Appendix K:

Acoustical Assessment

Acoustical Assessment
Alliance California Gateway South Building 8 Project
City of San Bernardino, California

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TABLE OF CONTENTS

APPENDICES

Appendix A: Noise Data

LIST OF ABBREVIATED TERMS

APN	Assessor's Parcel Number
ADT	Average daily traffic
dBA	A-weighted sound level
CEQA	California Environmental Quality Act
CLSP	California Landings Specific Plan
CSMA	California Subdivision Map 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
HOA	Homeowner's association
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
SBGP	City of San Bernardino General Plan
SBMC	City of San Bernardino Municipal Code
VdB	Vibration velocity level

1 INTRODUCTION

This report documents the results of an Acoustical Assessment completed for the Alliance California Gateway South Building 8 Project ("Project" or "proposed Project"). The purpose of this Acoustical Assessment is to evaluate the potential construction and operational noise associated with the Project and determine the level of impact the Project would have on the environment.

1.1 Project Location

The proposed Project is located at the northwest corner of E. Norman Road and Lena Road in the City of San Bernardino (City). The proposed site consists of 29 parcels (APN 0280-151-27 and -28; 0280-161-03, -05 through -18, and -30; 0280-17-01 through -11) on 15.25 acres. Currently, the eastern-half of the site are predominantly vacant and undeveloped with sparse vegetation and the western-half of the site contains single-family residential structures, an automobile body-shop and sales company, and vacant lands. The Project site is relatively flat and has elevations ranging from approximately 1,024 to 1,029 feet above mean sea level (amsl). The site's topography slightly slopes down to the west and southwest.

The Project site is bounded by industrial warehouse developments to the north and south, single-family residences and storage areas for trucks and shipping containers to the east, and single-family residence and a vacant lot to the west. In addition, the proposed Project is located approximately one mile southwest of the San Bernardino International Airport (SBIA) and is within the Airport Influence Area (AIA).

Local access to the Project site is provided via Lena Road and E. Norman Road. The nearest major freeways to the site include Interstate 215 (I-215), located approximately 1.1 miles west and Interstate 10 (I-10), located approximately 1.2 miles to the south of the site; refer to Exhibit 1: Regional Location and Exhibit 2: Local Vicinity.

1.2 Project Description

The Project proposes the development of an approximately 304,588-square-foot speculative industrial warehouse building that includes 16,000 square-feet of office space (with 10,000 square feet on the ground floor and 6,000 square feet on the mezzanine-level) and approximately 288,588 square feet of warehouse area on approximately 12.01 acres of the total 15.25 acres. The Project includes two (2) 40-foot-wide ingress and egress driveways from S. Lena Road and S. Foisy Street, along the northern part of the site and one (1) 30-foot-wide driveway from E. Norman Road. In addition, the rest of the site, which sits northeast of the proposed building would be developed into a 3.24-acre detention basin. The required parking, per the City's Development Code (DC) is 244 spaces. The Project provides a total of 246 parking spaces that includes 47 trailer stalls, 39 dock door parking spaces, and 160 standard auto parking spaces. Refer to Exhibit 3: Site Plan for further Project details.

The Project would increase onsite impermeable areas as a result of the construction of a 304,588-SF warehouse building and parking areas. However, the Project would also create a new 3.24-acre detention basin on the northeast of the site.

General Plan Land Use and Zoning Designations

As designated by the City's Development Code, the Project site has a General Plan land use designation of Industrial (I) and a Zoning designation of Industrial Light (IL). As such, the Project is anticipated to be consistent with the existing land use and zoning.

Site Access

The Project would include two (2) 40-foot driveways, each along S. Lena Road and S. Foisy Street one (1) 30-foot-wide driveway from E. Norman Road, which would provide local access to the Project site. Truck, passenger, and emergency vehicle access would be provided via the two (2) 40-foot access driveways along S. Lena Road and S. Foisy Street. Passenger vehicle access would also be provided via the 30-foot-wide driveway along E. Norman Road.

Walls and Fences

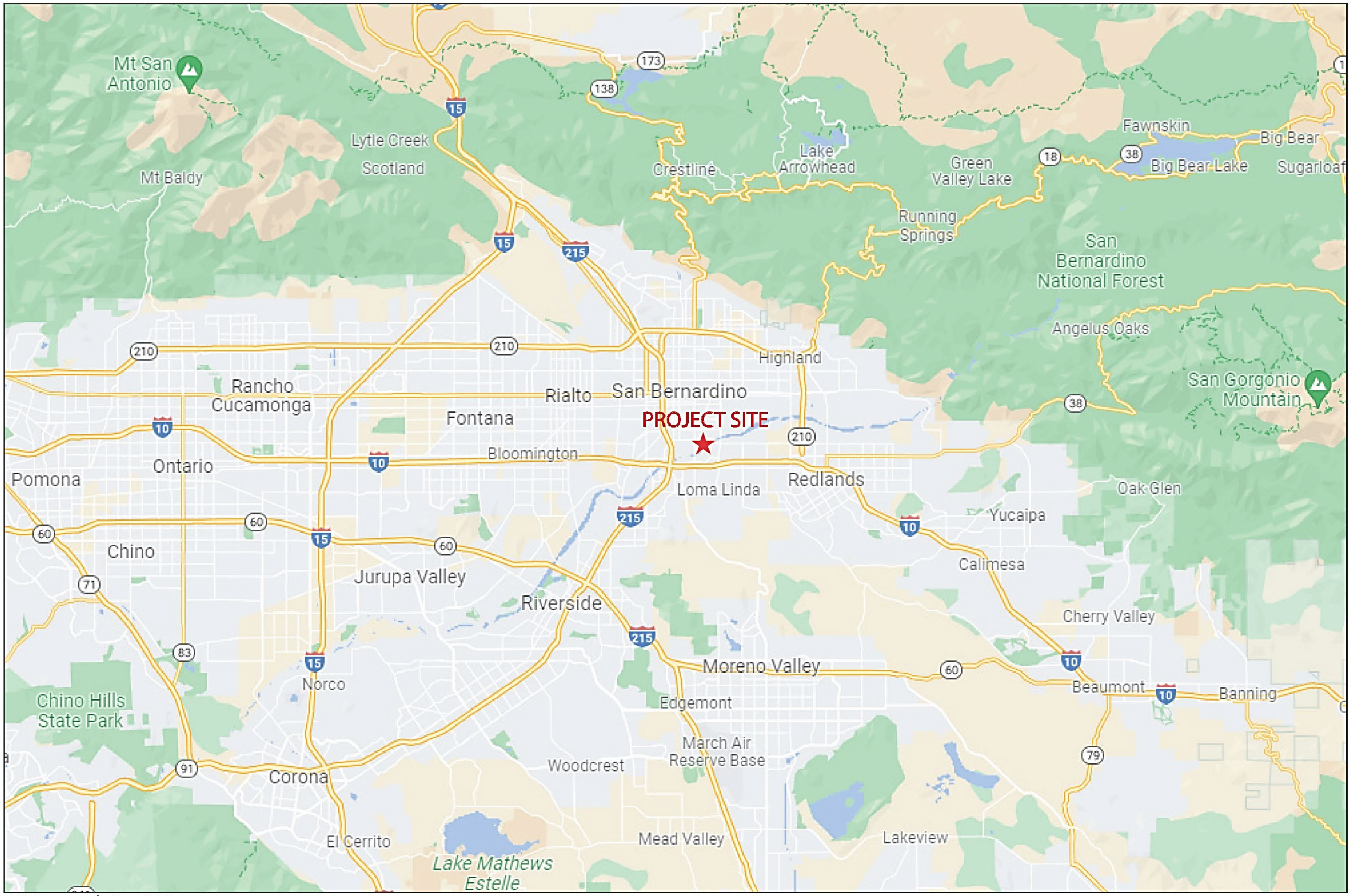
The Project proposes to incorporate two (2) 8-foot high wrought-iron entry gates, located in the northern portion of the site. One gate would be located at the northwestern entrance and another at the northeaster entrance of the property. Each entry gate would have a knox-pad lock and 14-foot-high screen walls on each side of the gate.

Parking

A total of 244 parking spaces would be required for the Project (1 space per 1,250 SF). The Project proposes to provide a total of 246 parking spaces that include 160 standard parking stalls (9 feet by 19 feet), 39 dock door parking stalls, and 47 trailer parking stalls (10 feet by 55 feet). Trailer stalls would be dispersed throughout the northern portion of the Project site. The proposed 160 standard parking stalls would be provided along the northwest and northeast portions of the site and along the western property line.

Hours of Operation

Tenant(s) of the facility have not been identified, so the precise nature of the facility operations cannot be determined at this time. Any future occupant would be required to adhere to the requirements of the pertinent City regulations. The hours of operation are assumed to be up to 7 days a week, 24 hours per day.



SOURCE: Google Map, 2021

Not to Scale

EXHIBIT 1: REGIONAL LOCATION

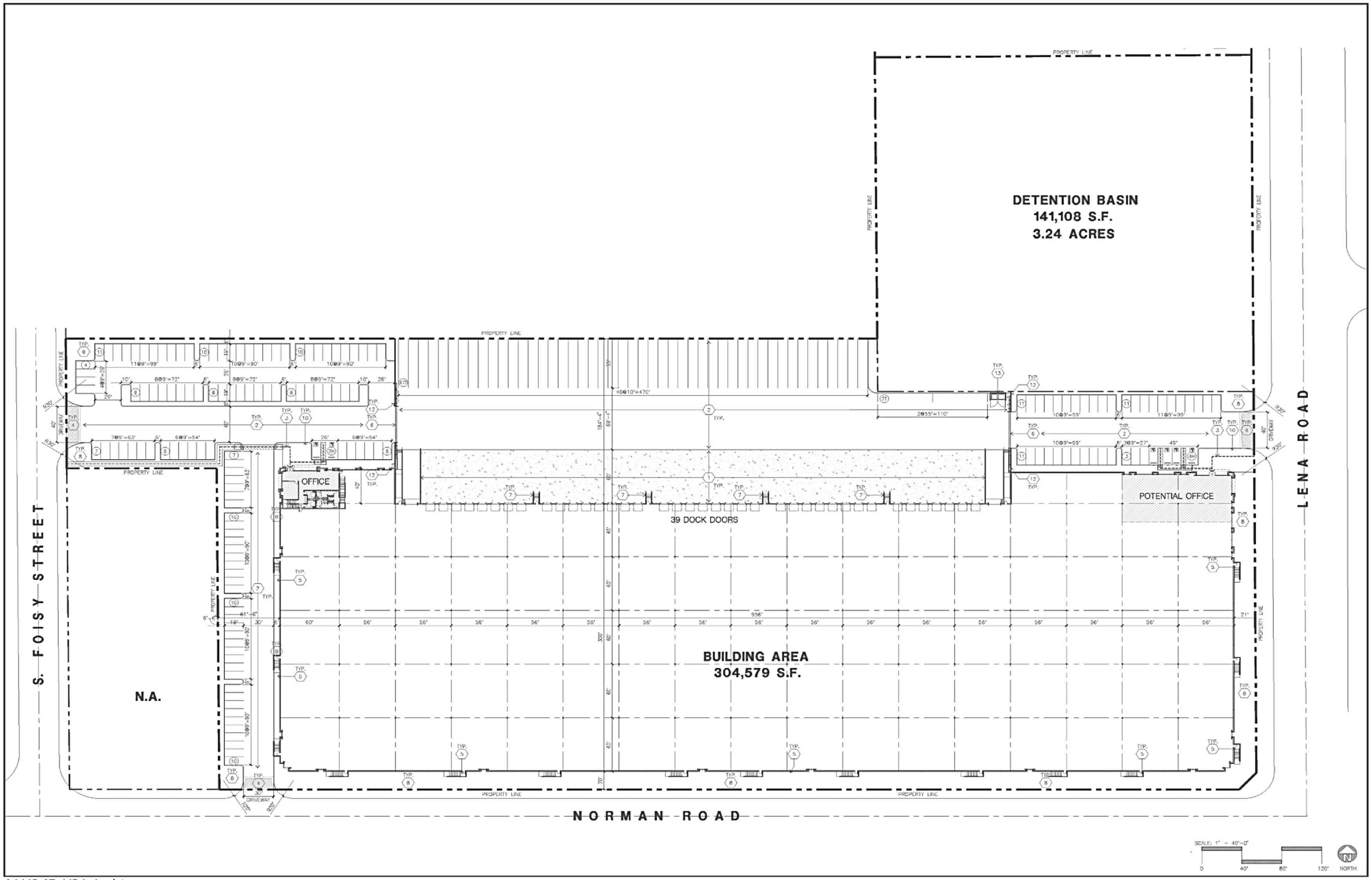
ALLIANCE CALIFORNIA GATEWAY SOUTH BUILDING 8 PROJECT

SOURCE: Nearmap, 2021

Not to Scale

EXHIBIT 2: LOCAL VICINITY

ALLIANCE CALIFORNIA GATEWAY SOUTH BUILDING 8 PROJECT



SOURCE: HPA Architecture, 2021

EXHIBIT 3: SITE PLAN

ALLIANCE CALIFORNIA GATEWAY SOUTH BUILDING 8 PROJECT

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 micro-pascals (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}) represents the equivalent continuous sound pressure level over the measurement period, while the day-night noise level (L_{dn}) and Community Equivalent Noise Level (CNEL) are measures of sound energy 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 pascal is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in 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.

Source: Compiled from Caltrans, *Technical Noise Supplement to the Caltrans Traffic Noise Analysis Protocol*, September 2013; Cyril M. Harris, *Handbook of Noise Control*, 1979; Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

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 approximately 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.

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

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1 Federal Highway Administration, *Noise Fundamentals,* 2017, https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm, accessed October 15, 2021.

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.

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.[5] 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:[6]

- 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 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.

[4] James P. Cowan, *Handbook of Environmental Acoustics,* 1994.
[5] James P. Cowan, *Handbook of Environmental Acoustics,* 1994 and Cyril M. Harris, Handbook of Noise Control, 1979.
[6] California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013, and FHWA, *Noise Fundamentals,* 2017.

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.[7]

2.2 Ground-Borne Vibration

Sources of ground-borne 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 or heavy equipment use during construction). 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 vibration decibels (VdB) (the vibration velocity level in decibel scale). Other methods are the peak particle velocity (PPV) and 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 ground-borne 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 ground-borne vibration are planes, trains, and construction activities such as earthmoving 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.

7 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

Maximum PPV (in/sec)	Vibration Annoyance Potential Criteria	Vibration Damage Potential Threshold Criteria	FTA Vibration Damage Criteria
0.008	--	Extremely fragile historic buildings, ruins, ancient monuments	--
0.01	Barely Perceptible	--	--
0.04	Distinctly Perceptible	--	--
0.1	Strongly Perceptible	Fragile buildings	--
0.12	--	--	Buildings extremely susceptible to vibration damage
0.2	--	--	Non-engineered timber and masonry buildings
0.25	--	Historic and some old buildings	--
0.3	--	Older residential structures	Engineered concrete and masonry (no plaster)
0.4	Severe	--	--
0.5	--	New residential structures, Modern industrial/commercial buildings	Reinforced-concrete, steel or timber (no plaster)

PPV = peak particle velocity; in/sec = inches per second; FTA = Federal Transit Administration

Source: California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2020 and Federal Transit administration, Transit Noise and Vibration Assessment Manual, 2018.

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 and non-residential buildings, the acceptable interior noise limit for new construction is 45 dBA CNEL.

3.2 Local

City of San Bernardino General Plan

The City of San Bernardino General Plan (SBGP) Noise Element (Chapter 14) identifies several policies to minimize the impacts of excessive noise levels throughout the community. The Noise Element provides policy guidance which addresses the generation, mitigation, avoidance, and the control of excessive noise. The noise policies specified in the Noise Element provide the guidelines necessary to satisfy these goals. The City of San Bernardino Noise Ordinance (Section 19.20.030.15 of the Development Code) specifies the maximum acceptable levels of noise for residential uses in the City. These standards indicate that exterior noise levels at residential locations should not exceed a CNEL of 65 dB while interior levels shall not exceed an annual CNEL of 45 dB in any habitable room. The following presents the goals and policies for noise related issues in the City of San Bernardino:

Goal 14.1: Ensure that residents are protected from excessive noise through careful land planning.

Policy 14.1.1: Minimize, reduce, or prohibit, as may be required, the new development of housing, health care facilities, schools, libraries, religious facilities, and other noise sensitive uses in areas where existing or future noise levels exceed an Ldn of 65 dB(A) exterior and an Ldn of 45 dB(A) interior if the noise cannot be reduced to these levels. (LU-1)

Policy 14.1.2: Require that automobile and truck access to commercial properties abutting residential parcels be located at the maximum practical distance from the residential parcel. (LU-1)

Policy 14.1.4: Prohibit the development of new or expansion of existing industrial, commercial, or other uses that generate noise impacts on housing, schools, health care facilities or other sensitive uses above a Ldn of 65 dB(A). (LU-1)

Goal 14.2: Encourage the reduction of noise from transportation-related noise sources such as motor vehicles, aircraft operations, and railroad movements.

Policy 14.2.19: As may be necessary, require acoustical analysis and ensure the provision of effective noise mitigation measures for sensitive land uses, especially residential uses, in areas significantly impacted by noise.

Goal 14.3: Protect residents from the negative effects of "spill over" or nuisance noise.

Policy 14.3.1: Require that construction activities adjacent to residential units be limited as necessary to prevent adverse noise impacts. (LU-1)

Policy 14.3.2: Require that construction activities employ feasible and practical techniques that minimize the noise impacts on adjacent uses. (LU-1)

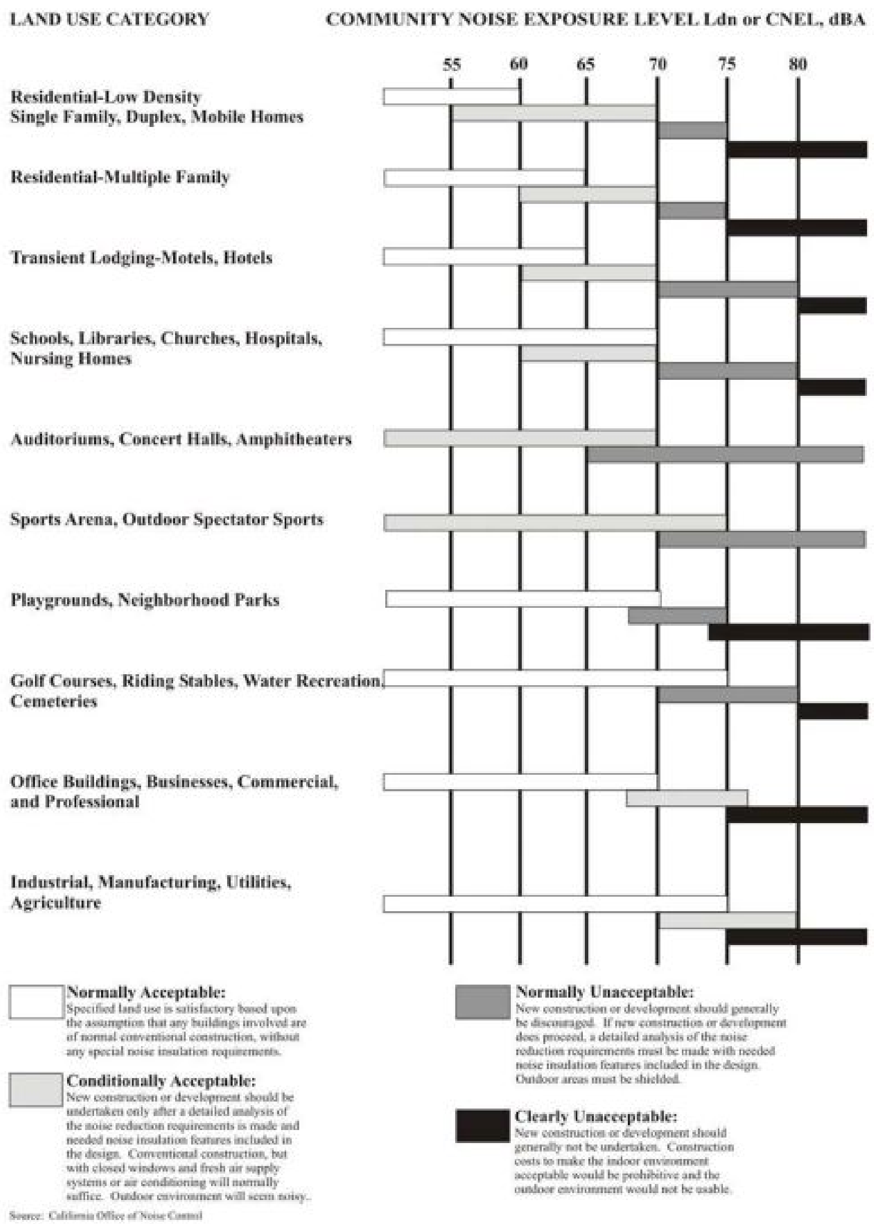
Policy 14.3.5: Require that the hours of truck deliveries to commercial properties abutting residential uses be limited unless there is no feasible alternative or there are overriding transportation benefits by scheduling deliveries at another hour. (LU-1)

Policy 14.3.8: Require common walls and floors between commercial and residential uses be constructed to minimize the transmission of noise and vibration. (LU-1)

SBGP Figure N-1 provides noise criteria to evaluate the land use compatibility of transportation-related noise; see Exhibit 4: Land Use Compatibility for Community Noise Exposure. The compatibility criteria indicate that residential land uses are considered normally acceptable with noise levels below 60 dBA L_{dn} and conditionally acceptable with noise levels of less than 70 dBA L_{dn}.

SBGP Table N-3 identifies a maximum allowable exterior noise level of 65 dBA CNEL and an interior noise level limit of 45 dBA CNEL for new residential developments; see Table 4: Interior and Exterior Noise Standards**.** While the City specifically identifies an exterior noise level limit for noise-sensitive residential land uses such as hotels, hospitals, schools, and parks, the City does not maintain exterior noise standards for non-noise sensitive land uses such as office, retail, manufacturing, utilities, agriculture, and industrial.

Exhibit 4: Land Use Compatibility for Community Noise Exposure



Source: City of San Bernardino, *General Plan Noise Element*, Figure N-1, 2005.

Table 4: Interior and Exterior Noise Standards

Land Use		CNEL (dBA)	
Categories	**Uses**	**Interior[1]**	**Exterior[2]**
Residential	Single and multi-family, duplex	45[3]	65
	Mobile homes	----	65[4]
Commercial	Hotel, motel, transient housing	45	----
	Commercial retail, bank, restaurant	55	----
	Office building, research and development, professional offices	50	----
	Amphitheater, concert hall, auditorium, movie theater	45	----
	Gymnasium (Multipurpose)	50	----
	Sports Club	55	----
	Manufacturing, warehouse, wholesale, utilities	65	----
	Movie Theaters	45	----
Institutional/Public	Hospital, school classrooms/playgrounds	45	65
	Church, library	45	----
Open Space	Parks	---	65

Notes:
1. Indoor environment excluding: bathrooms, kitchens, toilets, closets, and corridors
2. Outdoor environment limited to:
    - Private yard of single-family dwellings
    - Multi-family private patios or balconies accessed from within the dwelling units (balconies 6.0 feet deep or less are exempt)
    - Mobile home parks
    - Park picnic areas
    - School playgrounds
    - Hospital patios
3. Noise level requirement with closed windows, mechanical ventilation or other means of natural ventilation shall be provided as per Uniform Building Code Chapter 12, § 1205.
4. Exterior noise levels should be such that interior noise levels will not exceed 45 dBA CNEL.

Source: City of San Bernardino, *City of San Bernardino General Plan Noise Element*, Table N-3, 2005.

City of San Bernardino Municipal Code

San Bernardino Municipal Code Section 8.54

The City of San Bernardino Municipal Code (SBMC) Noise Control Ordinance (Chapter 8.54) includes regulations to control the negative effects of nuisance noise, but it does not identify specific exterior noise level limits. In addition, SBMC Chapter 19.20 contains exterior and interior noise level standards for residential land uses.

SBMC § 8.54.060 states when: “such noises are an accompaniment and effect of a lawful business, commercial or industrial enterprise carried on in an area zoned for that purpose…” these activities shall be exempt (SBMC § 8.54.060(B)). However, due to the Project’s proximity to residential land uses, SBMC § 19.20.030.15(A) limits the operational stationary-source noise from the proposed Project to an exterior noise level of 65 dBA for residential land uses.

SBMC § 8.54.070 states that no person shall be engaged or employed, or cause any person to be engaged or employed, in any work of construction, erection, alteration, repair, addition, movement, demolition, or improvement to any building or structure except within the hours of 7:00 a.m. and 8:00 p.m. While the City establishes limits to the hours during which construction activity may take place, it does not identify specific noise level limits for construction noise levels.

4 EXISTING CONDITIONS

4.1 Existing Noise Sources

As San Bernardino has developed and expanded its boundaries over time, there are numerous areas of the City that are impacted by noise. For instance, many residences are located near industrial areas or adjacent to busy streets or rail lines. The Citizens of San Bernardino are concerned about the effects of noise on their health and serenity and of the need to provide the range of uses needed to maintain a high quality of life.

San Bernardino is affected by several different sources of noise, including automobile, rail, and air traffic, sports events, commercial and industrial activity, and periodic nuisances such as construction. Excessive levels of noise can damage our physical health, psychological stability, social cohesion, property values, and economic productivity. The control of noise, therefore, is an essential component in creating a safe, compatible, and productive environment.

Several major transportation routes traverse the City of San Bernardino: State Routes 18, 30, 330, and 66, as well as Interstates 10 and 215. These routes are subject to federal funding and, as such, are under the purview of the Federal Highway Administration (FHWA), which has its own noise standards. These noise standards are based on L_{eq} and L_{10} values. The FHWA design noise level standards are included in Table N-1 of the SBGP.

Mobile Sources

The predominant mobile noise source in the Project area is the traffic noise along E. Norman Road and Lena Road. According to the FHWA National Transportation Map, the Project is located within the 45-50 dBA noise contour.[8]

Stationary Sources

The primary sources of stationary noise in the Project vicinity are those associated with the operations of adjacent general industrial uses (e.g., loading areas, large mechanical equipment, fabrication). The noise associated with these sources may represent a single-event noise occurrence or short-term noise.

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. The Project site is primarily surrounded by warehousing, factories, logistics, and distribution related uses. The sensitive land uses nearest to the Project site consist of single-family residences located adjacent east and west. Sensitive land uses nearest to the Project are shown in Table 5: Sensitive Receptors.

[8] Federal Highway Administration, *National Transportation Noise Map*, https://www.bts.gov/geospatial/national-transportation-noise-map, accessed October 15, 2021.

Table 5: Sensitive Receptors	
Receptor Description	**Distance and Direction from the Project**
Single-family Residences	40 feet to the west
Single-family Residences	80 feet to the east
Single-family Residences	335 feet to the south
Single-family Residences	1,160 feet to the north
Source: Nearmap, 2021.	

4.3 Noise Measurements

To quantify existing ambient noise levels in the Project area, Kimley-Horn conducted four short-term noise measurements on October 13, 2021; see Appendix A: Noise Data. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the Project site. The 10-minute measurements were taken between 9:46 a.m. and 10:50 a.m. Short-term L_{eq} measurements are considered representative of the noise levels throughout the day. The average noise levels and sources of noise measured at each location are listed in Table 6: Existing Noise Measurements and shown on Exhibit 4: Noise Measurement Locations.

Table 6: Existing Noise Measurements						
Site #	**Location**	**L_{eq} (dBA)**	**L_{min} (dBA)**	**L_{max} (dBA)**	**Duration**	**Time**
1	Along S. Valley View Avenue/ Lena Road, approximately 450 feet south of E. Central Ave.	62.4	48.2	82.1	10 mins	10:07 a.m.
2	At the northeast corner of the E. Norman Road and Lena Road intersection.	67.9	50.3	84.4	10 mins	9:46 a.m.
3	Along S. Foisy Street, 25 feet north of E. Norman Road.	69.1	53.0	82.4	10 mins	10:24 a.m.
4	Along South Waterman Ave, 850 feet south of E. Central Avenue.	70.1	52.3	82.9	10 mins	10:40 a.m.
Source: Noise measurements taken by Kimley-Horn, October 13, 2021. See Appendix A for noise measurement results.						

SOURCE: Nearmap, 2021

Not to Scale

EXHIBIT 5: NOISE MEASUREMENT LOCATIONS

ALLIANCE CALIFORNIA GATEWAY SOUTH BUILDING 8 PROJECT

5 SIGNIFICANCE CRITERIA AND METHODOLOGY

5.1 CEQA Thresholds

Appendix G of the California Environmental Quality Act (CEQA) contains analysis guidelines related to noise impacts. These guidelines have been used by the City 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 ground-borne vibration or ground-borne 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.

Noise and Vibration Thresholds

<u>Construction Thresholds</u>

The following thresholds of significance are applied for construction noise impacts:

- When adjacent to a residential land use, school, church or similar type of use, the noise generating activity does not take place between the hours of 8:00 p.m. and 7:00 a.m.
- Noise levels created do not exceed the following noise standards from the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (FTA, 2018) (FTA Noise and Vibration Manual) when measured at the property line of the receiving use:
    - Residential: 80 dBA L_{eq}
    - Commercial: 85 dBA L_{eq}
    - Industrial: 90 dBA L_{eq}

<u>Operational Thresholds</u>

The City of San Bernardino Municipal Code includes regulations to control noise. The Code states “such noises are an accompaniment and effect of a lawful business, commercial or industrial enterprise carried on in an area zoned for that purpose…” these activities shall be exempt (SBMC § 8.54.060(B)). However, due to the Project’s proximity to residential land uses, SBMC § 19.20.030.15(A) limits the operational stationary-source noise from the proposed Project to an exterior noise level of 65 dBA for residential land uses.

Vibration Thresholds

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

- Any vibration that exceeds 0.10 in/sec, the approximate threshold for annoyance.
- A vibration level that exceeds 0.20 in/sec.

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 operational noise environment is based on noise attenuation calculations (inverse square law) and empirical observations. Reference noise level data are used to estimate the Project operational noise impacts from stationary sources. Noise levels were collected from published sources from similar types of activities and 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 SBGP and SBMC.

Vibration

Ground-borne vibration levels associated with construction-related activities for the Project were evaluated utilizing typical ground-borne vibration levels associated with construction equipment, obtained from FTA published data for construction equipment. Potential ground-borne 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 for structural damage and human annoyance.

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. However, construction noise levels are not anticipated to affect sensitive receptors due to the Project's location. The Project site is located in an industrial area and the sensitive land uses nearest to the Project site consist of residences located west and a warehouse located south of the Project site.

Construction activities would include site preparation, grading, building construction, paving, 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. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 to 4 minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts). 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 7: Typical Construction Noise Levels.

Table 7: 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
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
Pile-driver (Impact)	101

Table 7: Typical Construction Noise Levels

Equipment	Typical Noise Level (dBA) at 50 feet from Source
Pile-driver (Sonic)	95
Pneumatic Tool	85
Pump	77
Roller	85
Saw	76
Scraper	85
Shovel	82
Truck	84

dBA_2 = estimated noise level at receptor; dBA_1 = reference noise level; d_1 = reference distance; d_2 = receptor location distance

Notes:
1. Calculated using the inverse square law formula for sound attenuation: $dBA_2 = dBA_1+20Log(d_1/d_2)$

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

The noise levels calculated in Table 8: Project Construction Noise Levels, show the exterior construction noise without accounting for attenuation from existing physical barriers which have been estimated using the FHWA Roadway Construction Noise Model (RCNM). The nearest noise sensitive receptors are residences located approximately 40 feet west of the property line and 580 feet from the center of construction activity. Following FTA methodology, all equipment is assumed to operate at the center of the Project site because equipment would operate throughout the site and not a fixed location for extended periods of time. These assumptions represent a worst-case noise scenario as construction activities would routinely be spread throughout the construction site further away from noise sensitive receptors.

Table 8: Project Construction Noise Levels

Construction Phase	Receptor Location			Worst Case Modeled Exterior Noise Level (dBA L_{eq})	Noise Threshold (dBA L_{eq})	Exceeded?
	Land Use	Direction	Distance (feet) [1]			
Demolition	Residential	West	580	62.3	80	No
	Industrial	South	312	60.8	90	No
Site Preparation	Residential	West	580	60.7	80	No
	Industrial	South	312	66.1	90	No
Grading	Residential	West	580	60.5	80	No
	Industrial	South	312	65.9	90	No
Construction	Residential	West	580	60.7	80	No
	Industrial	South	312	66.1	90	No
Paving	Residential	West	580	55.4	80	No
	Industrial	South	312	60.8	90	No
Architectural Coating	Residential	West	580	52.4	80	No
	Industrial	South	312	57.8	90	No

Notes:
1. In accordance with methodology from the FTA Noise and Vibration Manual, the equipment distance is assumed at the center of the Project.
2. Threshold from the FTA *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

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

As shown in Table 8, exterior noise levels during Project construction would range between 52.4 dBA and 66.1 dBA and would not exceed the FTA's construction noise thresholds at the nearest off-site uses. IN addition, construction equipment would operate throughout the Project site and the associated noise levels would not occur at a fixed location for extended periods of time. Further, the City of San Bernardino has set restrictions to control noise impacts from construction activities. SBMC § 8.54.070 states that no person shall be engaged or employed, or cause any person to be engaged or employed, in any work of construction, erection, alteration, repair, addition, movement, demolition, or improvement to any building or structure except within the hours of 7:00 a.m. and 8:00 p.m. Compliance with the SBMC would further minimize potential impacts from construction noise, as construction would be limited to daytime hours on weekdays and Saturdays. Therefore, construction noise impacts would be less than significant.

Operations

Implementation of the proposed project would create new sources of noise in the Project vicinity. The major noise sources associated with the Project including the followings:

- Mechanical equipment (i.e., trash compactors, air conditioners, etc.);
- Slow moving trucks on the Project site, approaching and leaving the loading areas;
- Activities at the loading areas (i.e., maneuvering and idling trucks, equipment noise);
- Parking areas (i.e., car door slamming, car radios, engine start-up, and car pass-by); and
- Off-Site Traffic Noise.

Mechanical Equipment

Potential stationary noise sources related to long-term operation of the project site would include mechanical equipment. Mechanical equipment (e.g., heating ventilation and air conditioning [HVAC] equipment) typically generates noise levels of approximately 52 dBA at 50 feet.[9] The HVAC equipment would be roof mounted and would be located as close as approximately 105 feet from the nearest residential uses to the west. At this distance, HVAC equipment noise would be approximately 45.6 dBA based on distance attenuation alone (using the inverse square law of sound propagation)[10] and would not exceed the City's 65 dBA standard for residential uses. Therefore, the proposed Project would result in a less than significant impact related to mechanical equipment noise levels.

Truck and Loading Dock Noise

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; dropping down the dock ramps; and maneuvering away from the docks. Loading or unloading activities would occur on the northern façade of the proposed warehouse building in the central portion of the Project site. Truck access to the site via two access driveways along S. Lena Road and S. Foisy Street.

Typically, heavy truck operations generate a noise level of 68 dBA at a distance of 30 feet.[11] As the closest residences would be approximately 340 feet west from the proposed loading areas, truck and loading noise would be approximately 46.9 dBA (based on the inverse square law of sound propagation), which is below the City's 65 dBA exterior noise standard for residential uses. Additionally, these noise levels would be further attenuated by the intervening warehouse building, and loading dock doors would be surrounded with protective aprons, gaskets, or similar improvements that, when a trailer is docked, would

[9] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, July 6, 2010.
[10] Sound level reduces by 6 dB for every doubling of distance.
[11] Loading dock reference noise level measurements conducted by Kimley-Horn on December 18, 2018.

serve as a noise barrier between the interior warehouse activities and the exterior loading area. This would attenuate noise emanating from interior activities, and as such, interior loading and associated activities would be permissible during all hours of the day. Noise levels associated with trucks and loading or unloading activities would not exceed the City's standards and impacts would be less than significant.

Parking Noise

The proposed Project would provide a total of 246 parking spaces, including 47 trailer stalls, 39 dock door parking spaces, and 160 standard auto parking spaces. In general, traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards. The instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car pass-bys range from 53 to 61 dBA.[12] 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 for normal speech to 50 dBA at 50 feet for very loud speech.[13] Parking lot noise activities would occur approximately 40 feet from the nearest residential uses to the west. At this distance, parking lot noise levels would be approximately 29 dBA and would not exceed the City's 65 dBA exterior noise standard for residential uses. It is also noted that actual noise levels over time resulting from parking lot activities would be far lower than the reference levels identified above, as parking lot noise is instantaneous and would have lower noise level (L_{eq}) when averaged over time.

Further, parking lot noise would be consistent with the existing noise in the vicinity and would be partially masked by background noise from traffic along S. Lena Road/S. Valley View Avenue and E. Norman Road. Noise associated with parking lot activities is not anticipated to exceed the City's noise standards during operation. Therefore, noise impacts from parking lots would be less than significant.

Off-Site Traffic Noise

Implementation of the Project would generate increased traffic volumes along nearby roadway segments. In general, a traffic noise increase of less than 3 dBA is barely perceptible to people, while a 5-dBA increase is readily noticeable.[14] Traffic volumes on Project area roadways would have to approximately double for the resulting traffic noise levels to increase by 3 dBA.[15] Therefore, permanent increases in ambient noise levels of less than 3 dBA would be less than significant. Project related trips would occur along E. Norman Road and Lena Road/S. Valley View Road, which are categorized as Collector roads according to the SBGP. Collector roads have relatively low volume with 5,000-20,000 average daily trips.[16] Additionally, according to the City's Traffic Map,[17] Orange Show Road, Waterman Avenue, and Tippecanoe Avenue have average daily traffic volumes of 9,947, 25,970, and 21,500 daily vehicles, respectively. The proposed Project would generate approximately 470 daily vehicle trips,[18] which would not double the existing traffic volumes and

[12] Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.
[13] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, June 26, 2015.
[14] Federal Highway Administration, *Highway Traffic Noise Analysis and Abatement Policy and Guidance, Noise Fundamentals*, https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm, accessed July 12, 2021.
[15] California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013.
[16] City of San Bernardino, *General Plan*, 2005.
[17] City of San Bernardino Public Works/Traffic Engineering, *24-Hour Traffic Count Map*, https://www.sbcity.org/pdf/DevSvcs/traffic%20map.pdf
[18] Translutions, Inc., *Gateway South 8 Warehouse Traffic Impact Analysis*, September 29, 2021.

would not result in a perceivable noise increase. Therefore, operational noise impacts would be less than significant.

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?

Once operational, the Project would not be a source of ground-borne vibration. Increases in ground-borne vibration levels attributable to the proposed Project would be primarily associated with short-term construction-related activities. Construction on the Project site would have the potential to result in varying degrees of temporary ground-borne vibration, depending on the specific construction equipment used and the operations involved.

The FTA has published standard vibration velocities for construction equipment operations. 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 any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. For example, for a building that is constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.20 in/sec is considered safe and would not result in any construction vibration damage.

Table 9: Typical Construction Equipment Vibration Levels, lists vibration levels at 25 feet for typical construction equipment. Ground-borne vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. As indicated in Table 9, 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.

Table 9: Typical Construction Equipment Vibration Levels

Equipment	Peak Particle Velocity at 25 Feet (in/sec)	Peak Particle Velocity at 40 Feet (in/sec)[1]
Large Bulldozer	0.089	0.044
Caisson Drilling	0.089	0.044
Loaded Trucks	0.076	0.038
Jackhammer	0.035	0.017
Small Bulldozer/Tractors	0.003	0.002

Notes:
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.

The nearest sensitive receptors are the residential uses approximately 40 feet west and the nearest structure is a warehouse located approximately 52 feet to the south of the active construction zone. Using the calculation shown in Table 9, at 40 feet the vibration velocities from construction equipment would not exceed 0.044 in/sec PPV, which is below the FTA's 0.20 in/sec PPV threshold for building damage and below the 0.10 in/sec PPV annoyance threshold. It is also acknowledged that construction activities would occur throughout the Project site and would not be concentrated at the point closest to the nearest structure.

Once operational, the Project would not be a significant source of groundborne vibration. Groundborne vibration surrounding the Project currently result from heavy-duty vehicular travel (e.g., refuse trucks, heavy duty trucks, delivery trucks, and transit buses) on the nearby local roadways. Operations of the proposed Project would include truck deliveries. Due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity. According to the FTA Noise and Vibration Manual, trucks rarely create vibration levels that exceed 70 VdB (equivalent to 0.012 inches per second PPV) when they are on roadways. Therefore, trucks operating at the Project site or along surrounding roadways would not exceed FTA thresholds for building damage or annoyance. Therefore, vibration impacts associated with the proposed Project 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 closest airport is the San Bernardino International Airport and it is located approximately 1.2 miles east of the Project site. The Project site is located outside of the 65 dBA CNEL noise level contour boundary of the airport.[19] No exterior or interior noise mitigation is required to satisfy the policies in the SBGP or SBMC. Further, standard building construction typically provides up to 25 dBA CNEL of attenuation, which would reduce the interior noise levels within the building at the Project site to satisfy the City's 45 dBA CNEL interior noise level standard. A less than significant impact would occur in this regard.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

[19] San Bernardino International Airport Authority, *San Bernardino International Airport, Airport Layout Plan Narrative Report*, November 2010.

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. Construction noise would be periodic and 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. As discussed above, Project construction noise levels would not be significant, and the Project would not represent a noticeable increase over the ambient conditions. Therefore, the Project's construction noise would not represent a substantial noise increase in excess of City standards and would not be cumulatively considerable.

Construction activities at other planned and approved projects near the Project site would be required to comply with applicable City rules related to noise and would take place during daytime hours on the days permitted by the applicable Municipal Code, and projects requiring discretionary City approvals would be required to evaluate construction noise impacts, comply with the City's standard conditions of approval, and implement mitigation, if necessary, to minimize noise impacts. Construction noise impacts are by nature localized. Based on the fact that noise dissipates as it travels away from its source, noise impacts would be limited to the Project site and vicinity. Therefore, Project construction would not result in a cumulatively considerable contribution to significant cumulative impacts, assuming such a cumulative impact existed, and impacts in this regard are not cumulatively considerable.

Cumulative Operational Noise

Stationary noise sources of the proposed Project would result in an incremental increase in non-transportation noise sources in the Project vicinity. However, as discussed above, operational noise caused by the proposed Project would be less than significant. Additionally, due to site distance to sensitive receptors cumulative stationary noise impacts would not occur. Similar to the proposed Project, other planned and approved projects would be required to mitigate for stationary noise impacts at nearby sensitive receptors, if necessary. As stationary noise sources are generally localized, there is a limited potential for other projects to contribute to cumulative noise impacts.

No known past, present, or reasonably foreseeable projects would combine with the operational noise levels generated by the Project to increase noise levels above acceptable standards because each project must comply with applicable City regulations that limit operational noise. Therefore, the Project, together with other projects, would not create a significant cumulative impact, and even if there was such a significant cumulative impact, the Project would not make a cumulatively considerable contribution to significant cumulative operational noises.

Given that noise dissipates as it travels away from its source, operational noise impacts from on-site activities and other stationary sources would be limited to the Project site and vicinity. Thus, cumulative operational noise impacts from related projects, in conjunction with Project specific noise impacts, would not be cumulatively significant.

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*, 2020.
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*, 2020.
5. City of San Bernardino, *City of San Bernardino General Plan*, November 2005.
6. City of San Bernardino Public Works/Traffic Engineering, *24-Hour Traffic Count Map*, https://www.sbcity.org/pdf/DevSvcs/traffic%20map.pdf.
7. City of San Bernardino, *San Bernardino Municipal Code*, October 2021.
8. Cyril M. Harris, *Handbook of Noise Control*, 1979.
9. Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, June 26, 2015.
10. Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.
11. Federal Highway Administration, *Highway Traffic Noise Analysis and Abatement Policy and Guidance, Noise Fundamentals*, https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm, accessed October 15, 2021.
12. Federal Highway Administration, *National Transportation Noise Map*, https://www.bts.gov/geospatial/national-transportation-noise-map, accessed October 15, 2021.
13. Federal Highway Administration, *Noise Fundamentals*, 2017, https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm, accessed October 15, 2021.
14. Federal Highway Administration, *Roadway Construction Noise Model*, 2006.
15. Federal Highway Administration, *Roadway Construction Noise Model User's Guide Final Report*, 2006.
16. Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, 1992.
17. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.
18. James P. Cowan, *Handbook of Environmental Acoustics,* 1994.
19. Translutions, Inc., *Gateway South 8 Warehouse – Trip Impact Analysis*, September 29, 2021.
20. United States Department of Housing and Urban Development, *Noise Guidebook*, 2009.
21. United States Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, 1979.

Appendix A

Noise Data

Noise Measurement Field Data

Project:	Alliance CA CWSB8 - Gateway 8	**Job Number:**	095996116
Site No.:	1	**Date:**	10/13/2021
Analyst:	Alex Howard and Melissa Thayer	**Time:**	10:07 - 10:17 AM
Location:	Along South Valley View Avenue/ Lena Road,450ft south of E Central Ave		
Noise Sources:	Cars on South Valley View Avenue/ Lena Road and E Central Ave		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	62.4	48.2	82.1	96.4

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	67°
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	29.96
Humidity:	15%

Photo:

Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	ST.001	Computer's File Name	SLM_0005586_ST_001.00.ldbin
Meter	LxT SE		
Firmware	2.404		
User	Alex Howard	Location	
Description	Gateway 8		
Note			

Start Time	2021-10-13 09:46:46	Duration	0:10:00.0		
End Time	2021-10-13 09:56:46	Run Time	0:10:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	67.9 dB		
LAE	95.7 dB	SEA	--- dB
EA	412.7 µPa²h		
LA_{peak}	97.3 dB	2021-10-13 09:47:47	
LAS_{max}	84.4 dB	2021-10-13 09:47:49	
LAS_{min}	50.3 dB	2021-10-13 09:50:40	
LA_{eq}	67.9 dB		
LC_{eq}	78.6 dB	LC_{eq} - LA_{eq}	10.7 dB
LAI_{eq}	69.2 dB	LAI_{eq} - LA_{eq}	1.3 dB

Exceedances

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
67.9 dB	67.9 dB	0.0 dB	
LDEN	**LDay**	**LEve**	**LNight**
67.9 dB	67.9 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	67.9 dB		78.6 dB		--- dB	
$Ls_{(max)}$	84.4 dB	2021-10-13 09:47:49	--- dB		--- dB	
$LS_{(min)}$	50.3 dB	2021-10-13 09:50:40	--- dB		--- dB	
$L_{Peak(max)}$	97.3 dB	2021-10-13 09:47:47	--- dB		--- dB	

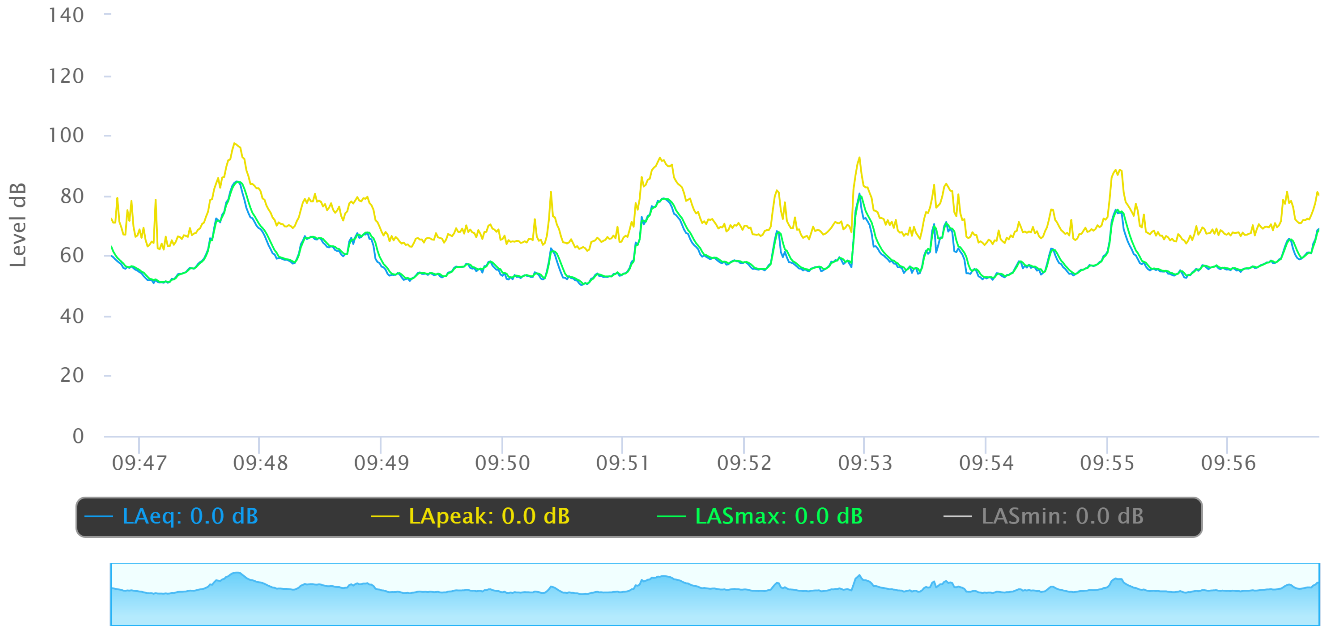
Overloads

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

Statistics

LAS 5.0	74.4 dB
LAS 10.0	69.5 dB
LAS 33.3	59.3 dB
LAS 50.0	56.7 dB
LAS 66.6	55.3 dB
LAS 90.0	52.9 dB

Time History



Noise Measurement Field Data

Project:	Alliance CA CWSB8 - Gateway 8	**Job Number:**	095996116
Site No.:	2	**Date:**	10/13/2021
Analyst:	Alex Howard and Melissa Thayer	**Time:**	9:46 - 9:56 AM
Location:	Northeast corner of E Norman Road and Lena Road		
Noise Sources:	Airplanes, and traffic on E Norman Rd and Lena Rd		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	67.9	50.3	84.4	97.3

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	67°
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	29.96
Humidity:	15%

Photo:

Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	ST.002	Computer's File Name	SLM_0005586_ST_002.00.ldbin
Meter	LxT SE		
Firmware	2.404		
User	Alex Howard	Location	
Description	Gateway 8		
Note			

Start Time	2021-10-13 10:07:51	Duration	0:10:00.0		
End Time	2021-10-13 10:17:51	Run Time	0:10:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	62.4 dB		
LAE	90.2 dB	SEA	--- dB
EA	115.2 µPa²h		
LA_{peak}	96.4 dB	2021-10-13 10:17:50	
LAS_{max}	82.1 dB	2021-10-13 10:17:50	
LAS_{min}	48.2 dB	2021-10-13 10:13:32	
LA_{eq}	62.4 dB		
LC_{eq}	71.4 dB	LC_{eq} - LA_{eq}	9.0 dB
LAI_{eq}	64.3 dB	LAI_{eq} - LA_{eq}	1.9 dB

Exceedances		Count	Duration
LAS >	85.0 dB	0	0:00:00.0
LAS >	115.0 dB	0	0:00:00.0
LApeak >	135.0 dB	0	0:00:00.0
LApeak >	137.0 dB	0	0:00:00.0
LApeak >	140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight	
	62.4 dB	62.4 dB	0.0 dB	
	LDEN	LDay	LEve	LNight
	62.4 dB	62.4 dB	--- dB	--- dB

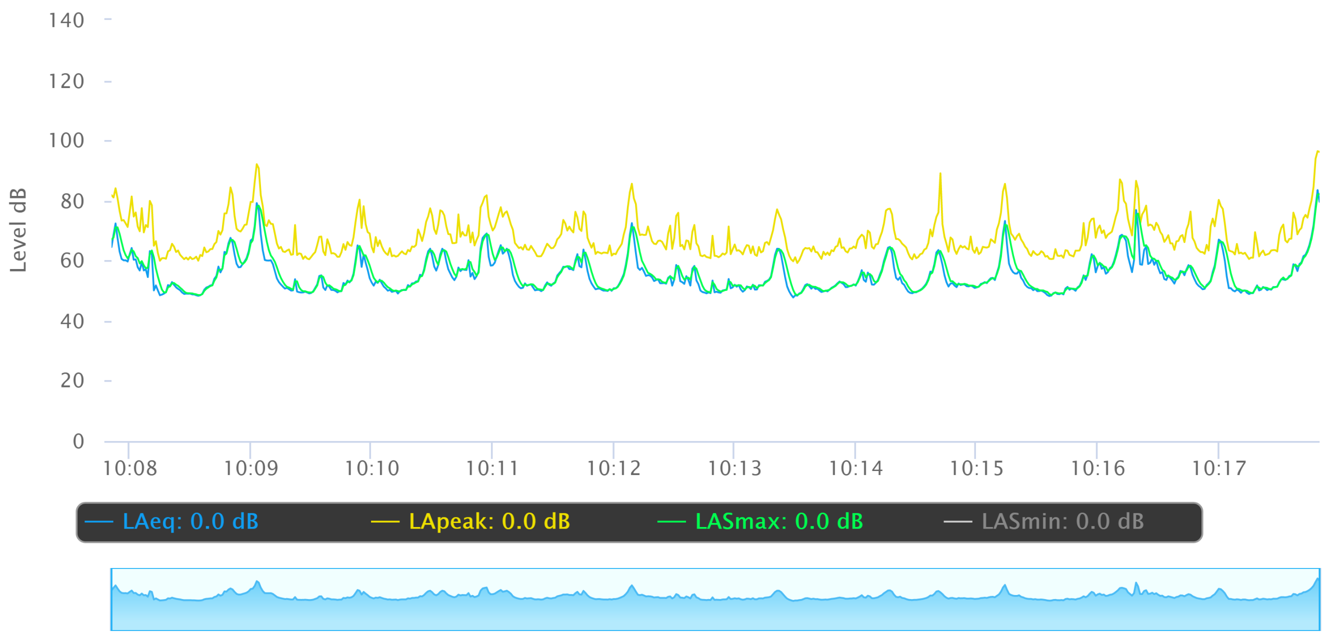
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	62.4 dB		71.4 dB		--- dB	
$Ls_{(max)}$	82.1 dB	2021-10-13 10:17:50	--- dB		--- dB	
$LS_{(min)}$	48.2 dB	2021-10-13 10:13:32	--- dB		--- dB	
$L_{Peak(max)}$	96.4 dB	2021-10-13 10:17:50	--- dB		--- dB	

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

Statistics

LAS 5.0	66.5 dB
LAS 10.0	63.3 dB
LAS 33.3	56.8 dB
LAS 50.0	53.5 dB
LAS 66.6	51.6 dB
LAS 90.0	49.8 dB

Time History



Noise Measurement Field Data

Project:	Alliance CA CWSB8 - Gateway 8	**Job Number:**	095996116
Site No.:	3	**Date:**	10/13/2021
Analyst:	Alex Howard and Melissa Thayer	**Time:**	10:24 - 10:34 AM
Location:	Along South Foisy Street, 25 feet north of E Norman Road		
Noise Sources:	Cars on E Norman Road and South Foisy Street		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	69.1	53.0	82.4	97.2

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	67°
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	29.96
Humidity:	15%

Photo:

Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	ST.003	Computer's File Name	SLM_0005586_ST_003.00.ldbin
Meter	LxT SE		
Firmware	2.404		
User	Alex Howard	Location	
Description	Gateway 8		
Note			

Start Time	2021-10-13 10:24:39	Duration	0:10:00.0		
End Time	2021-10-13 10:34:39	Run Time	0:10:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	69.1 dB		
LAE	96.9 dB	SEA	--- dB
EA	544.2 µPa²h		
LA_{peak}	97.2 dB	2021-10-13 10:29:36	
LAS_{max}	82.4 dB	2021-10-13 10:31:26	
LAS_{min}	53.0 dB	2021-10-13 10:25:24	
LA_{eq}	69.1 dB		
LC_{eq}	78.6 dB	LC_{eq} - LA_{eq}	9.5 dB
LAI_{eq}	71.1 dB	LAI_{eq} - LA_{eq}	2.0 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
69.1 dB	69.1 dB	0.0 dB	
LDEN	**LDay**	**LEve**	**LNight**
69.1 dB	69.1 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	69.1 dB		78.6 dB		--- dB	
$Ls_{(max)}$	82.4 dB	2021-10-13 10:31:26	--- dB		--- dB	
$LS_{(min)}$	53.0 dB	2021-10-13 10:25:24	--- dB		--- dB	
$L_{Peak(max)}$	97.2 dB	2021-10-13 10:29:36	--- dB		--- dB	

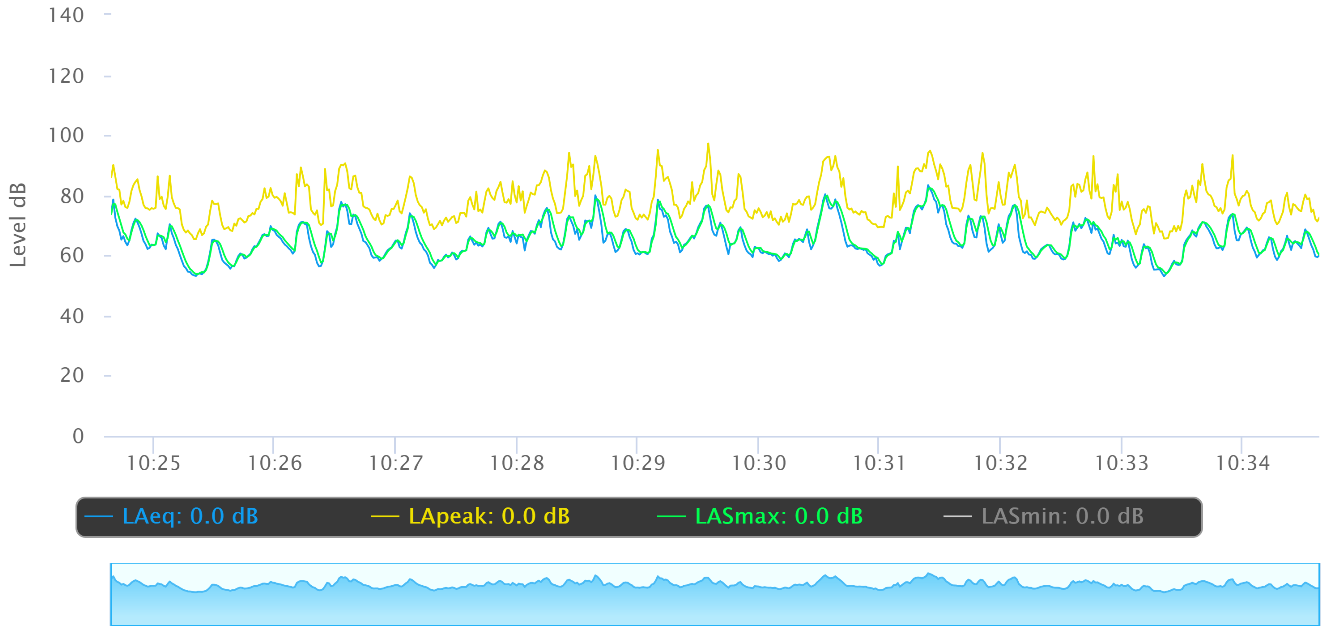
Overloads

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

Statistics

LAS 5.0	75.9 dB
LAS 10.0	72.6 dB
LAS 33.3	67.2 dB
LAS 50.0	64.7 dB
LAS 66.6	62.8 dB
LAS 90.0	59.0 dB

Time History



Noise Measurement Field Data

Project:	Alliance CA CWSB8 - Gateway 8	**Job Number:**	095996116
Site No.:	4	**Date:**	10/13/2021
Analyst:	Alex Howard and Melissa Thayer	**Time:**	10:40 - 10:50 AM
Location:	Along South Waterman Ave, 850 feet south of East Central Avenue		
Noise Sources:	Traffic on S Waterman Ave, typical operations with warehouses		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	70.1	52.3	82.9	96.4

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	67°
Wind (mph):	< 5
Sky:	Clear
Bar. Pressure:	29.96
Humidity:	15%

Photo:

Kimley»Horn

Measurement Report

Report Summary

Meter's File Name	ST.004	Computer's File Name	SLM_0005586_ST_004.00.ldbin
Meter	LxT SE		
Firmware	2.404		
User	Alex Howard	Location	
Description	Gateway 8		
Note			

Start Time	2021-10-13 10:40:04	Duration	0:10:00.0		
End Time	2021-10-13 10:50:04	Run Time	0:10:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	70.1 dB		
LAE	97.9 dB	SEA	--- dB
EA	684.2 µPa²h		
LA_{peak}	96.4 dB	2021-10-13 10:43:07	
LAS_{max}	82.9 dB	2021-10-13 10:43:08	
LAS_{min}	52.3 dB	2021-10-13 10:40:31	
LA_{eq}	70.1 dB		
LC_{eq}	78.6 dB	LC_{eq} - LA_{eq}	8.5 dB
LAI_{eq}	72.0 dB	LAI_{eq} - LA_{eq}	1.9 dB

Exceedances

	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LApeak > 135.0 dB	0	0:00:00.0
LApeak > 137.0 dB	0	0:00:00.0
LApeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
70.1 dB	70.1 dB	0.0 dB

LDEN	LDay	LEve	LNight
70.1 dB	70.1 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	70.1 dB		78.6 dB		--- dB	
$Ls_{(max)}$	82.9 dB	2021-10-13 10:43:08	--- dB		--- dB	
$LS_{(min)}$	52.3 dB	2021-10-13 10:40:31	--- dB		--- dB	
$L_{Peak(max)}$	96.4 dB	2021-10-13 10:43:07	--- dB		--- dB	

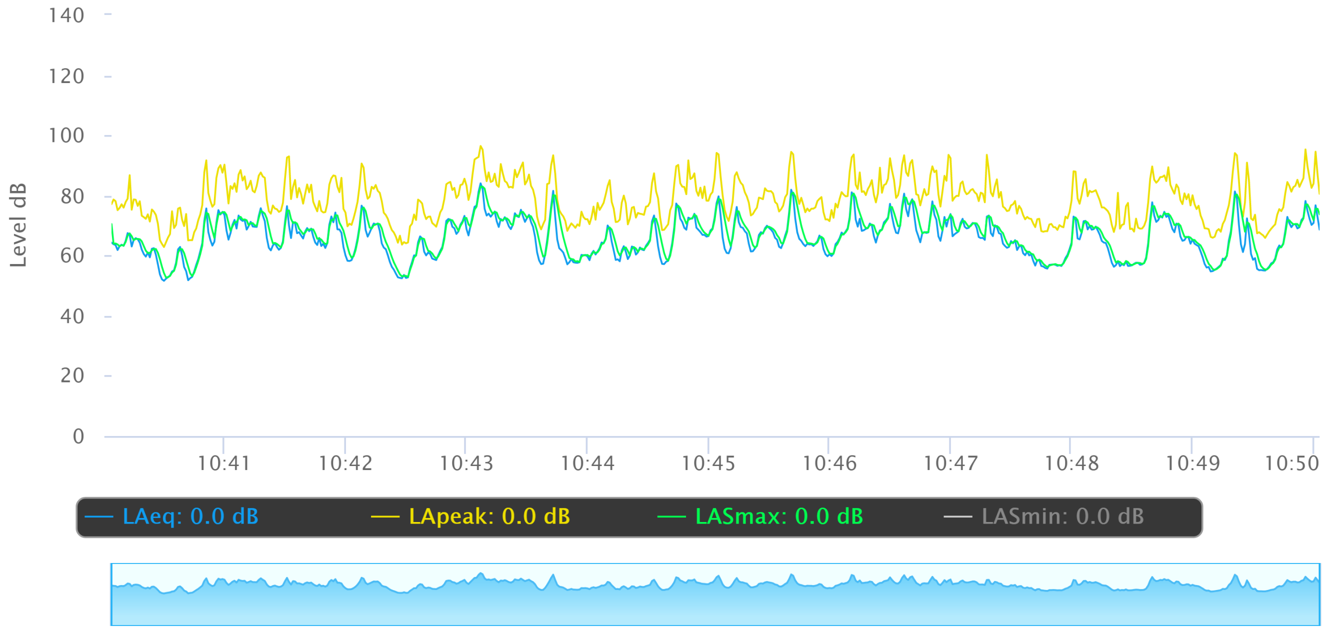
Overloads

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

Statistics

LAS 5.0	75.6 dB
LAS 10.0	73.7 dB
LAS 33.3	69.6 dB
LAS 50.0	66.7 dB
LAS 66.6	63.3 dB
LAS 90.0	57.3 dB

Time History



Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/14/2021
Case Description: Site Preparation

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Residential - W	Residential	1.0	1.0	1.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	580.0	0.0
Tractor	No	40	84.0		580.0	0.0

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	Leq
Dozer	60.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	62.7	58.7	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	62.7	60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Industrail - S	Industrial	1.0	1.0	1.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	312.0	0.0
Tractor	No	40	84.0		312.0	0.0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	65.8	61.8	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	68.1	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
Total	68.1	66.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/14/2021
Case Description: Grading

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Residential - W	Residential	1.0	1.0	1.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Scraper	No	40		83.6	580.0	0.0
Dozer	No	40		81.7	580.0	0.0

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	Leq
Scraper	62.3	58.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	60.4	56.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	62.3	60.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Industrial - S	Industrial	1.0	1.0	1.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Scraper	No	40		83.6	312.0	0.0
Dozer	No	40		81.7	312.0	0.0

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	Leq
Scraper	67.7	63.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	65.8	61.8	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	67.7	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

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/14/2021
Case Description: Demolition

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Residential - W	Residential	1.0	1.0	1.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Excavator	No	40		80.7	580.0	0.0
Concrete Saw	No	20		89.6	580.0	0.0

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	Leq
Excavator	59.4	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	68.3	61.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	68.3	62.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Industrial - S	Industrial	1.0	1.0	1.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Excavator	No	40		80.7	312.0	0.0
Concrete Saw	No	20		89.6	312.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Excavator	64.8	60.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	73.7	66.7	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	73.7	67.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/15/2021
Case Description: Building Construction

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Residential - W	Residential	1.0	1.0	1.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		580.0	0.0
Generator	No	50		80.6	580.0	0.0

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	Leq
Tractor	62.7	58.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	59.3	56.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	62.7	60.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Industrial - S	Industrial	1.0	1.0	1.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		312.0	0.0
Generator	No	50		80.6	312.0	0.0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	68.1	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
Generator	64.7	61.7	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	68.1	66.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/15/2021
Case Description: Paving

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Residential - W	Residential	1.0	1.0	1.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Paver	No	50		77.2	580.0	0.0
Roller	No	20		80.0	580.0	0.0

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	Leq
Paver	55.9	52.9	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	58.7	51.7	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	58.7	55.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Industrial - S	Industrial	1.0	1.0	1.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Paver	No	50		77.2	312.0	0.0
Roller	No	20		80.0	312.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Noise Limits (dBA) Day Lmax	Noise Limits (dBA) Day Leq	Noise Limits (dBA) Evening Lmax	Noise Limits (dBA) Evening Leq	Noise Limits (dBA) Night Lmax	Noise Limits (dBA) Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Noise Limit Exceedance (dBA) Day Leq	Noise Limit Exceedance (dBA) Evening Lmax	Noise Limit Exceedance (dBA) Evening Leq	Noise Limit Exceedance (dBA) Night Lmax	Noise Limit Exceedance (dBA) Night Leq
Paver	61.3	58.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	64.1	57.1	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	64.1	60.8	N/A	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: 10/15/2021
Case Description: Architectural Coating

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Residential - W	Residential	1.0	1.0	1.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	580.0	0.0

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)	56.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	56.4	52.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Industrial - S	Industrial	1.0	1.0	1.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	312.0	0.0

Results

Noise Limits (dBA) Noise Limit Exceedance (dBA)

Equipment	Calculated (dBA)		Day		Evening		Night		Day		Evening		Night	
	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	61.8	57.8	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	61.8	57.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A