Acoustical Assessment
Auburn Boulevard Fueling Station
Sacramento County, California

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LIST OF ABBREVIATED TERMS

ADT	average daily traffic
dBA	A-weighted sound level
CEQA	California Environmental Quality Act
CNEL	community equivalent noise level
L_{dn}	day-night noise level
dB	decibel
L_{eq}	equivalent noise level
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HVAC	heating ventilation and air conditioning
Hz	hertz
in/sec	inches per second
L_{max}	maximum noise level
µPa	micropascals
L_{min}	minimum noise level
PPV	peak particle velocity
RMS	root mean square
SMF	Sacramento International Airport
VdB	vibration velocity level

1 INTRODUCTION

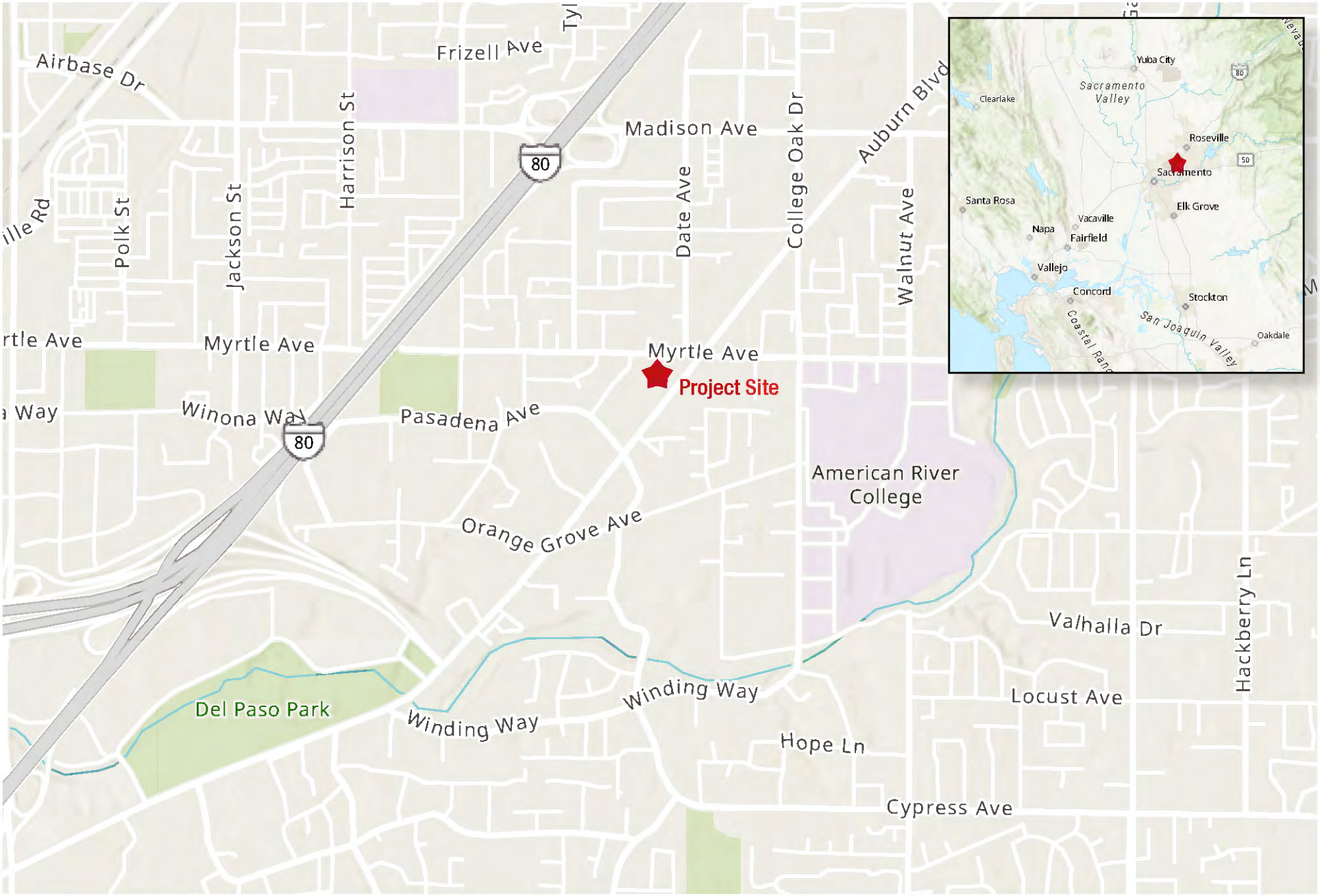
This report documents the results of an Acoustical Assessment completed for the Auburn Boulevard Fueling Station project (project). The purpose of this Acoustical Assessment is to evaluate the potential construction and operational noise and vibration levels associated with the project and determine the level of impact the project would have on the environment.

1.1 Project Location

The project is located east of the City of Sacramento, in Sacramento County. The project site (Assessor Parcel Number [APN] 240-0061-001 & 002) is located at the southwestern corner of Auburn Boulevard and Myrtle Avenue. The project site is currently developed with two existing storage and retail buildings. Access is currently provided from Auburn Boulevard. The approximately 1.1-acre site is located approximately 0.5 miles east of the I-80; refer to **Exhibit 1: Regional Location Map** and **Exhibit 2: Project Vicinity Map**.

1.2 Project Description

The project is proposing to demolish the existing retail and storage buildings and construct a new building with convenience store and drive-thru quick-serve restaurant (QSR) or coffee tenant, and a fuel canopy. As shown in the **Exhibit 3: Conceptual Site Plan**, the proposed development consists of a convenience store of 2,804 gross square foot (sf), QSR of 2,059 sf, new underground fuel tanks and piping, new fuel canopy and dispensers, new trash enclosure, landscaping, and irrigation. The intent of the project is to revitalize this corner site. The existing retail use would be changed to a convenience store (beer & wine sales, tobacco sales, 24-hour operation) with fueling and drive-thru. The project proposes 23 standard spaces, 1 accessible space, and 12 fueling positions (18 total). Vehicular access to the project site would be provided on Auburn Boulevard.



Source: USGS, 2022

Figure 1: Regional Map

Auburn Boulevard Fueling Station Project

Not to scale

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Source: Nearmap, 2022

Figure 2: Project Vicinity Map

Auburn Boulevard Fueling Station Project

Not to scale

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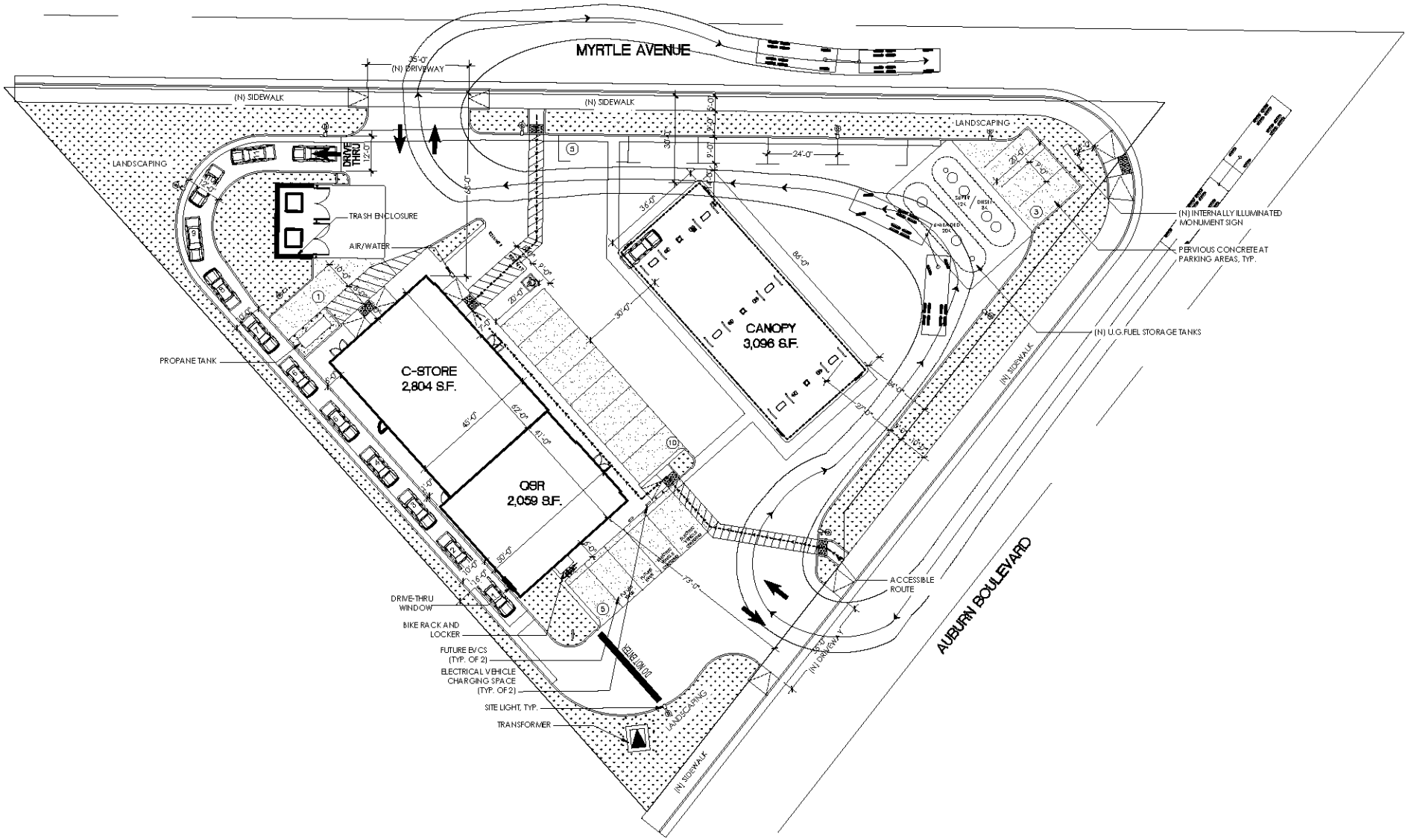

Source: PM Design, 2022

Figure 3: Site Plan

Auburn Boulevard Fueling Station Project

Not to scale

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2 ACOUSTIC FUNDAMENTALS

2.1 Sound and Environmental Noise

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

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

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

Table 1: Typical Noise Levels

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

Source: California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

Noise Descriptors

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

Table 2: Definitions of Acoustical Terms

Term	Definitions
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in µPa (or 20 micronewtons per square meter), where 1 pascals 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 dB 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 µPa). 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 dB 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 acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
Maximum Noise Level (L_{max}) Minimum Noise Level (L_{min})	The maximum and minimum dBA during the measurement period.
Exceeded Noise Levels (L_{01}, L_{10}, L_{50}, L_{90})	The dBA values that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day-Night Noise Level (L_{dn})	A 24-hour average L_{eq} with a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity at nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level (CNEL)	A 24-hour average L_{eq} with a 5 dBA weighting during the hours of 7:00 a.m. to 10:00 p.m. and a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

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

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 on the distance between the receptor and the noise source.

A-Weighted Decibels

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

Addition of Decibels

The dB scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic dB is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound. [1] When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than one source under the same conditions. [2] Under the dB scale, three sources of equal loudness together would produce an increase of 5 dBA.

Sound Propagation and Attenuation

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

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm

[1] FHWA, *Noise Fundamentals*, 2017. Available at: https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm

[2] Ibid.

[3] California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, Page 2-29, September 2013.

reduces noise levels by 5 to 10 dBA.[4] The way older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.[5]

Human Response to Noise

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

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA.[6] Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in dBA, the following relationships should be noted:[7]

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

Effects of Noise on People

Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise. The Occupational Safety and Health Administration has a noise exposure standard that is set at the noise threshold where

4 James P. Cowan, *Handbook of Environmental Acoustics,* 1994.

5 HUD, *Noise Guidebook*, 2009. Available at: https://www.hudexchange.info/resource/313/hud-noise-guidebook/

6 Compiled from James P. Cowan, *Handbook of Environmental Acoustics,* 1994 and Cyril M. Harris, Handbook of Noise Control, 1979.

7 Compiled from California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013, and FHWA, *Noise Fundamentals,* 2017.

hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over 8 hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. A noise level of about 55 dBA L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance[8].

2.2 Groundborne Vibration

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

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

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

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

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

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

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

3 REGULATORY SETTING

To limit population exposure to physically or psychologically damaging as well as intrusive noise levels, the Federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise.

3.1 State of California

California Government Code

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

Title 24 – Building Code

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

3.2 Local

County of Sacramento General Plan

The County of Sacramento General Plan is a roadmap that encompasses the hopes, aspirations, values, and dreams of the community. The County of Sacramento General Plan specifies exterior noise guidelines for land uses in the Noise Element section. The County requires that new developments be designed to meet these guidelines. Noise compatibility can be achieved by avoiding the location of conflicting land uses adjacent to one another, incorporating buffers and noise control techniques including setbacks, landscaping, building transitions, site design, and building construction techniques. Selection of the appropriate noise control technique would vary depending on the level of noise that needs to be reduced as well as the location and intended land use. General Plan policies that directly address reducing and avoiding noise or vibration impacts include the following:

Goal 1: To protect the existing and future citizens of Sacramento County from the harmful effects of exposure to excessive noise. More specifically, to protect existing noise-sensitive land uses from new uses that would generate noise levels which are incompatible with those uses, and to discourage new noise sensitive land uses from being developed near sources of high noise levels.

GOAL 2 To protect the economic base of Sacramento County by preventing the encroachment of noise-sensitive land uses into areas affected by existing noise-producing uses. More specifically, to recognize that noise is an inherent by-product of many land uses and to prevent new noise-sensitive land uses from being developed in areas affected by existing noise-producing uses.

GOAL 3 To provide the County with flexibility in the development of infill properties which may be located in elevated noise environments.

GOAL 4 To provide sufficient noise exposure information so that existing and potential future noise impacts may be effectively addressed in the land use planning and project review processes.

NO-1. Where the noise level are predicted to be exceeded at new uses proposed within Sacramento County which are affected by traffic or railroad noise, appropriate noise mitigation measures shall be included in the project design to reduce projected noise levels to a state of compliance.

NO-5. Where the noise level standards are predicted to be exceeded at a proposed noise-sensitive area due to existing non-transportation noise sources, appropriate noise mitigation measures shall be included in the project design.

NO-6. Where a project would consist of or include non-transportation noise sources, the noise generation of those sources shall be mitigated so as not exceed the interior and exterior noise level standards of Table 2 at existing noise-sensitive areas in the project vicinity. (refer to **Table 4: Non-Transportation Noise Standards**)

NO-7. The "last use there" shall be responsible for noise mitigation. However, if a noise generating use is proposed adjacent to lands zoned for uses which may have sensitivity to noise, then the noise generating use shall be responsible for mitigating its noise generation to a state of compliance with the Table 2 standards at the property line of the generating use in anticipation of the future neighboring development.

NO-8. Noise associated with construction activities shall adhere to the County Code requirements. Specifically, Section 6.68.090(e) addresses construction noise within the County.

NO-12. All noise analyses prepared to determine compliance with the noise level standards contained within this Noise Element shall be prepared in accordance with county standards.

NO-13. Where noise mitigation measures are required to satisfy the noise level standards of this Noise Element, emphasis shall be placed on the use of setbacks and site design to the extent feasible, prior to consideration of the use of noise barriers.

Table 4: Non-Transportation Noise Standards

Land Use Category	Community Noise Exposure (L_{50} / L_{max}, dBA)		
	Outdoor Areas[2]		Interior[3]
	Daytime	Nighttime	Day & Night
All Residential	55 / 75	50 / 70	35 / 55
Transient Lodging	55 / 75	-	35 / 55
Hospitals & Nursing Homes	55 / 75	-	35 / 55
Theaters & Auditoriums	-	-	30 / 50
Churches, Meeting Halls, Schools, Libraries, etc.	55 / 75	-	35 / 60
Office Buildings	60 / 75	-	45 / 65
Commercial Buildings	-	-	45 / 65
Playgrounds, Parks, etc.	65 / 75	-	-
Industry	60 / 80	-	50 / 70

Notes:

1. The Table 2 standards shall be reduced by 5 dB for sounds consisting primarily of speech or music, and for recurring impulsive sounds. If the existing ambient noise level exceeds the standards of Table 2, then the noise level standards shall be increased at 5 dB increments to encompass the ambient.
2. Sensitive areas are defined acoustic terminology section.
3. Interior noise level standards are applied within noise-sensitive areas of the various land uses, with windows and doors in the closed positions.
4. Outdoor activity areas of transient lodging facilities are not commonly used during nighttime hours.
5. Hospitals are often noise-generating uses. The exterior noise level standards for hospitals are applicable only at clearly identified areas designated for outdoor relaxation by either hospital staff or patients.
6. The outdoor activity areas of these uses (if any), are not typically utilized during nighttime hours.
7. Where median (L50) noise level data is not available for a particular noise source, average (Leq) values may be substituted for the standards of this table provided the noise source in question operates for at least 30 minutes of an hour. If the source in question operates less than 30 minutes per hour, then the maximum noise level standards shown would apply.

Source: County of Sacramento, *Noise Element*, December 13, 2017.

County of Sacramento Code of Ordinances

A noise ordinance is intended to control unnecessary, excessive, and annoying sounds from stationary, non-transportation noise sources. Noise ordinance requirements are not applicable to mobile noise sources such as heavy trucks traveling on public roadways. Federal and State laws preempt control of mobile noise sources on public roads. Noise ordinance standards generally apply to industrial and commercial noise sources, as well as parks and schools affecting residential areas.

The project would be subject to the limitations imposed by the County regarding construction noise. Sacramento County Code section 6.68.090(e) states that noise sources associated with construction, repair, remodeling, demolition, paving or grading of any real property, are exempt from maximum noise level requirements. That said activities must not take place between the hours of 8:00 p.m. and 6:00 a.m. on weekdays and Friday commencing at 8:00 p.m. through and including 7:00 a.m. on Saturday; Saturdays commencing at 8:00 p.m. through and including 7:00 a.m. on the next following Sunday and on Sunday after the hour of 8:00 p.m.

When an unforeseen or unavoidable condition occurs during a construction project and the nature of the project necessitates that work in process be continued until a specific phase is completed, the

contractor or owner shall be allowed to continue work after 8:00 p.m. and to operate machinery and equipment necessary until completion of the specific work in progress can be brought to conclusion under conditions which will not jeopardize inspection acceptance or create undue financial hardships for the contractor or owner.

4 EXISTING CONDITIONS

4.1 Existing Noise Source

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

Noise Measurements

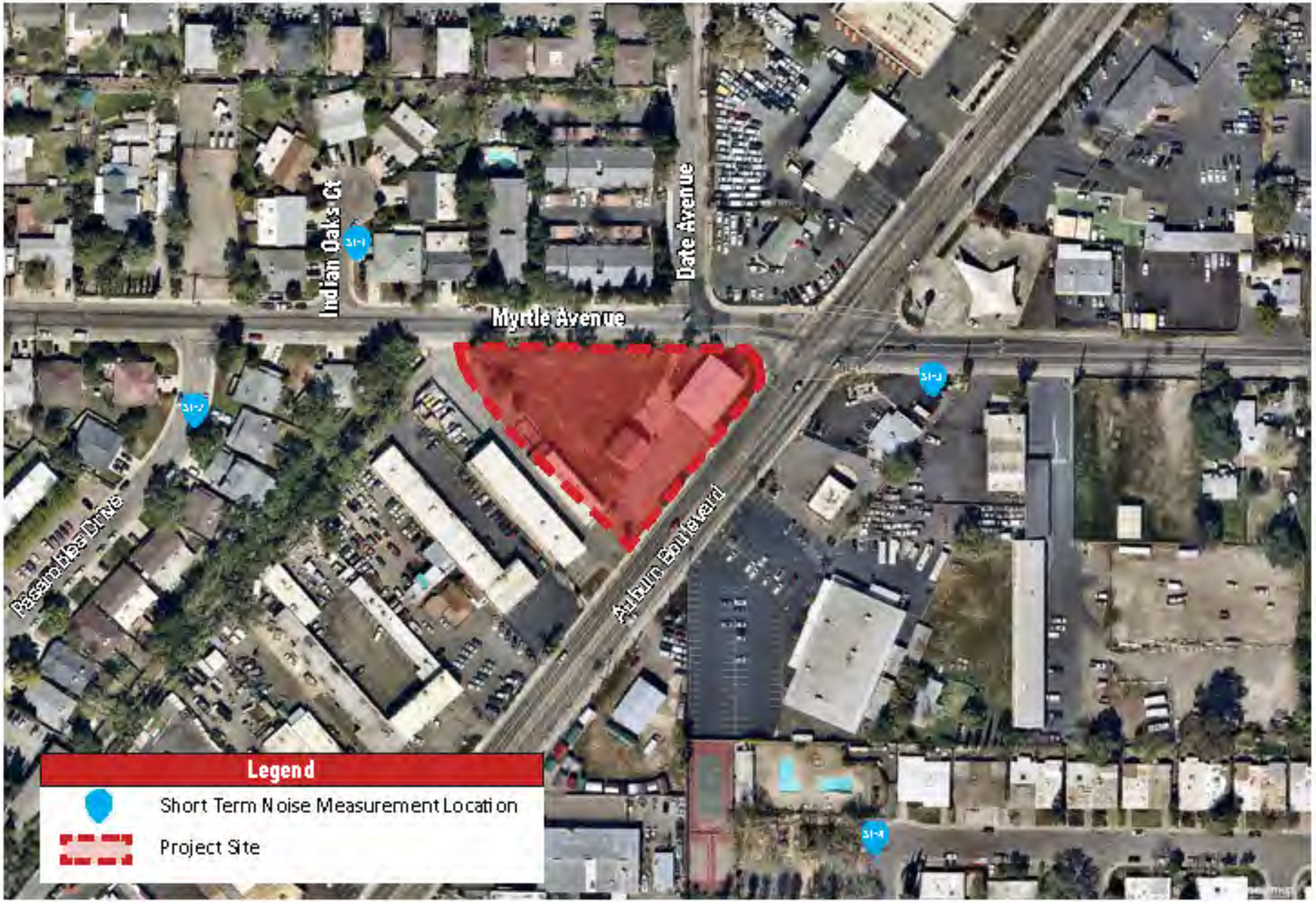
To determine ambient noise levels in the project area, four short-term (10-minute) noise measurements were taken using a Larson Davis Model 831 Type I integrating sound level meter on May 25, 2022; refer to Appendix A for existing noise measurement data.

As shown in **Figure 4: Noise Measurement Locations**, short-term measurement 1 (ST-1) was taken to represent the ambient noise level at the residential uses to the north of the project site , ST-2 was taken to represent existing noise levels at the residential uses to the west of the project site, ST-3 was taken to represent the existing noise level at the commercial uses to the east, and ST-4 was taken to represent existing noise levels at the residential uses to the southeast of the project site. The primary noise sources during the noise measurements were traffic along Auburn Boulevard, Myrtle Avenue Avenue, and stationary noise at commercial and industrial operations nearby. **Table 5: Noise Measurements** provides the ambient noise levels measured at these locations.

Table 5: Noise Measurements

Site No.	Location	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	L_{peak} (dBA)	Time	Date
ST-1	Myrtle Ave and Indian Oaks Ct intersection	58.1	41.2	72.0	92.5	10:50 a.m. to 11:00 a.m.	5/25/2022
ST-2	4838 Pasarobles Dr	48.5	42.8	62.9	86.0	11:13 a.m. to 11:23 a.m.	5/25/2022
ST-3	Auburn Blvd and Myrtle Ave intersection	63.7	44.1	77.2	97.2	11:42 a.m. to 11:52 a.m.	5/25/2022
ST-4	4732 River College Dr	53.3	42.5	73.9	90.5	12:06 p.m. to 12:16 p.m.	5/25/2022

Source: Noise Measurements taken by Kimley-Horn on May 25, 2022.



Source: Nearmap, 2022

Figure 4: Noise Measurement Locations

Auburn Boulevard Fueling Station Project

Not to scale

Kimley»Horn

Mobile Sources

Existing roadway noise levels were calculated for the roadway segments in the project vicinity. This task was accomplished using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) and existing traffic volumes from the Auburn Boulevard Fuel Station Traffic Evaluation (prepared by Kimley-Horn, 2022) (Traffic Evaluation). The noise prediction model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (also referred to as energy rates) used in the FHWA model have been modified to reflect average vehicle noise rates identified for California by the California Department of Transportation (Caltrans). The Caltrans data indicates that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels. [9] The average daily noise levels along roadway segments in proximity to the project site are included in **Table 6: Existing Traffic Noise Levels**.

Table 6: Existing Traffic Noise Levels

Roadway Segment	ADT	dBA CNEL 100 Feet from Roadway Centerline
Auburn Blvd		
Between Pasadena Ave and Myrtle Ave	20,118	68.4
Between Myrtle Ave and College Oak Dr	16,379	67.5
Myrtle Ave		
Between Date Ave and Auburn Blvd	5,826	60.7
Between Auburn Blvd and College Oak Dr	5,088	61.3
ADT = average daily trips; dBA = A-weighted decibels; CNEL = community noise equivalent level		
Source: Based on traffic data within the *Traffic Evaluation*, prepared by Kimley-Horn, 2022. Refer to **Appendix A** for traffic noise modeling assumptions and results.		

As depicted in **Table 6**, the existing traffic-generated noise level on project-vicinity roadways currently ranges from 60.7 dBA CNEL to 68.4 dBA CNEL 100 feet from the centerline. As previously described, CNEL is 24-hour average noise level with a 5 dBA "weighting" during the hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.

4.2 Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with those uses. Noise sensitive uses typically include residences, hospitals, schools, childcare facilities, and places of assembly. Vibration sensitive receivers are generally similar to noise sensitive receivers but may also include businesses, such as research facilities and laboratories that use vibration-sensitive equipment. Sensitive receptors near the project site consist mostly of single-family residences. Sensitive land uses nearest to the project are shown in **Table 7: Sensitive Receptors**.

Table 7: Sensitive Receptors

Receptor Description	Distance and Direction from the Project[1]
Single-Family Residential Community	60 feet north
Single-Family Residential Community	75 feet west
Single-Family Residential Community	430 feet southeast
Lyudia's Day Care	700 feet northwest

[9] California Department of Transportation, *California Vehicle Noise Emission Levels*, 1987.

Table 7: Sensitive Receptors

Receptor Description	Distance and Direction from the Project[1]
Multi-family Residences	900 feet east
American River College	1,500 feet east

Notes:
1. Distance measured from the project site to the receiver property line.

Source: Google Earth Pro, 2022.

5 SIGNIFICANCE CRITERIA AND METHODOLOGY

5.1 CEQA Thresholds

Appendix G of the California Environmental Quality Act (CEQA) Guidelines contains analysis guidelines related to noise impacts. These guidelines have been used by the County to develop thresholds of significance for this analysis. A project would create a significant environmental impact if it would:

- Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generate excessive groundborne vibration or groundborne noise levels; and
- 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, expose people residing or working in the project area to excessive noise levels.

Thresholds

Construction Noise

The project would be subject to the limitations imposed by the County regarding construction noise. Sacramento County Code section 6.68.090(e) states that noise associated with construction, repair, remodeling, demolition, paving or grading are exempt from maximum noise level requirements. Construction must not take place between the hours of 8:00 p.m. and 6:00 a.m. on weekdays and Friday commencing at 8:00 p.m. through and including 7:00 a.m. on Saturday; Saturdays commencing at 8:00 p.m. through and including 7:00 a.m. on the next following Sunday and on Sunday after the hour of 8:00 p.m.

Operational Stationary Noise

Pursuant to Sacramento County Code section 6.68.070, the project would have a significant impact if it caused ambient noise levels to increase by 5 dBA or more and the resulting noise falls on a noise-sensitive land use within an area categorized as either "clearly compatible" or "normally compatible" (see **Table 5**).

Operational Traffic Noise

Sacramento County has established some standards for roadway noise ranging from 1.5 dB to 5 dB, depending upon the existing noise environment. The substantial increase would result in an impact if the resulting total noise level would exceed the "normally acceptable" category for a given land use. Based upon the General Plan Noise Element, when pre-project traffic noise levels are less than 60 dB Ldn, a 5+ dB increase is required before the change is significant. When pre-project noise levels are between 60 dB and 65 dB Ldn, an increase of 3+ dB is required before the change is significant. When pre-project noise levels are above 65 dB Ldn, an increase of 1.5+ dB is required before the change is considered significant.

Vibration

The County currently does not have a significance threshold to assess vibration impacts. Thus, the FTA guidelines set forth in FTA's Transit Noise and Vibration Impact Assessment Manual are used to evaluate potential impacts related to vibration.

5.2 Methodology

Construction

Construction noise levels were based on typical noise levels generated by construction equipment published by the Federal Transit Administration (FTA) and FHWA. Construction noise is assessed in dBA L_{eq}. This unit is appropriate because L_{eq} can be used to describe noise level from operation of each piece of equipment separately, and levels can be combined to represent the noise level from all equipment operating during a given period.

Reference noise levels are used to estimate operational noise levels at nearby sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation for point sources of noise). Noise level estimates do not account for the presence of intervening structures or topography, which may reduce noise levels at receptor locations. Therefore, the noise levels presented herein represent a conservative, reasonable worst-case estimate of actual temporary construction noise.

Operations

The analysis of the Existing and With Project noise environments is based on noise prediction modeling and empirical observations. Reference noise level data are used to estimate the project operational noise impacts from stationary sources. Noise levels are collected from field noise measurements and other published sources from similar types of activities are used to estimate noise levels expected with the project's stationary sources. The reference noise levels are used to represent a worst-case noise environment as noise level from stationary sources can vary throughout the day. Operational noise is evaluated based on the standards within the County's Noise Ordinance and General Plan. The Without Project and With Project traffic noise levels in the project vicinity were calculated using the FHWA Highway Noise Prediction Model (FHWA-RD-77-108).

Vibration

Groundborne vibration levels associated with construction-related activities for the project were evaluated utilizing typical groundborne vibration levels associated with construction equipment, obtained from FTA published data for construction equipment. Potential groundborne vibration impacts related to building/structure damage and interference with sensitive existing operations were evaluated, considering the distance from construction activities to nearby land uses and typically applied criteria.

6 POTENTIAL IMPACTS AND MITIGATION

6.1 Acoustical Impacts

Threshold 6.1 Would the project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Construction

Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g. land clearing, grading, excavation, paving). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. During construction, exterior noise levels could affect the residential neighborhoods surrounding the construction site. Project construction would occur approximately 60 feet from the nearest sensitive receptor to the north. However, construction activities would occur throughout the project site and would not be concentrated at a single point near sensitive receptors. Noise levels typically attenuate (or drop off) at a rate of 6 dB per doubling of distance from point sources, such as industrial machinery. During construction, exterior noise levels could affect sensitive receptors near the construction site.

Construction activities associated with development of the project would include some demolition, site preparation, grading, paving, building construction, and architectural coating. Such activities would require graders, scrapers, and tractors during site preparation; graders, dozers, and tractors during grading; cranes, forklifts, generators, tractors, and welders during building construction; pavers, rollers, mixers, tractors, and paving equipment during paving; and air compressors during architectural coating. Grading and excavation phases of project construction tend to be the shortest in duration and create the highest construction noise levels due to the operation of heavy equipment required to complete these activities. It should be noted that only a limited amount of equipment can operate near a given location at a particular time. Equipment typically used during this stage includes heavy-duty trucks, backhoes, bulldozers, excavators, front-end loaders, and scrapers. Operating cycles for these types of construction equipment may involve one or two minutes of full-power operation followed by three to four minutes at lower power settings. Other primary sources of noise would be shorter-duration incidents, such as dropping large pieces of equipment or the hydraulic movement of machinery lifts, which would last less than one minute. According to the applicant, no pile-driving would be required during construction and as such a project condition of approval will be included in the project permit to reflect the project's proposed construction.

Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Typical noise levels associated with individual construction equipment are listed in **Table 8: Typical Construction Noise Levels**.

Table 8: Typical Construction Noise Levels

Equipment	Typical Noise Level (dBA) at 50 feet from Source
Air Compressor	80
Backhoe	80
Compactor	82
Concrete Mixer	85
Concrete Pump	82

Table 8: Typical Construction Noise Levels	
Equipment	**Typical Noise Level (dBA) at 50 feet from Source**
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	82
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	80
Paver	85
Pneumatic Tool	85
Pump	77
Roller	85
Saw	76
Scraper	85
Shovel	82
Truck	84
[1] Calculated using the inverse square law formula for sound attenuation: $dBA_2 = dBA_1+20Log(d_1/d_2)$ dBA_2 = estimated noise level at receptor; dBA_1 = reference noise level; d_1 = reference distance; d_2 = receptor location distance	
Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.	

Pursuant to Sacramento County Code section 6.68.090(e), as noted above, construction activities are exempt from the specified noise ordinance standards during the hours of 6:00 a.m. to 8:00 p.m. Monday through Friday, and Saturday and Sunday from 7:00 a.m. to 8:00 p.m. While the County establishes limits to the hours during which construction activity may take place, it does not identify specific noise level limits for construction noise levels. The permitted hours of construction are required in recognition that construction activities undertaken during daytime hours are a typical part of living in an urban environment and do not cause a significant impact. However, this analysis conservatively uses the FTA's threshold of 80 dBA L_{eq} for residential uses and 90 dBA L_{eq} for commercial and industrial uses to evaluate construction noise impacts. [10]

As shown in **Table 8** noise maximum levels are below 88 dBA at 50 feet. The highest anticipated construction noise level of 88 dBA at 50 feet is expected to occur during the demolition phase. Noise impacts for mobile construction equipment are typically assessed as emanating from the center of the equipment activity or construction site. [11] For the proposed project, this center point would be approximately 140 feet from the nearest sensitive receptor property line. These sensitive uses may be exposed to elevated noise levels during project construction. The Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) was used to calculate noise levels during construction activities; refer to Appendix A: Noise Data. RCNM is a computer program used to assess construction noise impacts and allows for user-defined construction equipment and user-defined noise limit criteria. Noise

[10] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, Table 7-2, Page 179, September 2018.

[11] For the purposes of this analysis, the construction area is defined as the center of the project site per the methodology in the FTA Transit Noise and Vibration Impact Assessment Manual (September 2018). Although some construction activities may occur at distances closer than 140 feet from the nearest properties, construction equipment would be dispersed throughout the project site during various construction activities. Therefore, the center of the project site represents the most appropriate distance based on the sporadic nature of construction activities.

levels were calculated for each construction phase and are based on the equipment used, distance to the nearest property/receptor, and acoustical use factor for equipment.

The noise levels calculated in **Table 9: Project Construction Noise Levels**, show estimated exterior construction noise at the closest sensitive receptors to the south and north of the project site, as well as the closest off-site building to the west. Based on calculations using the RCNM model, construction noise levels would range from approximately 50.2 dBA L_{eq} and 79.7 dBA L_{eq} at the nearest sensitive receptors and off-site uses; see **Table 9**.

Table 9: Project Construction Noise Levels

Construction Phase	Receptor Location			Modeled Exterior Noise Level (dBA L_{eq}) [2]	Noise Threshold (dBA L_{eq}) [3]	Exceeded?
	Land Use	Direction	Distance (feet) [1]			
Demolition	Single Family Residential	North	140	76.4	80	No
	Single Family Residential	West	285	70.2		No
	Industrial	South	140	76.4	90	No
Site Preparation	Single Family Residential	North	140	75.6	80	No
	Single Family Residential	West	285	69.4		No
	Industrial	South	140	75.6	90	No
Grading	Single Family Residential	North	140	75.6	80	No
	Single Family Residential	West	285	69.4		No
	Industrial	South	140	75.6	90	No
Building Construction	Single Family Residential	North	140	73.9	80	No
	Single Family Residential	West	285	67.7		No
	Industrial	South	140	73.9	90	No
Paving	Single Family Residential	North	140	75.5	80	No
	Single Family Residential	West	285	69.3		No
	Industrial	South	140	75.5	90	No
Architectural Coating	Single Family Residential	North	140	64.7	80	No
	Single Family Residential	West	285	58.6		No
	Industrial	South	140	64.7	90	No

Notes:
1. Distance is from the nearest receptor to the main construction activity area on the project site. Not all equipment would operate at the closest distance to the receptor.
2. Modeled noise levels conservatively assume the simultaneous operation of all pieces of equipment.
3. The FTA Noise and Vibration Manual establishes construction noise standards of 80 dBA $L_{eq(8-hour)}$ for residential uses and 90 dBA $L_{eq(8-hour)}$ for commercial and industrial uses.

Source: Federal Highway Administration, *Roadway Construction Noise Model*, 2006. Refer to **Appendix A: Noise Data** for noise modeling results.

As shown in **Table 9**, the loudest noise levels would be 76.4 dBA L_{eq} at the nearest sensitive receptor and the nearest industrial uses, which would not exceed the FTA's construction noise standards of 80 dBA L_{eq} and/or 90 dBA L_{eq}. Actual construction-related noise activities would be lower than the conservative levels described above and would cease upon completion of construction. Due to the variability of construction activities and equipment for the project, overall construction noise levels would be intermittent and would fluctuate over time. These assumptions represent the worst-case noise scenario because construction activities would typically be spread out throughout the project site, and thus some equipment would be farther away from the affected receptors. In addition, the noise modeling assumes that construction noise is constant, when, in fact, construction activities and associated noise levels would fluctuate and generally be brief and sporadic, depending on the type, intensity, and location of construction activities.

The contractor would equip all construction equipment, fixed and mobile, with properly operating and maintained noise mufflers, consistent with manufacturer's standards and as mandated by the State which would further reduce construction noise levels. Project construction would be required to comply with Sacramento County Code section 6.68.090(e), limiting construction to the hours of 6:00 a.m. to 8:00 p.m. Monday through Friday, and Saturday and Sunday from 7:00 a.m. to 8:00 p.m. Adherence to the time of day restrictions in the Sacramento County Code would reduce construction noise impacts to a less than significant level.

Construction Traffic Noise

Construction noise may be generated by large trucks moving materials to and from the project site. Large trucks would be necessary to deliver building materials as well as remove dump materials. Excavation and cut and fill would be required. Soil hauling would be required as approximately 125 cubic yards (cy) of soil would be exported. Based on the California Emissions Estimator Model (CalEEMod) default assumptions for this project, the project would generate the highest number of daily trips during the demolition and building construction phases. The model estimates that the project would generate approximately 13 daily worker trips and 24 daily hauling trips (119 hauling trips over 5 days) during the demolition phase. Building construction would have 24 worker trips and 9 daily vendor trips. Because of the logarithmic nature of noise levels, a doubling of the traffic volume (assuming that the speed and vehicle mix do not also change) would result in a noise level increase of 3 dBA. Auburn Boulevard, between Pasadena Avenue and Myrtle Avenue, has an average daily traffic (ADT) volume of approximately 20,118 vehicles (**Table 6**). Therefore, project construction trips would not double the existing traffic volume per day. Construction related traffic noise would not be noticeable and would not create a significant noise impact.

California establishes noise limits for vehicles licensed to operate on public roads using a pass-by test procedure. Pass-by noise refers to the noise level produced by an individual vehicle as it travels past a fixed location. The pass-by procedure measures the total noise emissions of a moving vehicle with a microphone. When the vehicle reaches the microphone, the vehicle is at full throttle acceleration at an engine speed calculated for its displacement. For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dB. The State pass-by standard for light trucks and passenger cars (less than 4.5 tons gross vehicle rating) is also 80 dB at 15 meters from the centerline. According to the FHWA, dump trucks typically generate noise levels of 77 dBA and flatbed trucks typically generate noise levels of 74 dBA, at a distance of 50 feet from the truck (FHWA, Roadway Construction Noise Model, 2006).

Operations

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

- Off-site traffic noise;
- Mechanical equipment (i.e., trash compactors, air conditioners, etc.);
- Gas dispensing activities;
- Restaurant and commercial retail activities (e.g., outdoor seating and dining areas, vehicle queuing, speaker systems);
- Delivery trucks activities at the loading areas (i.e., maneuvering and idling trucks, loading/unloading, and equipment noise);

- Parking areas (i.e., car door slamming, car radios, engine start-up, and car pass-by); and
- Landscape maintenance activities.

Implementation of the project would create new sources of noise in the project vicinity from mechanical equipment, gas station activities, restaurant and commercial retail activities, truck loading areas, parking lot noise, and landscape maintenance. This analysis, conservatively, did not take credit for the existing noise sources on-site generated by the storage and retail uses. **Table 10: Operational Noise Levels** shows the noise levels generated by various stationary noise sources and the resulting noise level at the nearest receiver. **Table 10** also show the project's compliance with the General Plan Policy N-P-4, as well as the Municipal Code. Each stationary source is discussed below.

Mechanical Equipment

Regarding mechanical equipment, the project would generate stationary-source noise associated with heating, ventilation, and air conditioning (HVAC) units. HVAC units typically generate noise levels of approximately 52 dBA at 50 feet.[12] **Table 10** shows that mechanical equipment would not exceed the County's General Plan standards in Policy NO-6.

Loading Area Noise

The project is a commercial development that would include deliveries. The primary noise associated with deliveries is the arrival and departure of trucks. Operations of the proposed project would potentially require a mixture of deliveries from vans, light trucks, and heavy-duty trucks. Normal deliveries typically occur during daytime hours. During loading and unloading activities, noise would be generated by the trucks' diesel engines, exhaust systems, and brakes during low gear shifting' braking activities; backing up toward the docks/loading areas; dropping down the dock ramps; and maneuvering away from the docks. The nearest loading area at the project site would be located approximately 140 feet away from the residential uses to the west along Atherton Drive. Typically, heavy truck operations generate a noise level of 64 dBA at a distance of 50 feet.[13] While there would be temporary noise increases during truck maneuvering and engine idling, these impacts would be of short duration and infrequent. **Table 10** shows that loading area noise would not exceed the County's General Plan standards in Policy NO-6.

Parking Lot and Gas Station Activities

The proposed project would accommodate the need for parking. Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the CNEL scale. Additionally, 18 standard fuel pumps would also include similar noise sources as parking spaces, which would include vehicular circulation, louder engines, car alarms, door slams, and human voices. The instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car pass-bys range from 53 to 61 dBA at 50 feet and may be an annoyance to adjacent noise-sensitive receptors.[14] Conversations in parking areas may also be an annoyance to adjacent sensitive receptors. Sound levels of speech typically range from 33 dBA at 50 feet

[12] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, July 6, 2010.

[13] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, July 6, 2010.

[14] Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.

for normal speech to 50 dBA at 50 feet for very loud speech.[15] It should be noted that parking lot noises are instantaneous noise levels compared to noise standards in the hourly L_{eq} metric, which are averaged over the entire duration of a time period. Actual noise levels over time resulting from parking lot and gas station activities would be far lower than the reference levels identified above. Parking lot noise would occur within the surface parking lot on-site. **Table 10** shows that parking lot and gas station activities noise would not exceed the County's General Plan standards in Policy NO-6.

Drive-Thru Operations

The proposed project would include a drive-thru restaurant with menu boards and intercoms that would be located near the restaurant building. Project noise sources from drive-thru operations include amplified speech from the intercom, idling vehicles, and vehicles circulating along the drive-thru lane. The measured noise level associated with active drive-thru operations is 64 dBA at a distance of 20 feet.[16] The nearest sensitive receptors (single-family residences to the west) are located approximately 140 feet from the proposed menu board and intercom, and as close as 130 feet from the drive-thru lane/queuing area. **Table 10** shows that drive-thru operation noise activities noise would not exceed the County's General Plan standards in Policy NO-6.

Landscape Maintenance

Development and operation of the project includes new landscaping that would require periodic maintenance. Noise generated by a gasoline-powered lawnmower is estimated to be approximately 70 dBA at a distance of five feet.[17] Landscape maintenance activities would be 50 dBA at 50 feet away and 44.0 dBA at the closest sensitive receptor approximately 70 feet away. Maintenance activities would operate during daytime hours for brief periods of time as allowed by the County Municipal Code and would not permanently increase ambient noise levels in the project vicinity and would be consistent with activities that currently occur at the surrounding uses. **Table 10** shows that landscape maintenance noise activities noise would not exceed the County's General Plan standards in Policy NO-6.

[15] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden. Noise Navigator Sound Level Database with Over 1700 Measurement Values, July 6, 2010.

[16] Drive-thru noise sample collected by Kimley-Horn on August 17, 2018.

[17] U.S. EPA, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, 1971

Table 10: Operational Noise Levels

Nearest Land Use	Distance[1] (feet)	Reference Level at 50 ft (dBA)	General Plan Policy NO-6		
			Noise Level at Receiver	Exterior Noise Standard	Exceed Threshold
Mechanical Equipment					
Single Family Residential (North)	115	52 dBA[2]	45 dBA	55 dBA[5]	No
Single Family Residential (West)	190		40 dBA		No
Industrial	70		49 dBA	60 dBA[5]	No
Loading Area					
Single Family Residential (North)	200	64 dBA[2]	52 dBA	55 dBA[5]	No
Single Family Residential (West)	140		55 dBA		No
Industrial	750		59 dBA	60 dBA[5]	No
Parking Area/Gas Dispensing Activities					
Single Family Residential (North)	115	61 dBA[3]	54 dBA	55 dBA[5]	No
Single Family Residential (West)	140		52 dBA		No
Industrial	75		58 dBA	60 dBA[5]	No
Drive-Thru Operations					
Single Family Residential (North)	140	50 dBA[3]	47 dBA	55 dBA[5]	No
Single Family Residential (West)	130		48 dBA		No
Industrial	75		53 dBA	60 dBA[5]	No
Landscape Maintenance					
Single Family Residential (North)	70	61 dBA[4]	47 dBA	55 dBA[5]	No
Single Family Residential (West)	120		42 dBA		No
Industrial	65		48 dBA	60 dBA[5]	No

1. The distance is from the location of the operational noise source to the sensitive receptor property line.
2. Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, July 6, 2010.
3. Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.
4. U.S. EPA, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, 1971.
5. County of Sacramento, *Noise Element: Table 2: Non-Transportation Noise Standards*, December, 13, 2017.

Summary

As shown in **Table 10**, stationary sources would not exceed the Policy NO-6 of the County's General Plan at the nearest residential uses. Additionally, noise levels would be further attenuated by intervening terrain and structures and were not accounted for in the noise calculations in **Table 10**. Therefore, operational noise impacts associated with on-site activities would be less than significant.

Off-Site Traffic Noise

Implementation of the project would generate increased traffic volumes along study roadway segments. The project is expected to generate a net of 792 average daily trips, which would result in noise increases on project area roadways. In general, a traffic noise increase of less than 3 dBA is barely perceptible to people, while a 5-dBA increase is readily noticeable (Caltrans, 2013). Generally, traffic volumes on project area roadways would have to approximately double for the resulting traffic noise levels to increase by 3 dBA. Therefore, permanent increases in ambient noise levels of less than 3 dBA are considered to be less than significant.

Based on the General Plan Noise Element, when pre-project traffic noise levels are less than 60 dB, a 5+ dB increase is required before the change is significant. When pre-project noise levels are between 60 dB and 65 dB, an increase of 3+ dB is required before the change is significant. When pre-project noise levels are above 65 dB, an increase of 1.5+ dB is required before the change is considered significant.

As shown in **Table 11: Existing and Existing Plus Project Noise Levels**, the existing plus project traffic-generated noise level on project area roadways is between 61.0 dBA L_{dn} and 68.5 dBA L_{dn} at 100 feet from the centerline. As previously described, L_{dn} is 24-hour average noise level with a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.

Traffic noise levels for roadways primarily affected by the project were calculated using the FHWA's Highway Noise Prediction Model (FHWA-RD-77-108). Traffic noise modeling was conducted for conditions with and without the project, based on traffic volumes (Kimley-Horn, 2022).

Table 11: Existing and Existing Plus Project Noise Levels

Roadway Segment	Existing		Existing Plus Cargo Facility		Change	Significant Impacts
	ADT	dBA CNEL[1]	ADT	dBA CNEL[1]		
Auburn Blvd						
Between Pasadena Ave and Myrtle Ave	20,118	68.4	20,403	68.5	0.1	No
Between Myrtle Ave and College Oak Dr	16,379	67.5	16,712	67.6	0.1	No
Myrtle Ave						
Between Date Ave and Auburn Blvd	5,826	60.7	6,124	61.0	0.3	No
Between Auburn Blvd and College Oak Dr	5,088	61.3	5,167	61.4	0.1	No

ADT = average daily trips; dBA = A-weighted decibels; CNEL = community noise equivalent level.
1. dBA CNEL at 100 feet from the roadway centerline. The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures, barriers, and topography.

Source: Based on traffic data within the *Traffic Evaluation*, prepared by Kimley-Horn, 2022. Refer to **Appendix A** for traffic noise modeling assumptions and results.

As noted in **Table 11**, the project would have the highest increase of 0.3 dBA on Myrtle Avenue, between Date Avenue and Auburn Boulevard. However, the 0.3 dBA L_{dn} increase is under the perceptible 3.0 dBA

and the 1.5+ dB increase per the County's General Plan Noise Element. Therefore, the project would not have a significant impact on existing traffic noise levels.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.2 Would the Project expose persons to or generate excessive ground borne vibration or ground borne noise levels?

Construction

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

The FTA has published standard vibration velocities for construction equipment operations. In general, depending on the building category of the nearest buildings adjacent to the potential pile driving area, the potential construction vibration damage criteria vary. For example, for a building constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.50 inch per second (in/sec) peak particle velocity (PPV) is considered safe and would not result in any construction vibration damage. In general, the FTA architectural damage criterion for continuous vibrations (i.e. 0.2 in/sec) appears to be conservative. 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. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience cosmetic damage (e.g. plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on soil composition and underground geological layer between vibration source and receiver.

Table 12: Typical Construction Equipment Vibration Levels, lists vibration levels at 25 feet for typical construction equipment. Groundborne vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. As indicated in **Table 12**, based on FTA data, vibration velocities from typical heavy construction equipment operations that would be used during project construction range from 0.003 to 0.089 in/sec PPV at 25 feet from the source of activity.

As shown in **Table 12**, the highest vibration levels are achieved with the large bulldozer operations. This construction activity is expected to take place during grading. Project construction would be approximately 50 feet from the closest structure. However, construction equipment vibration velocities would not exceed the FTA's 0.20 PPV threshold. In general, other construction activities would occur

throughout the project site and would not be concentrated at the point closest to the nearest structure. Therefore, vibration impacts associated with the project would be less than significant.

Table 12: Typical Construction Equipment Vibration Levels

Equipment	Peak Particle Velocity at 25 Feet (in/sec)	Peak Particle Velocity at 50 Feet (in/sec)[1]
Large Bulldozer	0.089	0.031
Caisson Drilling	0.089	0.031
Loaded Trucks	0.076	0.027
Rock Breaker	0.059	0.021
Jackhammer	0.035	0.012
Small Bulldozer/Tractors	0.003	0.001

[1] Calculated using the following formula: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$, where: PPV_{equip} = the peak particle velocity in in/sec of the equipment adjusted for the distance; PPV_{ref} = the reference vibration level in in/sec from Table 7-4 of the Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018; D = the distance from the equipment to the receiver.

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

Operations

The project would not generate groundborne vibration that could be felt at surrounding uses. Project operations would not involve railroads or substantial heavy truck operations, and therefore would not result in vibration impacts at surrounding uses. As a result, impacts from vibration associated with project operation would be less than significant.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.3 For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

The nearest airport to the project site is the Sacramento McClellan Airport located approximately 2 miles west of the project site. The project site lies outside of the CNEL noise contours shown in the Sacramento McClellan Airport Land Use Compatibility Plan Update report published in January 1987 and amended in December 1992. [18] Aircraft-related noise at the project site would not substantially increase ambient noise levels. Exterior noise levels resulting from aircraft would be compatible with the proposed project. By ensuring compliance with the County's normally acceptable noise level standards, interior noise levels would also be considered acceptable with aircraft noise. Therefore, the project would not expose people residing or working in the project area to excessive airport- or airstrip-related noise levels and no mitigation is required.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

[18] Sacramento Area Council of Governments, *McClellan Air Force Base, Comprehensive Land Use Plan*, January 1987.

6.2 Cumulative Noise Impacts

Cumulative Construction Noise

The project's construction activities would not result in a substantial temporary increase in ambient noise levels. The project would be subject to the limitations imposed by the County regarding construction noise. Sacramento County does not permit construction activities between the hours of 8:00 p.m. and 6am on weekdays and Friday commencing at 8:00 p.m. through and including 7:00 a.m. on Saturday; Saturdays commencing at 8:00 p.m. through and including 7:00 a.m. on the next following Sunday and on Sunday after the hour of 8:00 p.m. There would be periodic, temporary, noise impacts that would cease upon completion of construction activities. The project would contribute to other proximate construction project noise impacts if construction activities were conducted concurrently. However, based on the noise analysis above, the project's construction-related noise impacts would be less than significant following compliance with the Sacramento County Code and General Plan. Therefore, would not create a significant cumulative impact from construction noise. In addition, project construction would not make a cumulatively considerable contribution to significant cumulative impacts, assuming such a cumulative impact existed, and impacts in this regard are not cumulatively considerable.

Cumulative Construction Vibration

The project's construction vibration levels would not exceed FTA thresholds therefore, the project's incremental contribution is not cumulatively considerable. Given that vibration propagates in waves through the soil, multiple pieces of equipment operating simultaneously would each produce vibration waves in different phases that typically would not increase the magnitude of the vibration. Furthermore, vibration is a localized phenomenon, and tends to dissipate to insignificant levels within dozens of feet, as discussed in Threshold 6.2. Thus, there would be no possibility for vibration associated with the project to combine with vibration from other projects because of their distances from the project site. Therefore, the cumulative vibration impacts would be cumulatively less than significant.

Cumulative Operational Noise

Cumulative noise impacts describe how much noise levels are projected to increase over existing conditions with the development of the project and other foreseeable projects. Cumulative noise impacts would occur primarily as a result of increased noise associated with the proposed drive-thru operations, which include amplified speech from the intercom, idling vehicles, and vehicles circulating along the drive-thru lane, as well as noise from gas station activities, such as vehicular circulation, louder engines, car alarms, door slams, and human voices. Additionally, increased traffic on local roadways due to buildout of the project and other projects in the vicinity would also generate cumulative noise levels.

Stationary Noise

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

Cumulative Off-Site Traffic Noise

A project's contribution to a cumulative traffic noise increase would be considered significant when the combined effect exceeds perception level (i.e., auditory level increase) threshold. A described above, implementation of the project would generate increased traffic volumes along study roadway segments. The project is expected to generate a net of 792 average daily trips, which would result in noise increases on project area roadways. Auburn Boulevard, between Pasadena Avenue and Myrtle Avenue, has an average daily traffic (ADT) volume of approximately 20,118 vehicles (**Table 6**). Therefore, a maximum of 792 daily project trips would not double the existing traffic volume per day. Operational related traffic noise would not be noticeable and would not create a significant noise impact.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

7 REFERENCES

1. California Department of Transportation, *California Vehicle Noise Emission Levels*, 1987.
2. California Department of Transportation, *Traffic Noise Analysis Protocol*, 2011.
3. California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013.
4. California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2013.
5. California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2013.
6. County of Sacramento, Sacramento County Code, March 2020.
7. County of Sacramento, *General Plan*, 2017.
8. County of Sacramento, *International Airport Land Use Plan,* December 12, 2013.
9. Cyril M. Harris, *Handbook of Noise Control*, 1979.
10. Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, July 6, 2010.
11. Federal Highway Administration, *Noise Fundamentals*, 2017. Available at: https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm
12. Federal Highway Administration, *Roadway Construction Noise Model*, 2006.
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14. Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, 1992.
15. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018.
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17. Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.
18. Kimley-Horn, *Auburn Boulevard Fuel Station Traffic Evaluation*, May 2022.
19. United States Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100),* 1979.
20. United States Department of Housing and Urban Development, *Noise Guidebook*, 2009.

Appendix A

Noise Modeling Results

Noise Measurement Field Data

Project:	Sacramento County Fuel Station	**Job Number:**	197015026
Site No.:	1	**Date:**	5/25/2022
Analyst:	Addie Sedoff	**Time:**	10:50 AM
Location:	Intersection of Myrtle Ave & Indian Oaks CT		
Noise Sources:	Cars driving by, car door slaming, birds		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	58.1	41.2	72.0	92.5

Equipment	
Sound Level Meter:	LArson Davis Model 831
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	93°
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	30.07"
Humidity:	27%

Photo:



Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	831_Data.014.s	Computer's File Name	831_0002335-20220525 105019-831_Data.014.ldbin
Meter	831 0002335	Firmware	2.403
User		Location	
Job Description			
Note			
Start Time	2022-05-25 10:50:19	Duration	0:10:00.0
End Time	2022-05-25 11:00:19	Run Time	0:10:00.0
Pre-Calibration	2022-04-28 09:57:43	Post-Calibration	None
Pause Time	0:00:00.0	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	58.1 dB		
LAE	85.9 dB	SEA	--- dB
EA	43.0 µPa²h		
EA8	2.1 mPa²h		
EA40	10.3 mPa²h		
LZ_{peak}	92.5 dB	2022-05-25 10:59:44	
LAS_{max}	72.0 dB	2022-05-25 11:00:10	
LAS_{min}	41.2 dB	2022-05-25 10:57:19	
LA_{eq}	58.1 dB		
LC_{eq}	64.9 dB	LC_{eq} - LA_{eq}	6.8 dB
LAI_{eq}	60.3 dB	LAI_{eq} - LA_{eq}	2.2 dB

Exceedances

	Count	Duration
LAS > 65.0 dB	13	0:00:43.9
LAS > 85.0 dB	0	0:00:00.0
LZpeak > 135.0 dB	0	0:00:00.0
LZpeak > 137.0 dB	0	0:00:00.0
LZpeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
58.1 dB	58.1 dB	0.0 dB

LDEN	LDay	LEve	LNight
58.1 dB	58.1 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	58.1 dB		64.9 dB		67.1 dB	
$Ls_{(max)}$	72.0 dB	2022-05-25 11:00:10	78.0 dB	2022-05-25 10:54:30	79.6 dB	2022-05-25 10:58:06
$LF_{(max)}$	74.0 dB	2022-05-25 11:00:09	81.2 dB	2022-05-25 10:58:05	83.3 dB	2022-05-25 10:58:05
$LI_{(max)}$	75.4 dB	2022-05-25 10:54:30	83.5 dB	2022-05-25 10:58:05	86.0 dB	2022-05-25 10:58:05
$LS_{(min)}$	41.2 dB	2022-05-25 10:57:19	55.1 dB	2022-05-25 10:57:21	59.5 dB	2022-05-25 10:56:52
$LF_{(min)}$	40.1 dB	2022-05-25 10:57:16	53.0 dB	2022-05-25 10:57:09	56.9 dB	2022-05-25 10:56:52
$LI_{(min)}$	41.4 dB	2022-05-25 10:57:17	55.8 dB	2022-05-25 10:57:16	60.8 dB	2022-05-25 10:59:07
$L_{Peak(max)}$	89.6 dB	2022-05-25 10:55:35	91.4 dB	2022-05-25 10:59:44	92.5 dB	2022-05-25 10:59:44

Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Noise Measurement Field Data

Project:	Sacramento County Fuel Station	**Job Number:**	197015026
Site No.:	2	**Date:**	5/25/2022
Analyst:	Addie Sedoff	**Time:**	11:13 AM
Location:	4838 Pasarobles Drive		
Noise Sources:	Cars driving by, dogs barking, people talking, emergency vehicle siren		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	48.5	42.8	62.9	86.0

Equipment	
Sound Level Meter:	LArson Davis Model 831
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	93°
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	30.07"
Humidity:	27%

Photo:



Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	831_Data.015.s	Computer's File Name	831_0002335-20220525 111340-831_Data.015.ldbin
Meter	831 0002335	Firmware	2.403
User		Location	
Job Description			
Note			

Start Time	2022-05-25 11:13:40	Duration	0:10:00.0		
End Time	2022-05-25 11:23:40	Run Time	0:10:00.0	Pause Time	0:00:00.0
Pre-Calibration	2022-04-28 09:57:43	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	48.5 dB		
LAE	76.3 dB	SEA	--- dB
EA	4.7 µPa²h		
EA8	226.5 µPa²h		
EA40	1.1 mPa²h		
LZ_{peak}	86.0 dB	2022-05-25 11:20:11	
LAS_{max}	62.9 dB	2022-05-25 11:14:14	
LAS_{min}	42.8 dB	2022-05-25 11:14:30	
LA_{eq}	48.5 dB		
LC_{eq}	59.1 dB	LC_{eq} - LA_{eq}	10.6 dB
LAI_{eq}	52.3 dB	LAI_{eq} - LA_{eq}	3.8 dB

Exceedances	Count	Duration
LAS > 65.0 dB	0	0:00:00.0
LAS > 85.0 dB	0	0:00:00.0
LZpeak > 135.0 dB	0	0:00:00.0
LZpeak > 137.0 dB	0	0:00:00.0
LZpeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	48.5 dB	48.5 dB	0.0 dB

	LDEN	LDay	LEve	LNight
	48.5 dB	48.5 dB	--- dB	--- dB

Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	48.5 dB		59.1 dB		63.6 dB	
$Ls_{(max)}$	62.9 dB	2022-05-25 11:14:14	69.6 dB	2022-05-25 11:15:09	72.8 dB	2022-05-25 11:15:09
$LF_{(max)}$	65.1 dB	2022-05-25 11:14:13	72.2 dB	2022-05-25 11:14:14	74.5 dB	2022-05-25 11:15:09
$LI_{(max)}$	66.9 dB	2022-05-25 11:14:13	74.5 dB	2022-05-25 11:20:11	77.7 dB	2022-05-25 11:20:11
$LS_{(min)}$	42.8 dB	2022-05-25 11:14:30	55.4 dB	2022-05-25 11:14:33	59.7 dB	2022-05-25 11:14:30
$LF_{(min)}$	41.8 dB	2022-05-25 11:14:28	53.1 dB	2022-05-25 11:17:09	56.8 dB	2022-05-25 11:17:09
$LI_{(min)}$	42.7 dB	2022-05-25 11:14:29	56.2 dB	2022-05-25 11:14:54	60.3 dB	2022-05-25 11:14:30
$L_{Peak(max)}$	81.6 dB	2022-05-25 11:14:41	83.7 dB	2022-05-25 11:14:14	86.0 dB	2022-05-25 11:20:11

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

Noise Measurement Field Data

Project:	Sacramento County Fuel Station	**Job Number:**	197015026
Site No.:	3	**Date:**	5/25/2022
Analyst:	Addie Sedoff	**Time:**	11:42 AM
Location:	Southeast Corner of the Auburn Blvd & Myrtle Ave Intersection		
Noise Sources:	Cars, trucks, and buses driving by, people talking, car horn		
Comments:	Noise from gas station and auto-motive shop across intersection		

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	63.7	44.1	77.2	97.2

Equipment	
Sound Level Meter:	LArson Davis Model 831
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	93°
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	30.07"
Humidity:	27%

Photo:



Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	831_Data.017.s	Computer's File Name	831_0002335-20220525 114240-831_Data.017.ldbin
Meter	831 0002335	Firmware	2.403
User		Location	
Job Description			
Note			

Start Time	2022-05-25 11:42:40	Duration	0:13:14.9		
End Time	2022-05-25 12:06:06	Run Time	0:13:14.9	Pause Time	0:00:00.0
Pre-Calibration	2022-04-28 09:57:43	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	63.7 dB		
LAE	92.7 dB	SEA	--- dB
EA	207.0 µPa²h		
EA8	7.5 mPa²h		
EA40	37.5 mPa²h		
LZ_{peak}	97.2 dB	2022-05-25 11:52:32	
LAS_{max}	77.2 dB	2022-05-25 11:45:12	
LAS_{min}	44.1 dB	2022-05-25 12:05:51	
LA_{eq}	63.7 dB		
LC_{eq}	72.3 dB	LC_{eq} - LA_{eq}	8.6 dB
LAI_{eq}	65.4 dB	LAI_{eq} - LA_{eq}	1.7 dB

Exceedances	Count	Duration
LAS > 65.0 dB	22	0:03:01.7
LAS > 85.0 dB	0	0:00:00.0
LZpeak > 135.0 dB	0	0:00:00.0
LZpeak > 137.0 dB	0	0:00:00.0
LZpeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	63.7 dB	63.7 dB	0.0 dB

	LDEN	LDay	LEve	LNight
	63.7 dB	63.7 dB	--- dB	--- dB

Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	63.7 dB		72.3 dB		74.1 dB	
$Ls_{(max)}$	77.2 dB	2022-05-25 11:45:12	85.1 dB	2022-05-25 11:45:46	85.3 dB	2022-05-25 11:45:46
$LF_{(max)}$	79.6 dB	2022-05-25 11:45:12	88.0 dB	2022-05-25 11:45:46	88.1 dB	2022-05-25 11:45:46
$LI_{(max)}$	80.3 dB	2022-05-25 11:45:12	88.8 dB	2022-05-25 11:45:45	88.9 dB	2022-05-25 11:45:45
$LS_{(min)}$	44.1 dB	2022-05-25 12:05:51	58.6 dB	2022-05-25 12:04:11	61.2 dB	2022-05-25 12:03:54
$LF_{(min)}$	43.2 dB	2022-05-25 12:05:56	57.2 dB	2022-05-25 12:03:54	59.4 dB	2022-05-25 12:03:54
$LI_{(min)}$	43.7 dB	2022-05-25 12:05:56	59.3 dB	2022-05-25 12:04:00	62.3 dB	2022-05-25 12:03:21
$L_{Peak(max)}$	92.3 dB	2022-05-25 11:45:12	97.3 dB	2022-05-25 11:45:46	97.2 dB	2022-05-25 11:52:32

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

Noise Measurement Field Data

Project:	Sacramento County Fuel Station	**Job Number:**	197015026
Site No.:	4	**Date:**	5/25/2022
Analyst:	Addie Sedoff	**Time:**	12:06 PM
Location:	4732 River College Dr.		
Noise Sources:	Cars drivign by, overhead airplane noise, people talking		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	53.3	42.5	73.9	90.5

Equipment	
Sound Level Meter:	LArson Davis Model 831
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	93°
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	30.07"
Humidity:	27%

Photo:



Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	831_Data.018.s	Computer's File Name	831_0002335-20220525 120621-831_Data.018.ldbin
Meter	831 0002335	Firmware	2.403
User		Location	
Job Description			
Note			

Start Time	2022-05-25 12:06:21	Duration	0:10:00.0		
End Time	2022-05-25 12:16:21	Run Time	0:10:00.0	Pause Time	0:00:00.0
Pre-Calibration	2022-04-28 09:57:43	Post-Calibration	None	Calibration Deviation	---

Results

Overall Metrics

LA_{eq}	53.3 dB		
LAE	81.1 dB	SEA	--- dB
EA	14.3 µPa²h		
EA8	684.1 µPa²h		
EA40	3.4 mPa²h		
LZ_{peak}	90.5 dB	2022-05-25 12:09:20	
LAS_{max}	73.9 dB	2022-05-25 12:12:41	
LAS_{min}	42.5 dB	2022-05-25 12:15:06	
LA_{eq}	53.3 dB		
LC_{eq}	61.7 dB	LC_{eq} - LA_{eq}	8.4 dB
LAI_{eq}	58.8 dB	LAI_{eq} - LA_{eq}	5.5 dB

Exceedances	Count	Duration
LAS > 65.0 dB	3	0:00:09.3
LAS > 85.0 dB	0	0:00:00.0
LZpeak > 135.0 dB	0	0:00:00.0
LZpeak > 137.0 dB	0	0:00:00.0
LZpeak > 140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight
	53.3 dB	53.3 dB	0.0 dB

	LDEN	LDay	LEve	LNight
	53.3 dB	53.3 dB	--- dB	--- dB

Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	53.3 dB		61.7 dB		64.9 dB	
$Ls_{(max)}$	73.9 dB	2022-05-25 12:12:41	73.5 dB	2022-05-25 12:12:41	73.9 dB	2022-05-25 12:12:41
$LF_{(max)}$	78.1 dB	2022-05-25 12:12:41	77.6 dB	2022-05-25 12:12:41	77.8 dB	2022-05-25 12:12:41
$LI_{(max)}$	78.7 dB	2022-05-25 12:12:41	78.2 dB	2022-05-25 12:12:41	78.5 dB	2022-05-25 12:12:41
$LS_{(min)}$	42.5 dB	2022-05-25 12:15:06	57.5 dB	2022-05-25 12:07:33	61.0 dB	2022-05-25 12:10:14
$LF_{(min)}$	41.7 dB	2022-05-25 12:14:50	55.4 dB	2022-05-25 12:07:19	58.5 dB	2022-05-25 12:07:46
$LI_{(min)}$	42.5 dB	2022-05-25 12:15:19	58.1 dB	2022-05-25 12:07:33	62.1 dB	2022-05-25 12:10:35
$L_{Peak(max)}$	92.1 dB	2022-05-25 12:09:20	90.5 dB	2022-05-25 12:09:20	90.5 dB	2022-05-25 12:09:20

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/18/2022
Case Description: Arch Coating

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residences North	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		**77.7**	140	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)														
	68.7	**64.7**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	**68.7**	**64.7**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residences West	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		**77.7**	285	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)														
	62.6	58.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	62.6	58.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Industrial	Industrial	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		**77.7**	140	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)														
	69.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	**75.1**	**75.5**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/18/2022
Case Description: Construction

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residences North	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	140	0
Man Lift	No	20		74.7	140	0
Generator	No	50		80.6	140	0
Tractor	No	40	84		140	0
Welder / Torch	No	40		74	140	0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Crane	71.6	63.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	65.8	58.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	71.7	68.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	75.1	71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	65.1	61.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	75.1	73.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residences West	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	285	0
Man Lift	No	20		74.7	285	0
Generator	No	50		80.6	285	0
Tractor	No	40	84		285	0
Welder / Torch	No	40		74	285	0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Crane	65.4	57.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	59.6	52.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	65.5	62.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	68.9	64.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	58.9	54.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	68.9	67.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Industrial	Industrial	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	140	0
Man Lift	No	20		74.7	140	0
Generator	No	50		80.6	140	0
Tractor	No	40	84		140	0
Welder / Torch	No	40		74	140	0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Crane	69.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	68.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	75.1	71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	71.1	64.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	75.1	71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	75.1	75.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 5/18/2022
Case Description: Demo

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residences North	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	140	0
Dozer	No	40		81.7	140	0
Tractor	No	40	84		140	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	80.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	72.7	68.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	75.1	71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.6	76.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residences West	Residential	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	285	0
Dozer	No	40		81.7	285	0
Tractor	No	40	84		285	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	74.5	67.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	68.9	64.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	74.5	70.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Industrial	Industrial	1	1	1

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	140	0
Dozer	No	40		81.7	140	0
Tractor	No	40	84		140	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	80.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	72.7	68.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	75.1	71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.6	76.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 5/18/2022
Case Description: Site Prep

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residences North	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40	85		140	0
Dozer	No	40		81.7	140	0
Tractor	No	40	84		140	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader		76.1	72.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		72.7	68.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		75.1	71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	76.1	75.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residences West	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40	85		285	0
Dozer	No	40		81.7	285	0
Tractor	No	40	84		285	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader		69.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		68.9	64.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	69.9	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Industrial	Industrial	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40	85		140	0
Dozer	No	40		81.7	140	0
Tractor	No	40	84		140	0

Results

		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader		76.1	72.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		72.7	68.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor		75.1	71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	76.1	75.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 5/18/2022
Case Description: Paving

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residences North	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Mixer Truck	No	40		78.8	140	0
Paver	No	50		77.2	140	0
Tractor	No	40	84		140	0
Roller	No	20		80	140	0
Tractor	No	40	84		140	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Mixer Truck	69.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	68.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	75.1	71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	71.1	64.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	75.1	71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	75.1	75.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residences West	Residential	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Mixer Truck	No	40		78.8	285	0
Paver	No	50		77.2	285	0
Tractor	No	40	84		285	0
Roller	No	20		80	285	0
Tractor	No	40	84		285	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Mixer Truck	63.7	59.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	62.1	59.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	68.9	64.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	64.9	57.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	68.9	64.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	68.9	69.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Industrial	Industrial	1	1	1

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Mixer Truck	No	40		78.8	140	0
Paver	No	50		77.2	140	0
Tractor	No	40	84		140	0
Roller	No	20		80	140	0
Tractor	No	40	84		140	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Mixer Truck	69.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	68.3	65.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	75.1	71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	71.1	64.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	75.1	71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	75.1	75.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 5/18/2022
Case Description: Site Prep

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residences North	Residential	1	1	1

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40	85		140	0
Dozer	No	40		81.7	140	0
Tractor	No	40	84		140	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
			Day		Evening		Night		Day		Evening		Night
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Grader	76.1	72.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	72.7	68.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	75.1	71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	76.1	75.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Residences West	Residential	1	1	1

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40	85		285	0
Dozer	No	40		81.7	285	0
Tractor	No	40	84		285	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
			Day		Evening		Night		Day		Evening		Night
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Grader	69.9	65.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	66.6	62.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	68.9	64.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	69.9	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Industrial	Industrial	1	1	1

			Equipment			
	Impact		Spec Lmax	Actual Lmax	Receptor Distance	Estimated Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40	85		140	0
Dozer	No	40		81.7	140	0
Tractor	No	40	84		140	0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
			Day		Evening		Night		Day		Evening		Night
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Grader	76.1	72.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	72.7	68.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	75.1	71.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	76.1	75.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Sac County Fuel Station
Project Number:
Scenario: Existing
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

								Vehicle Mix			Distance from Centerline of Roadway			
#	Roadway	Segment	Lanes	Median Width	ADT Volume	Speed (mph)	Alpha Factor	Medium Trucks	Heavy Trucks	CNEL at 100 Feet	Distance to Contour 70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Auburn Blvd	Pasedena/Mrytle	4	17	20,118	40	0	5.7%	4.4%	68.4	69	220	694	2,196
2	Auburn Blvd	Myrtle/Colleg Oak	4	17	16,379	40	0	5.7%	4.4%	67.5	57	179	565	1,788
3	Myrtle Ave	Date/Auburn	2	2	5,826	25	0	5.7%	4.4%	60.7	-	37	118	372
4	Myrtle Ave	Auburn/College Oak	2	2	5,088	35	0	5.7%	4.4%	61.3	-	43	136	430

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Sac County Fuel Station
Project Number:
Scenario: Existing Plus Project
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

#	Roadway	Segment	Lanes	Median Width	ADT Volume	Speed (mph)	Alpha Factor	Vehicle Mix: Medium Trucks	Vehicle Mix: Heavy Trucks	CNEL at 100 Feet	Distance from Centerline of Roadway to Contour: 70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Auburn Blvd	Pasedena/Mrytle	4	17	20,403	40	0	5.7%	4.4%	68.5	70	223	704	2,227
2	Auburn Blvd	Myrtle/Colleg Oak	4	17	16,712	40	0	5.7%	4.4%	67.6	58	182	577	1,824
3	Myrtle Ave	Date/Auburn	2	2	6,214	25	0	5.7%	4.4%	61.0	-	40	125	397
4	Myrtle Ave	Auburn/College Oak	2	2	5,167	35	0	5.7%	4.4%	61.4	-	44	138	436

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.