site preparation work, foundation work, paving, and new building framing and finishing. The proposed project would not require pile driving, which can cause excessive vibration.

The California Department of Transportation recommends a vibration limit of 0.5 in/sec PPV for buildings structurally sound and designed to modern engineering standards, which typically consist of buildings constructed since the 1990s. Conservative vibration limits of 0.25 to 0.3 in/sec PPV has been used for buildings that are found to be structurally sound but where structural damage is a major concern (see Table 3 above for further explanation). For historical buildings or buildings that are documented to be structurally weakened, a cautious limit of 0.08 in/sec PPV is often used to provide the highest level of protection. No historical buildings or buildings that are documented to be structurally weakened adjoin the project site. For the purposes of this study, groundborne vibration levels exceeding the conservative 0.25 in/sec PPV limit at the existing adjacent residences would have the potential to result in a significant vibration impact.

Table 11 presents typical vibration levels that could be expected from construction equipment at a distance of 25 feet. Project construction activities, such as drilling, the use of jackhammers, rock drills and other high-power or vibratory tools, and rolling stock equipment (tracked vehicles, compactors, etc.), may generate substantial vibration in the immediate vicinity. Vibration levels would vary depending on soil conditions, construction methods, and equipment used.

Vibration levels are highest close to the source, and then attenuate with increasing distance at the rate $(D_{ref}/D)^{1.1}$, where D is the distance from the source in feet and D_{ref} is the reference distance of 25 feet. Using this equation, Table 11 also summarizes the vibration levels estimated at the nearest nonhistorical buildings immediately surrounding the site. While construction noise sources increase based on all equipment operating simultaneously, construction vibration would be dependent on the location of individual pieces of equipment. That is, equipment scattered throughout the site would not generate a collective vibration source level, but an individual piece of construction equipment which generates excessive vibration levels, such as a vibratory roller, operating near the project site boundary would generate the worst-case vibration levels for the receptor sharing that property line. Further, construction vibration impacts are assessed based on damage to buildings on receiving land uses, not receptors at the nearest property lines. Therefore, the distances used to propagate construction vibration levels (as shown in Table 11), which are different than the distances used to propagate construction noise levels (as shown in Table 7), were estimated under the assumption that each piece of equipment was operating along the nearest boundary of the project site, which would represent the worst-case scenario.

All surrounding buildings would be located 50 feet or more from the nearest boundary of the project site and would be exposed to vibration levels below 0.1 in/sec PPV. Vibration levels due

to project construction is not expected to exceed 0.25 in/sec PPV at any surrounding building. This is a less-than-significant impact.

Mitigation Measure 2: **None required.**

Impact 3 **Excessive Aircraft Noise.** The project site is located more than 6 miles from the Stockton Metropolitan Airport and would be considered normally acceptable under the San Joaquin County ALUC noise compatibility policies. This is a **less-than-significant** impact.

Stockton Metropolitan Airport is a joint civil-military airport located approximately 6.7 miles north of the project site. According to the Airport Land Use Compatibility Plan Update for Stockton Metropolitan Airport plan published in May 2016 and amended in February 2018,[1] the project site lies well outside the 60 dBA CNEL noise contour in the years 2028 and 2038 (Figure 8). Noise generated by aircraft operations associated with this airport would be compatible with the proposed project.

Other nearby airports include the New Jerusalem Airport, which is about 7.7 miles southwest of the project site, and Tracy Municipal Airport, which is over 12 miles southwest of the project site. Due to the distances from the project site, noise generated by aircraft operations associated with these airports would be compatible with the proposed project. This would be a less-than-significant impact.

Mitigation Measure 3: **None required.**

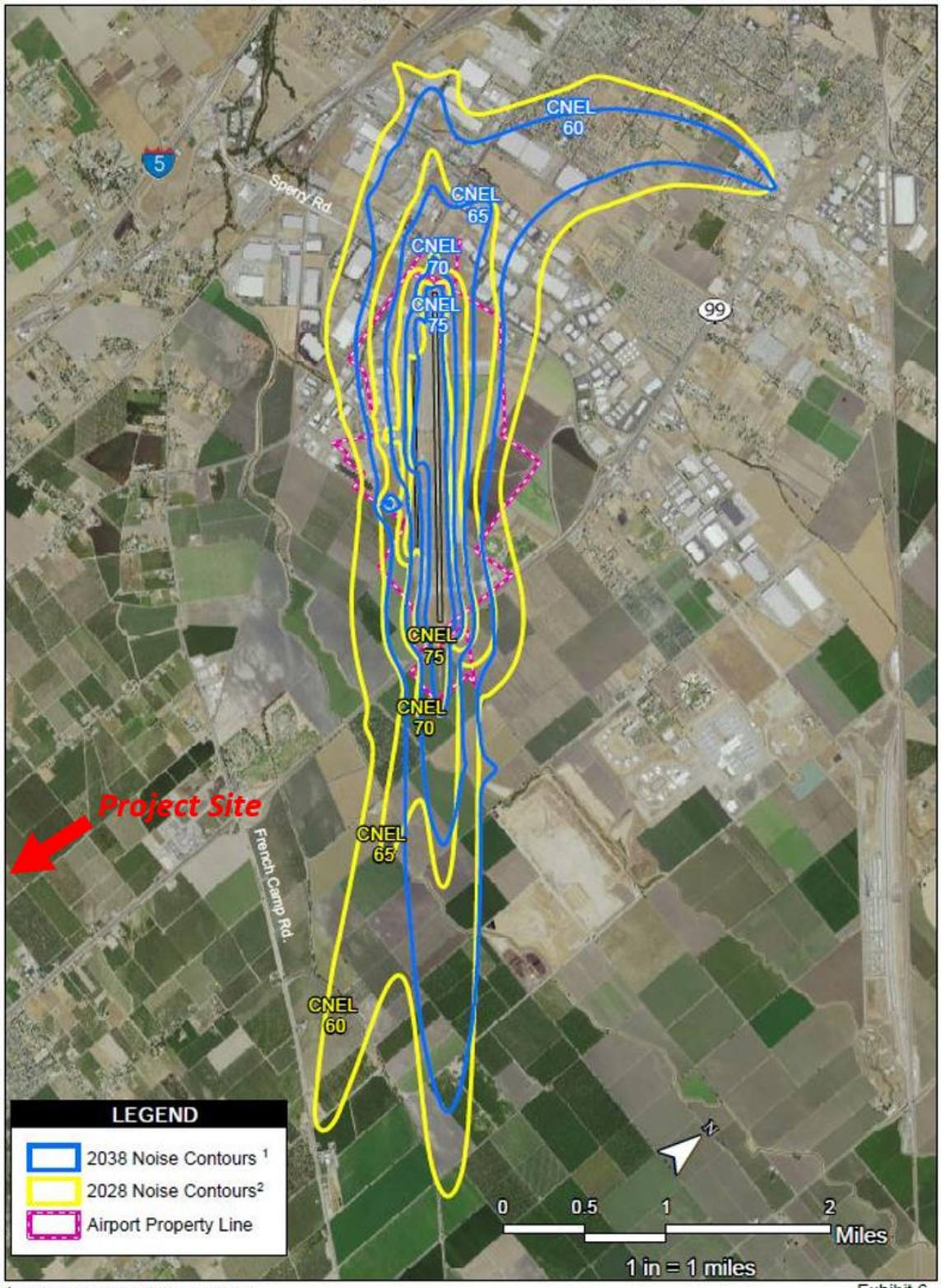
1 Coffman Associates, Inc., "Airport Land Use Compatibility Plan Update for Stockton Metropolitan Airport," May 2016 and amended February 2018.

TABLE 11 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft. (in/sec)	PPV at Receiving Structures (in/sec)				
			East Res. (165ft)	North Res. (105ft)	South Res. (155ft)	West Res. (365ft)	South Carwash (50ft)
Clam shovel drop		0.202	0.025	0.042	0.027	0.011	0.094
Hydromill	0.008	0.008	0.001	0.002	0.001	0.0004	0.004
(slurry wall)	0.017	0.017	0.002	0.004	0.002	0.001	0.008
Vibratory Roller		0.210	0.026	0.043	0.028	0.011	0.098
Hoe Ram		0.089	0.011	0.018	0.012	0.005	0.042
Large bulldozer		0.089	0.011	0.018	0.012	0.005	0.042
Caisson drilling		0.089	0.011	0.018	0.012	0.005	0.042
Loaded trucks		0.076	0.010	0.016	0.010	0.004	0.035
Jackhammer		0.035	0.004	0.007	0.005	0.002	0.016
Small bulldozer		0.003	0.0004	0.001	0.0004	0.0002	0.001

Source: Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, Office of Planning and Environment, U.S. Department of Transportation, September 2018, as modified by Illingworth & Rodkin, Inc., March 2020.

FIGURE 8 65 CNEL Noise Contour for SCK (2038) Relative to Site



[1] Coffman Associates Analysis
[2] 2010 Stockton Metropolitan Airport Master Plan

Exhibit 6
Stockton Metropolitan Airport
NOISE CONTOUR COMPARISON

Cumulative Impacts

Cumulative noise impacts would include either cumulative traffic noise increases under future conditions and temporary construction noise from cumulative construction projects.

A significant cumulative traffic noise increase would occur if two criteria are met: 1) if the cumulative traffic noise level increase was 5 dBA L_{dn} or greater for future noise levels; and 2) if the project would make a "cumulatively considerable" contribution to the overall traffic noise increase. A "cumulatively considerable" contribution would be defined as an increase of 1 dBA L_{dn} or more attributable solely to the proposed project.

To determine the cumulative traffic noise impact due to the proposed project, the cumulative (no project) and cumulative plus project traffic conditions were compared to the existing traffic conditions. A traffic noise increase of 5 dBA L_{dn} or more was not calculated along any roadway segments in the project vicinity. Further, the noise level increases calculated under both cumulative scenarios (no project and plus project conditions) were the same. Neither condition of the cumulative traffic noise impact would be met. This would be a less-than-significant impact.

There are no known approved projects in the vicinity of the project site that would be constructed during the same timeframe as the proposed project. Therefore, the noise-sensitive receptors surrounding the project site would not be subject to cumulative construction impacts.