Environmental Noise Assessment

B & D Freight Terminal

City of Live Oak, California

February 12, 2021

Project # 201101

Prepared for:

Raney Planning and Management
1501 Sports Drive, Suite A
Sacramento, CA 95834

Prepared by:

Saxelby Acoustics LLC

Luke Saxelby, INCE Bd. Cert.
Principal Consultant
Board Certified, Institute of Noise Control Engineering (INCE)

(916) 760-8821
www.SaxNoise.com | Luke@SaxNoise.com
915 Highland Pointe Drive, Suite 250
Roseville, CA 95678

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INTRODUCTION

The Bishop Avenue Truck Parking project includes the construction of a truck parking located south of Live Oak, California. The project site covers 9.7 acres on the south side of Bishop Avenue. The project is located approximately 300 feet east of Highway 99, 350 feet east of the Union Pacific railroad line, and adjacent to the west side of the Sunset Lateral canal. The project will provide 80 parking spaces for semi-trucks upon full buildout. Surrounding land uses include industrial and agricultural uses. Existing rural residential uses are located to the west, east, and south of the project site.

Figure 1 shows the project site plan. **Figure 2** shows an aerial photo of the project site.

ENVIRONMENTAL SETTING

BACKGROUND INFORMATION ON NOISE

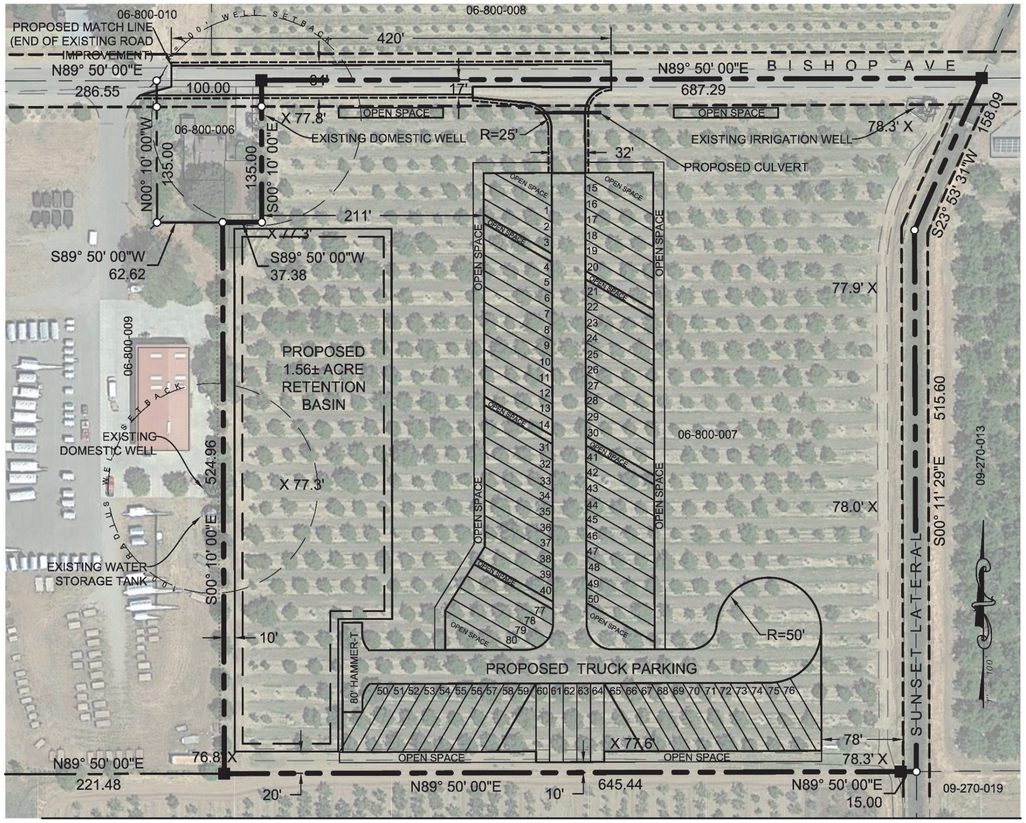
Fundamentals of Acoustics

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then 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).

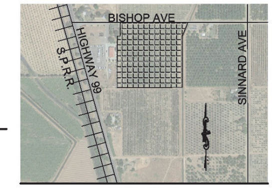
Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective from person to person.

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

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



SITE



VICINITY

OWNER INFORMATION

DILBAG S. DEOL
AVTAR S. BUTTER
9026 IDA STREET
LIVE OAK, CA 95953

PROPERTY INFORMATION

APN: 06-800-007
LOT SIZE: 9.70± ACRES
USE TYPE: AGRICULTURAL
ZONING: E - EMPLOYMENT
FLOOD ZONE: X

PROJECT NAME & LOCATION

B & D FREIGHT TERMINAL
2104 BISHOP AVENUE
LIVE OAK, CA 95953

DRIVEWAY & PARKING AREA NOTES

1. DRIVEWAY APPROACH SHALL BE PAVED WITH DUST FREE SURFACING.
2. APPLICANT REQUESTS PARKING AREA CONSIST OF A 6" CLASS 2 AGGREGATE BASE COMPACTED TO 95%. SUB-GRADE SHALL BE PREPARED TO THE DEPTH OF 6" AND RELATIVE COMPACTION OF 90%.
3. THE DEPICTION OF THE 50' RADIUS AND 80' HAMMERHEAD-T TURNAROUNDS TO DEMONSTRATE ABILITY TO TURN AROUND ON-SITE.
4. OPEN SPACES ARE RESERVED FOR LIGHTING AND LANDSCAPING, IF APPLICABLE. (OPEN SPACES REPRESENT 13% OF THE IMPACTED AREA).
5. PARKING STALLS SHOWN: 80 SPACES - 13 FEET WIDE & 75 FEET DEEP.
6. PHASING FOR PARKING IS DESIRED. PHASE 1 = 30 SPACES, PHASE 2 = 50 SPACES TOTAL AND PHASE 3 = 80 TOTAL SPACES.

OFF-SITE NOTES

1. APPLICANT REQUESTS TO WIDEN EXISTING PAVEMENT TO 14 FEET WITH 3 FOOT SHOULDERS TO BETTER MATCH EXISTING ROAD IMPROVEMENTS TO THE WEST.

GRADING AND DRAINAGE NOTES

1. APPLICANT REQUESTS TO PROVIDE IMPROVEMENT PLAN(S), CALCULATION(S) AND/OR SUPPORTING DOCUMENT(S) AFTER REVIEW AND DETERMINATION(S) FOR CONDITION OF APPROVAL HAVE BEEN MADE.

LEGEND

- CALCULATED CORNER SYMBOLS
- PROPERTY LINES
- ADJACENT LOT LINES
- RIGHT OF WAY LINES
- X 3.0' EXISTING SPOT ELEVATIONS
- FOUND MONUMENTS
- PROPOSED IMPROVEMENTS
- PROPOSED GRAVEL SHOULDER
- PROPOSED ASPHALT DRIVEWAY

SITE PLAN NOTES

1. THE PROPERTY LINES AND RIGHT OF WAY LINES DEPICTED HEREON ARE BASED ON THE CURRENT GRANT DEED, ORIGINAL RECORD MAPPING AND MONUMENTS FOUND IN THE FIELD. THEY SHALL BE CONSIDERED APPROXIMATE.
2. THE VERTICAL DATUM IS: THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. THE IMAGE IS APPROXIMATE AND IS SCALED TO FIT FIELD OCCUPATIONS.
4. NO STRUCTURES PROPOSED FOR THIS PROJECT.

ENGINEER

DAVID L. SWARTZ, PE 52840
CALIFORNIA ENGINEERING CO., INC.
1110 CIVIC CENTER BLVD., SUITE 404B
YUBA CITY, CA 95993
(530) 751-0952

REGISTERED PROFESSIONAL ENGINEER DAVID LYNDOL SWARTZ No. 52840 STATE OF CALIFORNIA

NO. 1 DATE 1/26/21 DESCRIPTION SITE PLAN REVISION

MDM TRUCKING LLC
SITE PLAN
2104 BISHOP AVENUE

PROJECT NUMBER 20-202
SHEET 1 OF 2

B&D Freight Terminal
City of Live Oak, California

Figure 1
Project Site Plan

B&D Freight Terminal

City of Live Oak, California

Figure 2

Noise Measurement Sites

Legend

- Project Site
- Noise Measurement Site - Long Term

0 m 50 m 100 m

Projection: State Plane (California Zone 2) / NAD83 / meters
Rev. Date: 11/24/2020

SAXELBY ACOUSTICS
Acoustics · Noise · Vibration

The decibel scale is logarithmic, not linear. In other words, two sound levels 10-dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10-dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound, and twice as loud as a 60 dBA sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day/night average level (DNL or L_{dn}) is based upon the average noise level over a 24-hour day, with a +10-decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Table 1 lists several examples of the noise levels associated with common situations. **Appendix A** provides a summary of acoustical terms used in this report.

TABLE 1: TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft.)	--100--	
Gas Lawn Mower at 1 m (3 ft.)	--90--	
Diesel Truck at 15 m (50 ft.), at 80 km/hr. (50 mph)	--80--	Food Blender at 1 m (3 ft.) Garbage Disposal at 1 m (3 ft.)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft.)	--70--	Vacuum Cleaner at 3 m (10 ft.)
Commercial Area Heavy Traffic at 90 m (300 ft.)	--60--	Normal Speech at 1 m (3 ft.)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

Source: Caltrans, Technical Noise Supplement, Traffic Noise Analysis Protocol. September, 2013.

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as hearing loss or sudden startling

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1-dBA cannot be perceived;
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference;
- A change in level of at least 5-dBA is required before any noticeable change in human response would be expected; and
- A 10-dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6-dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

EXISTING AND FUTURE NOISE AND VIBRATION ENVIRONMENTS

EXISTING NOISE RECEPTORS

Some land uses are considered more sensitive to noise than others. Land uses often associated with sensitive receptors generally include residences, schools, libraries, hospitals, and passive recreational areas. Sensitive noise receptors may also include threatened or endangered noise sensitive biological species, although many jurisdictions have not adopted noise standards for wildlife areas. Noise sensitive land uses are typically given special attention in order to achieve protection from excessive noise.

Sensitivity is a function of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities involved. In the vicinity of the project site, sensitive land uses include existing single-family residential uses located directly to the east of the project site.

EXISTING GENERAL AMBIENT NOISE LEVELS

The existing ambient noise environment in the project vicinity is primarily defined by traffic on Highway 99 and the Union Pacific railroad.

To quantify the existing ambient noise environment in the project vicinity, Saxelby Acoustics conducted continuous (24-hr.) noise level measurements at one location at the closest adjacent residential use. Noise measurement locations are shown on **Figure 2**. A summary of the noise level measurement survey results is provided in **Table 2**. **Appendix B** contains the complete results of the noise monitoring.

The sound level meter was programmed to record the maximum, median, and average noise levels during the survey. The maximum value, denoted L_{max}, represents the highest noise level measured. The average value, denoted L_{eq}, represents the energy average of all of the noise received by the sound level meter microphone during the monitoring period. The median value, denoted L_{50}, represents the sound level exceeded 50 percent of the time during the monitoring period.

A Larson Davis Laboratories (LDL) model 820 precision integrating sound level meter was used for the ambient noise level measurement survey. The meter was calibrated before and after use with a B&K Model 4230 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

TABLE 2: SUMMARY OF EXISTING BACKGROUND NOISE MEASUREMENT DATA

Site	Date	Average Measured Hourly Noise Levels, dBA						
		CNEL/L_{dn}	Daytime (7:00 am - 10:00 pm)			Nighttime (10:00 pm – 7:00 am)		
			L_{eq}	L_{50}	L_{max}	L_{eq}	L_{50}	L_{max}
LT-1	11/23/20	75	77	51	90	53	44	69
Source: Saxelby Acoustics – 2020								

FUTURE TRAFFIC NOISE ENVIRONMENT AT OFF-SITE RECEPTORS

The proposed project is only predicted to generate a maximum of 160 total truck trips per day. The nearest residential use to the project site is located approximately 50 feet from the centerline of Bishop Avenue. At this distance, the daily noise level from project-related trucks would be 61.4 dBA L_{dn}. Based upon the existing measured noise level of 75 dBA L_{dn} at this residence, the project-related traffic noise increase would be 0.2 dBA.

EVALUATION OF PROJECT OPERATIONAL NOISE AT RESIDENTIAL RECEPTORS

Parking Lot Circulation

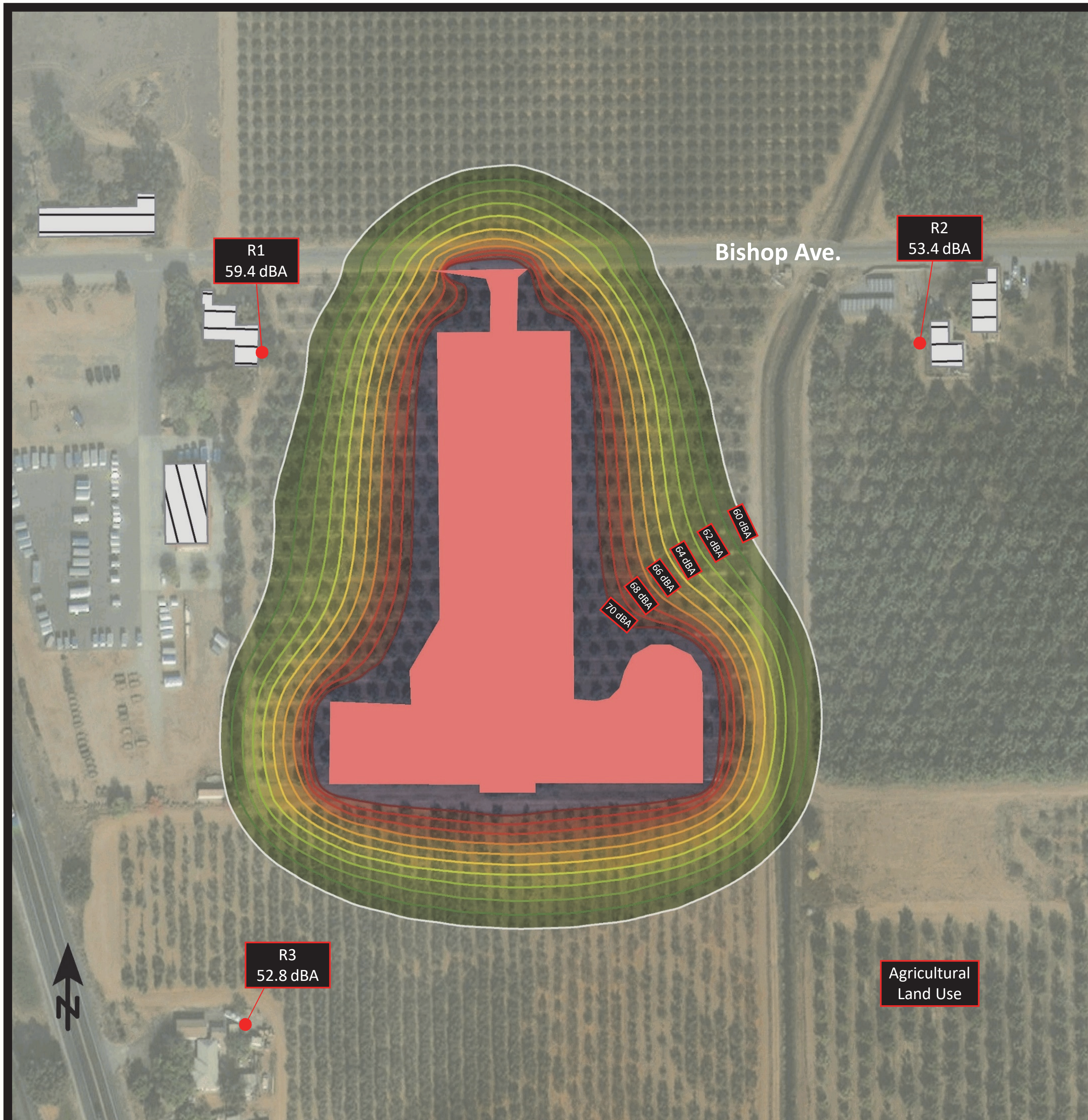
Based upon the daily estimate of 160 total truck trips, the peak hour trips for the project are estimated to be 16 truck trips. This analysis assumes that all of the vehicles would be tractor-trailers. Based upon noise measurements conducted of vehicle movements in parking lots, the sound exposure level (SEL) for a single tractor-trailer is 85 dBA at the same distance.

Saxelby Acoustics used the SoundPLAN noise model to calculate noise levels at the nearest sensitive receptors. Input data included the parking lot noise generation, as discussed above. It should be noted that brief maximum (L_{max}) noise levels for the trucking facility are estimated to be 20 dB higher due to sounds from air brakes and backup alarms. The results of this analysis are shown in **Table 3** below for each of the three closest residential receptors. **Figure 4** shows the predicted project noise levels in terms of average (L_{eq}) noise levels. **Figure 5** shows the predicted project maximum (L_{max}) noise levels.

TABLE 3: TRUCKING FACILITY OPERATIONAL NOISE AT NEAREST RECEPTORS

Descriptor	R1 (Northwest)	R2 (Northeast)	R3 (Southwest)
Average (L_{eq}, dBA)	39.4	33.4	32.8
Maximum (L_{max}, dBA)	59.4	53.4	52.8


B&D Freight Terminal
City of Live Oak, California
Figure 3
Project Noise Contours
(dBA L_{eq})
Signs and symbols
Circulation/Parking
Levels in dB(A) - Leq
<= 40
40 - 41
41 - 42
42 - 43
43 - 44
44 - 45
45 - 46
46 - 47
47 - 48
48 - 49
49 - 50
> 50
1 : 2129
0 10 20 40 60 80
m
Bishop Ave.
R1
39.4 dBA
R2
33.4 dBA
R3
32.8 dBA
40 dBA
42 dBA
44 dBA
46 dBA
48 dBA
50 dBA
Agricultural
Land Use



B&D Freight Terminal

City of Live Oak, California

Figure 4

Project Noise Contours
(dBA L_{max})

Signs and symbols

Circulation/Parking

Levels in dB(A) - Lmax

Levels
<= 60
60 - 61
61 - 62
62 - 63
63 - 64
64 - 65
65 - 66
66 - 67
67 - 68
68 - 69
69 - 70
> 70

1 : 2129

0 10 20 40 60 80 m

CONSTRUCTION NOISE ENVIRONMENT

During the construction of the proposed project noise from construction activities would temporarily add to the noise environment in the project vicinity. As shown in **Table 4**, activities involved in construction would generate maximum noise levels ranging from 76 to 90 dB at a distance of 50 feet.

TABLE 4: CONSTRUCTION EQUIPMENT NOISE

Type of Equipment	Maximum Level, dBA at 50 feet
Auger Drill Rig	84
Backhoe	78
Compactor	83
Compressor (air)	78
Concrete Saw	90
Dozer	82
Dump Truck	76
Excavator	81
Generator	81
Jackhammer	89
Pneumatic Tools	85

Source: *Roadway Construction Noise Model User's Guide*. Federal Highway Administration. FHWA-HEP-05-054. January 2006.

CONSTRUCTION VIBRATION ENVIRONMENT

The primary vibration-generating activities associated with the proposed project would occur during construction when activities such as grading, utilities placement, and parking lot construction occur. **Table 5** shows the typical vibration levels produced by construction equipment.

TABLE 5: VIBRATION LEVELS FOR VARIOUS CONSTRUCTION EQUIPMENT

Type of Equipment	Peak Particle Velocity at 25 feet (inches/second)	Peak Particle Velocity at 50 feet (inches/second)	Peak Particle Velocity at 100 feet (inches/second)
Large Bulldozer	0.089	0.031	0.011
Loaded Trucks	0.076	0.027	0.010
Small Bulldozer	0.003	0.001	0.000
Auger/drill Rigs	0.089	0.031	0.011
Jackhammer	0.035	0.012	0.004
Vibratory Hammer	0.070	0.025	0.009
Vibratory Compactor/roller	0.210 (Less than 0.20 at 26 feet)	0.074	0.026

Source: *Transit Noise and Vibration Impact Assessment Guidelines.* Federal Transit Administration. May 2006.

REGULATORY CONTEXT

FEDERAL

There are no federal regulations related to noise that apply to the Proposed Project.

STATE

There are no state regulations related to noise that apply to the Proposed Project.

LOCAL

LIVE OAK GENERAL PLAN NOISE ELEMENT

The City of Live Oak General Plan establishes the following standards relative to project's creating new non-transportation noise sources.

Policy NOISE-1.3: Proposed noise-generating industrial and other land uses shall be located away from noise-sensitive land uses, shall enclose any substantial noise sources completely within buildings or structures, or use other site planning or mitigation techniques to achieve the standards established in this Noise Element (see Table NOISE-2, **Table 6**).

TABLE 6: STATIONARY NOISE SOURCE NOISE STANDARDS

Noise Level Descriptor	Outdoor Activity Areas[1] Daytime[2] (7 a.m. to 10 p.m.)	Outdoor Activity Areas[1] Nighttime[2] (10 p.m. to 7 a.m.)
Hourly equivalent sound level (Leq), dB	60	45
Maximum sound level (Lmax), dB	75	65

Notes:
dBA = A-weighted decibel; Leq = energy-equivalent noise level; Lmax = maximum noise level.
Each of the noise levels specified shall be lowered by 5 dBA for simple tone noises, noises consisting primarily of speech, music, or for recurring impulsive noises.

These noise-level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings). Noise-sensitive land uses include schools, hospitals, rest homes, long-term care, mental care facilities, residences, and other similar land uses.

Outdoor activity areas are defined in Table Noise-1.

Where development projects or roadway improvement projects could potentially create noise impacts, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design. Such analysis shall be the financial responsibility of the applicant and be prepared by a qualified person experienced in the fields of environmental noise assessment and architectural acoustics. Mitigation strategies shall emphasize site planning and design over other types of mitigation.

IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Appendix G of the CEQA Guidelines states that a project would normally be considered to result in significant noise impacts if noise levels conflict with adopted environmental standards or plans or if noise generated by the project would substantially increase existing noise levels at sensitive receivers on a permanent or temporary basis. Significance criteria for noise impacts are drawn from CEQA Guidelines Appendix G (Items XI [a-f]).

Would the project:

a. 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?

b. Generate excessive groundborne vibration or groundborne noise levels?

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

Noise Level Increase Criteria for Long-Term Project-Related Noise Level Increases

The California Environmental Quality Act (CEQA) guidelines define a significant impact of a project if it “increases substantially the ambient noise levels for adjoining areas.” Generally, a project may have a significant effect on the environment if it will substantially increase the ambient noise levels for adjoining areas or expose people to severe noise levels. In practice, more specific professional standards have been developed. These standards state that a noise impact may be considered significant if it would generate noise that would conflict with local project criteria or ordinances, or substantially increase noise levels at noise sensitive land uses. The potential increase in traffic noise from the project is a factor in determining significance. Research into the human perception of changes in sound level indicates the following:

- A 3-dB change is barely perceptible,
- A 5-dB change is clearly perceptible, and
- A 10-dB change is perceived as being twice or half as loud.

A limitation of using a single noise level increase value to evaluate noise impacts is that it fails to account for pre-project-noise conditions. **Table 7** is based upon recommendations made by the Federal Interagency Committee on Noise (FICON) to provide guidance in the assessment of changes in ambient noise levels resulting from aircraft operations. The recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, it has been accepted that they are applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the L_{dn}.

TABLE 7: SIGNIFICANCE OF CHANGES IN NOISE EXPOSURE

Ambient Noise Level Without Project, L_{dn}	Increase Required for Significant Impact
<60 dB	+5.0 dB or more
60-65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more

Source: Federal Interagency Committee on Noise (FICON)

Based on **Table 7**, an increase in the traffic noise level of 5 dB or more would be significant where the pre-project noise levels are less than 60 dB L_{dn}, or 3 dB or more where existing noise levels are between 60 to 65 dB L_{dn}. Extending this concept to higher noise levels, an increase in the traffic noise level of 1.5 dB or more may be significant where the pre-project traffic noise level exceeds 65 dB L_{dn}. The rationale for the **Table 7** criteria is that as ambient noise levels increase, a smaller increase in noise resulting from a project is sufficient to cause annoyance.

Criteria for Acceptable Vibration

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating.

Vibration can be measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities in inches per second. Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities.

Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. **Table 8**, which was developed by Caltrans, shows the vibration levels which would normally be required to result in damage to structures. The vibration levels are presented in terms of peak particle velocity in inches per second.

Table 8 indicates that the threshold for architectural damage to structures is 0.20 in/sec p.p.v. A threshold of 0.20 in/sec p.p.v. is considered to be a reasonable threshold for short-term construction projects.

TABLE 8: EFFECTS OF VIBRATION ON PEOPLE AND BUILDINGS

Peak Particle Velocity		Human Reaction	Effect on Buildings
mm/second	in/second		
0.15-0.30	0.006-0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of "architectural" damage to normal buildings
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of "architectural" damage to normal dwelling - houses with plastered walls and ceilings. Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize "architectural" damage
10-15	0.4-0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage

Source: *Transportation Related Earthborne Vibrations.* Caltrans. TAV-02-01-R9601. February 20, 2002.

PROJECT-SPECIFIC IMPACTS AND MITIGATION MEASURES

IMPACT 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?

Traffic Noise Increases at Off-Site Receptors

The FICON guidelines specify criteria to determine the significance of traffic noise impacts. Where existing traffic noise levels are greater than 65 dB L_{dn}, at the outdoor activity areas of noise-sensitive uses, a +1.5 dB L_{dn} increase in roadway noise levels will be considered significant. As discussed earlier, the maximum increase is traffic noise at the nearest sensitive receptor is predicted to be 0.2 dBA. Therefore, impacts resulting from increased traffic noise would be considered ***less-than-significant***.

Operational Noise at Sensitive Receptors

Based upon **Table 3**, the proposed project is predicted to generate hourly (Leq) noise levels of 32.8 to 39.4 dBA at the nearest residential receptors. This complies with the City of Live Oak 45 dBA L_{eq} nighttime noise standard. Additionally, maximum noise levels are predicted to range between 52.8 to 59.4 dBA $L_{max.}$ This meets the City's 60 dBA L_{max} noise standard applied to simple tone noises, such as truck backup alarms. Therefore, noise impacts resulting from on-site vehicle circulation would be considered ***less-than-significant***.

Construction Noise

During the construction phases of the project, noise from construction activities would add to the noise environment in the immediate project vicinity. As indicated in **Table 4**, activities involved in construction would generate maximum noise levels ranging from 76 to 90 dBA L_{max} at a distance of 50 feet. Construction activities would also be temporary in nature and are anticipated to occur during normal daytime working hours.

Noise would also be generated during the construction phase by increased truck traffic on area roadways. A project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from the construction site. This noise increase would be of short duration, and would occur during daytime hours.

Noise from localized point sources (such as construction sites) typically decreases by approximately 6 dBA with each doubling of distance from source to receptor. The nearest residential uses are located approximately 350 feet, or more, from the center of the site. At this distance, maximum noise levels from construction would range from 61 dBA to 73 dBA L_{max}. Considering that existing maximum noise levels were measured to be 90 dBA L_{max} at the nearest residential uses, it is estimated that construction noise would be less than existing conditions. Therefore, noise impacts resulting from on-site construction would be considered ***less-than-significant***.

IMPACT 2: WOULD THE PROJECT GENERATE EXCESSIVE GROUNDBORNE VIBRATION OR GROUNDBORNE NOISE LEVELS?

Construction vibration impacts include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural.

The **Table 5** data indicate that construction vibration levels anticipated for the project are less than the 0.2 in/sec p.p.v. threshold of damage to buildings at distances of 26 feet. Sensitive receptors which could be impacted by construction related vibrations, especially vibratory compactors/rollers, are located further than 26 feet from typical construction activities. At distances greater than 26 feet construction vibrations are not predicted to exceed acceptable levels. Additionally, construction activities would be temporary in nature and would likely occur during normal daytime working hours. Therefore, no additional vibration control measures would be required.

IMPACT 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?

There are no airports in the project vicinity. Therefore, this impact is not applicable to the proposed project.

REFERENCES

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Appendix A: Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
ASTC	Apparent Sound Transmission Class. Similar to STC but includes sound from flanking paths and correct for room reverberation. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by +5 dBA and nighttime hours weighted by +10 dBA.
DNL	See definition of Ldn.
IIC	Impact Insulation Class. An integer-number rating of how well a building floor attenuates impact sounds, such as footsteps. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz).
Ldn	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
Lmax	The highest root-mean-square (RMS) sound level measured over a given period of time.
L(n)	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L50 is the sound level exceeded 50% of the time during the one-hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
NIC	Noise Isolation Class. A rating of the noise reduction between two spaces. Similar to STC but includes sound from flanking paths and no correction for room reverberation.
NNIC	Normalized Noise Isolation Class. Similar to NIC but includes a correction for room reverberation.
Noise	Unwanted sound.
NRC	Noise Reduction Coefficient. NRC is a single-number rating of the sound-absorption of a material equal to the arithmetic mean of the sound-absorption coefficients in the 250, 500, 1000, and 2,000 Hz octave frequency bands rounded to the nearest multiple of 0.05. It is a representation of the amount of sound energy absorbed upon striking a particular surface. An NRC of 0 indicates perfect reflection; an NRC of 1 indicates perfect absorption.
RT60	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 Sabin.
SEL	Sound Exposure Level. SEL is a rating, in decibels, of a discrete event, such as an aircraft flyover or train pass by, that compresses the total sound energy into a one-second event.
SPC	Speech Privacy Class. SPC is a method of rating speech privacy in buildings. It is designed to measure the degree of speech privacy provided by a closed room, indicating the degree to which conversations occurring within are kept private from listeners outside the room.
STC	Sound Transmission Class. STC is an integer rating of how well a building partition attenuates airborne sound. It is widely used to rate interior partitions, ceilings/floors, doors, windows and exterior wall configurations. The STC rating is typically used to rate the sound transmission of a specific building element when tested in laboratory conditions where flanking paths around the assembly don't exist. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
Simple Tone	Any sound which can be judged as audible as a single pitch or set of single pitches.

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Appendix B: Continuous Ambient Noise Measurement Results

Appendix B1: Continuous Noise Monitoring Results

Site: LT-1
Project: B & D Freight Terminal
Location: East of Project Site
Coordinates: 39.259167°, -121.653972°
Meter: LDL 820-4
Calibrator: CAL200

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Monday, November 23, 2020	0:00	45	65	39	32
Monday, November 23, 2020	1:00	44	69	38	30
Monday, November 23, 2020	2:00	43	58	40	32
Monday, November 23, 2020	3:00	56	72	43	34
Monday, November 23, 2020	4:00	57	73	49	41
Monday, November 23, 2020	5:00	54	73	52	47
Monday, November 23, 2020	6:00	52	71	51	48
Monday, November 23, 2020	7:00	56	73	52	48
Monday, November 23, 2020	8:00	53	74	49	45
Monday, November 23, 2020	9:00	71	98	48	44
Monday, November 23, 2020	10:00	76	100	48	44
Monday, November 23, 2020	11:00	73	100	48	44
Monday, November 23, 2020	12:00	71	100	49	46
Monday, November 23, 2020	13:00	82	103	53	47
Monday, November 23, 2020	14:00	79	100	57	47
Monday, November 23, 2020	15:00	79	102	53	47
Monday, November 23, 2020	16:00	84	104	61	48
Monday, November 23, 2020	17:00	82	104	54	50
Monday, November 23, 2020	18:00	55	74	53	48
Monday, November 23, 2020	19:00	54	74	51	47
Monday, November 23, 2020	20:00	53	77	48	45
Monday, November 23, 2020	21:00	49	71	46	41
Monday, November 23, 2020	22:00	48	72	43	38
Monday, November 23, 2020	23:00	54	72	42	36

Statistics	Leq	Lmax	L50	L90
Day Average	77	90	51	46
Night Average	53	69	44	38
Day Low	49	71	46	41
Day High	84	104	61	50
Night Low	43	58	38	30
Night High	57	73	52	48
Ldn	75	Day %		100
CNEL	75	Night %		0