Magnolia Avenue Business Center

NOISE IMPACT ANALYSIS

CITY OF CORONA

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
L_{min}	Minimum level measured over the time interval
OPR	Office of Planning and Research
PPV	Peak particle velocity
Project	Magnolia Avenue Business Center
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
VdB	Vibration Decibels

EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the potential noise impacts and the necessary noise mitigation measures, if any, for the proposed Magnolia Avenue Business Center development ("Project"). The proposed Project is to consist of two buildings with a total of 334,520 square feet of warehousing/industrial use. This study has been prepared to satisfy applicable City of Corona standards and thresholds of significance based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

The results of this Magnolia Avenue Business Center Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report. Table ES-1 shows the findings of significance for each potential noise and/or vibration impact under CEQA before and after any required mitigation measures.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Operational Noise	7	*Less Than Significant*	-
Construction Noise	8	*Less Than Significant*	-
Construction Vibration		*Less Than Significant*	-

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1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed Magnolia Avenue Business Center ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, sets out the local regulatory setting, presents the study methods and procedures for noise analysis, and evaluates the future exterior noise environment. In addition, this study includes an analysis of the potential Project-related long-term stationary-source operational noise and short-term construction noise and vibration impacts.

1.1 SITE LOCATION

The proposed project is located at 1375 Magnolia Avenue in the City of Corona as shown on Exhibit 1-A.

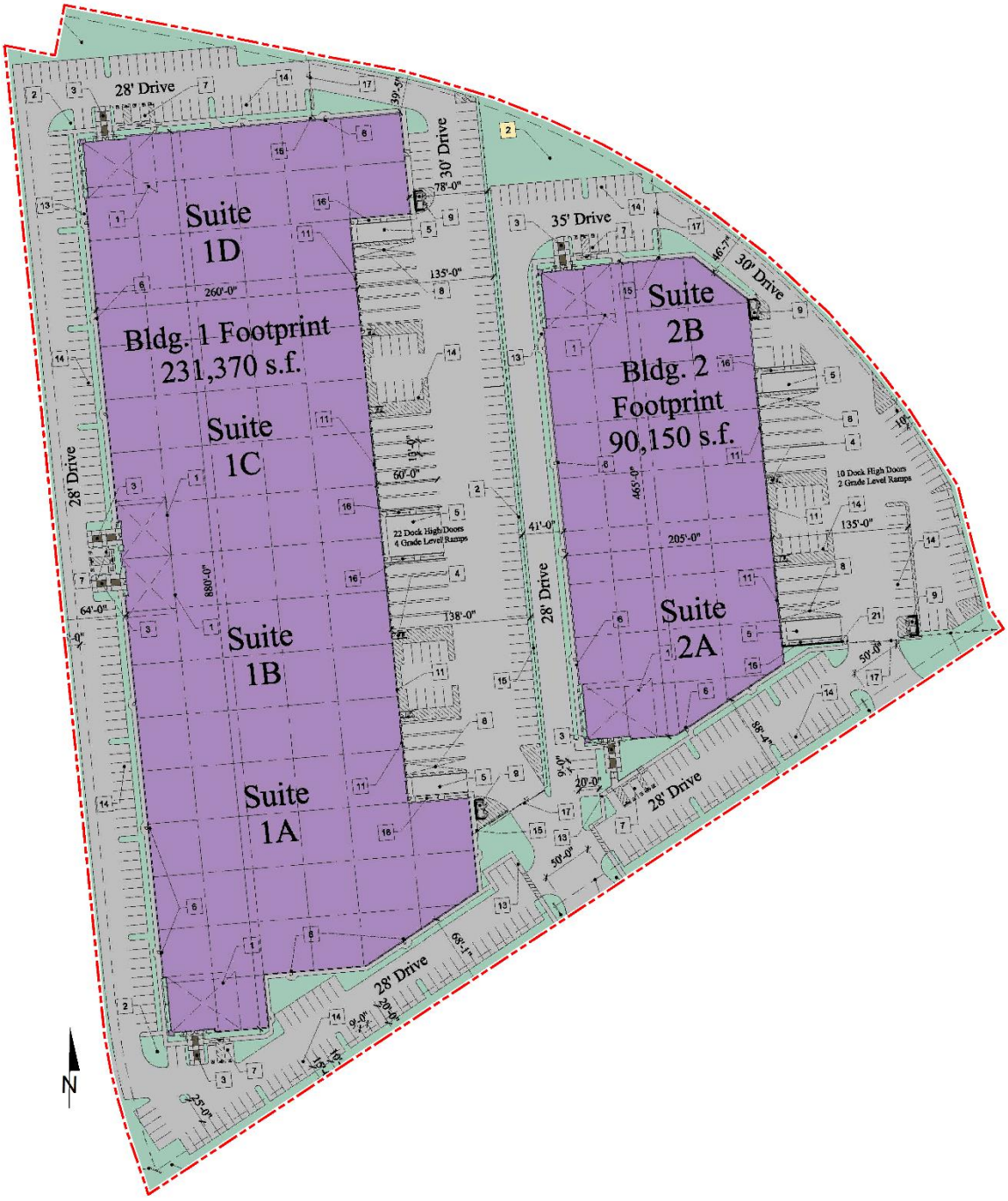
1.2 PROJECT DESCRIPTION

The proposed Project is to consist of two buildings with a total of 334,520 square feet of warehousing/industrial use (includes office/mezzanine space) as shown on Exhibit 1-B. Building 1 is anticipated to contain four suites and serve multiple tenants. As such, Building 1 has been evaluated assuming 238,370 square feet of industrial park use while Building 2 has been evaluated assuming 96,150 square feet of warehousing use.

The on-site Project-related noise sources are expected to include: loading dock activity, roof-top air conditioning units, trash enclosure activity, parking lot vehicle movements, trash compactor, and truck movements. This noise analysis is intended to describe noise level impacts associated with the expected typical operational activities at the Project site.

EXHIBIT 1-A: LOCATION MAP

EXHIBIT 1-B: SITE PLAN



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2 FUNDAMENTALS

Noise is simply defined as "unwanted sound." Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). A-weighted decibels (dBA) approximate the subjective response of the human ear to broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear. Exhibit 2-A presents a summary of the typical noise levels and their subjective loudness and effects that are described in more detail below.

EXHIBIT 2-A: TYPICAL NOISE LEVELS

COMMON OUTDOOR ACTIVITIES	COMMON INDOOR ACTIVITIES	A - WEIGHTED SOUND LEVEL dBA	SUBJECTIVE LOUDNESS	EFFECTS OF NOISE
THRESHOLD OF PAIN		140	INTOLERABLE OR DEAFENING	HEARING LOSS
NEAR JET ENGINE		130		
		120		
JET FLY-OVER AT 300m (1000 ft)	ROCK BAND	110		
LOUD AUTO HORN		100	VERY NOISY	
GAS LAWN MOWER AT 1m (3 ft)		90		
DIESEL TRUCK AT 15m (50 ft), at 80 km/hr (50 mph)	FOOD BLENDER AT 1m (3 ft)	80		SPEECH INTERFERENCE
NOISY URBAN AREA, DAYTIME	VACUUM CLEANER AT 3m (10 ft)	70	LOUD	
HEAVY TRAFFIC AT 90m (300 ft)	NORMAL SPEECH AT 1m (3 ft)	60		
QUIET URBAN DAYTIME	LARGE BUSINESS OFFICE	50	MODERATE	SLEEP DISTURBANCE
QUIET URBAN NIGHTTIME	THEATER, LARGE CONFERENCE ROOM (BACKGROUND)	40		
QUIET SUBURBAN NIGHTTIME	LIBRARY	30	FAINT	NO EFFECT
QUIET RURAL NIGHTTIME	BEDROOM AT NIGHT, CONCERT HALL (BACKGROUND)	20		
	BROADCAST/RECORDING STUDIO	10	VERY FAINT	
LOWEST THRESHOLD OF HUMAN HEARING	LOWEST THRESHOLD OF HUMAN HEARING	0		

Source: Environmental Protection Agency Office of Noise Abatement and Control, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004) March 1974.

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (2) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 1,000 feet, which can cause serious discomfort. (3) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most used metric is the equivalent level (L_{eq}). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the "average" noise levels within the environment.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level is utilized. The CNEL is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time-of-day corrections require the addition of 5 decibels to dBA L_{eq} sound levels in the evening from 7:00 p.m. to 10:00 p.m., and the addition of 10 decibels to dBA L_{eq} sound levels at night between 10:00 p.m. and 7:00 a.m. These additions are made to account for the noise sensitive time periods during the evening and night hours when noise can become more intrusive. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. The City of Corona relies on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources.

2.3 SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. The way noise reduces with distance depends on the following factors.

2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. (2)

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually

sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source. (4)

2.3.3 ATMOSPHERIC EFFECTS

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects. (2)

2.3.4 SHIELDING

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an "out of sight, out of mind" effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearby residents. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of-sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The Federal Highway Administration (FHWA) does not consider the planting of vegetation to be a noise abatement measure. (5)

2.4 NOISE CONTROL

Noise control is the process of obtaining an acceptable noise environment for an observation point or receiver by controlling the noise source, transmission path, receiver, or all three. This concept is known as the source-path-receiver concept. In general, noise control measures can be applied to these three elements.

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receiver. Noise barriers, however, do have limitations. For a noise barrier to work, it must block the line-of-sight path of sound from the noise source.

2.6 LAND USE COMPATIBILITY WITH NOISE

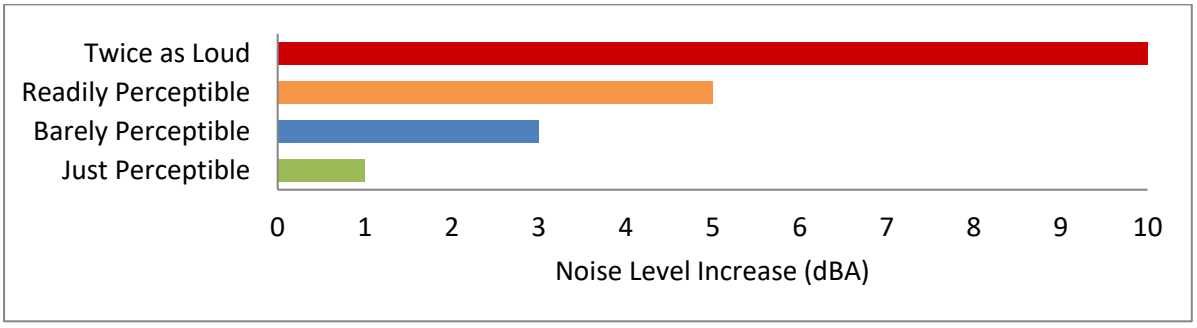
Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. (6)

2.7 COMMUNITY RESPONSE TO NOISE

Approximately sixteen percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints may occur. Twenty to thirty percent of the population will not complain even in very severe noise environments. (7 pp. 8-6) Thus, a variety of reactions can be expected from people exposed to any given noise environment.

Surveys have shown that community response to noise varies from no reaction to vigorous action for newly introduced noises averaging from 10 dB below existing to 25 dB above existing. (8) According to research originally published in the Noise Effects Handbook (7), the percentage of high annoyance ranges from approximately 0 percent at 45 dB or less, 10 percent are highly annoyed around 60 dB, and increases rapidly to approximately 70 percent being highly annoyed at approximately 85 dB or greater. Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. A change of 3 dBA is considered barely perceptible, and changes of 5 dBA are considered readily perceptible. (4)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



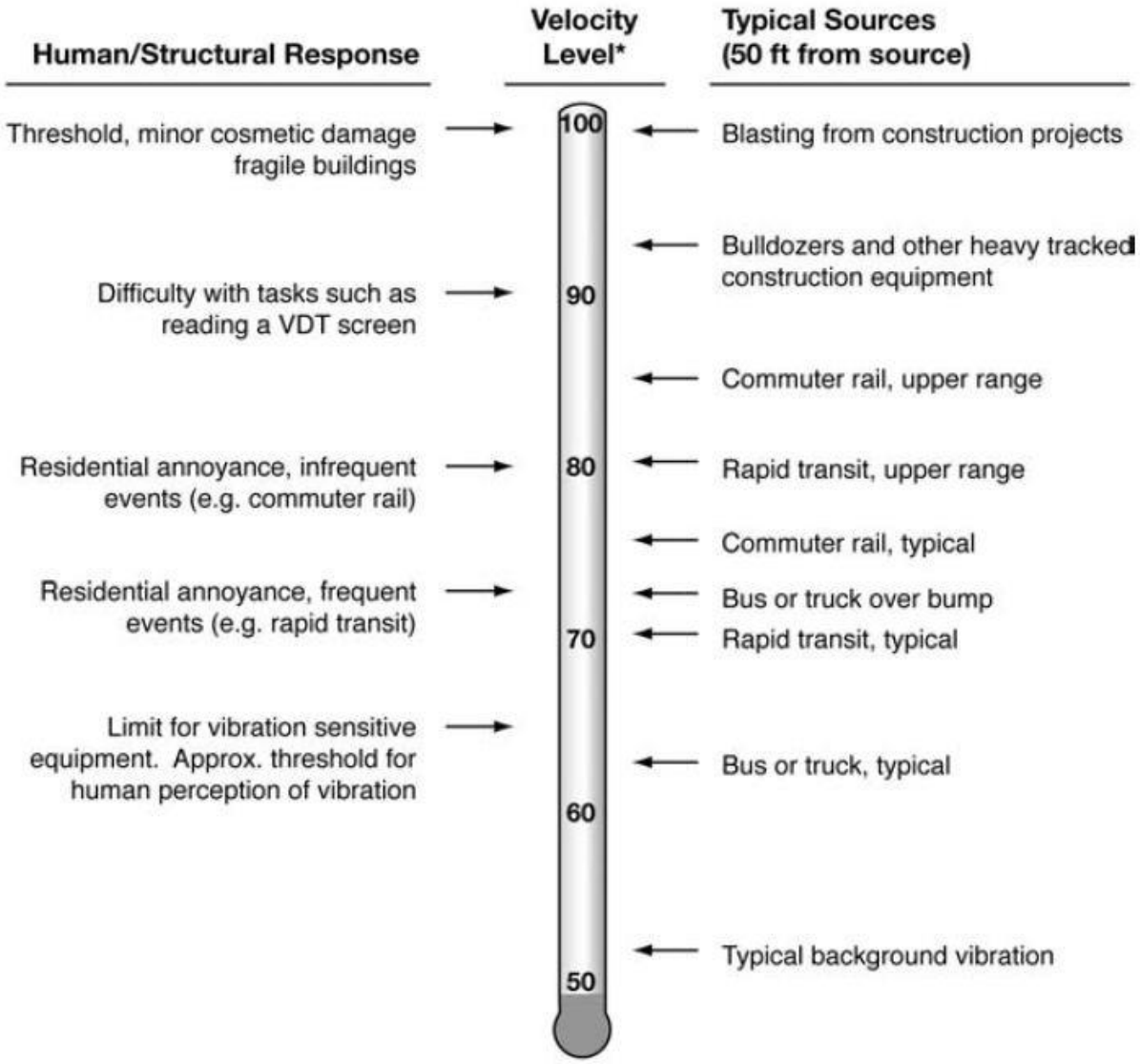
2.8 VIBRATION

Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Impact Assessment Manual* (8) , vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings but is not always suitable for evaluating human response (annoyance) because it takes some time for the human body to respond to vibration signals. Instead, the human body responds to average vibration amplitude often described as the root mean square (RMS). The RMS amplitude is defined as the average of the squared amplitude of the signal and is most frequently used to describe the effect of vibration on the human body. Decibel notation (VdB) is commonly used to measure RMS. Decibel notation (VdB) serves to reduce the range of numbers used to describe human response to vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receivers for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration-sensitive equipment and/or activities.

The background vibration-velocity level in residential areas is generally 50 VdB. Ground-borne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Exhibit 2-C illustrates common vibration sources and the human and structural response to ground-borne vibration.

EXHIBIT 2-C: TYPICAL LEVELS OF GROUND-BORNE VIBRATION



** RMS Vibration Velocity Level in VdB relative to 10^{-6} inches/second*

Source: Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual.

3 REGULATORY SETTING

The federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains constant with time. Air and rail traffic, and commercial and industrial activities are also major sources of noise in some areas. Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies.

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research (OPR). (9) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

3.2 CITY OF CORONA GENERAL PLAN NOISE ELEMENT

The City of Corona has adopted a General Plan Noise Element to control and abate environmental noise, and to protect the citizens of the City of Corona from excessive exposure to noise. (10) The Noise Element specifies the maximum allowable exterior noise levels for new developments impacted by transportation noise sources such as arterial roads, freeways, airports and railroads. In addition, the Noise Element identifies several polices to minimize the impacts of excessive noise levels throughout the community and establishes noise level requirements for all land uses. To protect City of Corona residents from excessive noise, the Noise Element contains the following four goals:

- *N-1 Protect residents, visitors, and noise-sensitive land uses from the adverse human health and environmental impacts created by excessive noise levels from transportation sources by requiring proactive mitigation.*
- *N-2 Prevent and mitigate the adverse impacts of excessive ambient noise exposure on residents, employees, visitors, and noise-sensitive land uses.*
- *N-3 Discourage the spillover or encroachment of unacceptable noise levels from mixed use, commercial, and industrial land uses on to noise sensitive land uses.*
- *N-4 Minimize noise impacts created by railroad transit and airport operations and flight patterns on residential areas and other "noise sensitive" land use areas.*

The noise criteria identified in the City of Corona Noise Element (Table N-1) are guidelines to evaluate the land use compatibility of transportation related noise. The compatibility criteria, shown on Exhibit 3-A, provides the City with a planning tool to gauge the compatibility of land

uses relative to existing and future exterior noise levels. The *Noise Levels and Land Use Compatibility Guidelines* describes categories of compatibility and not specific noise standards.

3.2.1 NOISE LEVELS AND LAND USE COMPATIBILITY

The proposed Magnolia Avenue Business Center contains warehouse and industrial park land use that is considered *clearly compatible* with unmitigated exterior noise levels of less than 70 dBA CNEL, *normally compatible* with unmitigated exterior noise levels above 80 dBA CNEL. Although specific development plans are not proposed for the other areas of the property, the noise sensitive residential land uses are considered *clearly compatible* with unmitigated exterior noise levels of less than 60 dBA CNEL, *normally compatible* with unmitigated exterior noise levels below 70 dBA CNEL and *clearly incompatible* with unmitigated exterior noise levels above 70 dBA CNEL. For *normally compatible* land use, *new construction should be undertaken only after detailed analysis of the noise reduction requirements and needed noise insulation features are determined. Conventional construction, with windows closed and fresh air supply or air conditioning, will normally suffice.* For *normally incompatible* land use, *new construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.* For *clearly incompatible* land use, *new construction or development should generally not be undertaken.*

3.2.2 LAND USE NOISE STANDARDS

The City of Corona General Plan Noise Element specifies the maximum noise levels allowable for new developments impacted by transportation noise sources such as arterial roads, freeways, airports and railroads. For noise-sensitive residential land uses, Table N-2 *Interior and Exterior Noise Standards* of the Noise Element indicates that the exterior noise levels shall not exceed 65 dBA CNEL and interior noise levels of 45 dBA CNEL. The 65 dBA CNEL exterior noise standards typically apply to outdoor areas where people congregate. The City of Corona does not identify any exterior noise standards for the Project commercial or industrial land use activities. The City of Corona transportation noise standards are shown on Exhibit 3-B.

EXHIBIT 3-A: NOISE LEVELS AND LAND USE COMPATIBILITY GUIDELINES

Land Use Categories		Community Noise Equivalent Level (CNEL)						
Categories	**Uses**	**<55**	**60**	**65**	**70**	**75**	**80>**	
Residential	Single Family, Duplex	A	A	B	B	D	D	D
	Multiple Family	A	A	B	B	C	D	D
	Hotel, Motel Lodging	A	A	B	C	C	D	D
Commercial Regional, District	Commercial Retail, Bank, Restaurant, Movie Theatre	A	A	B	B	C	C	D
Commercial Regional, Village District, Special	Commercial Retail, Bank, Restaurant, Movie Theatre	A	A	A	A	B	B	C
Commercial Office, Institution	Office Building, R&D, Professional Offices, City Office Building	A	A	A	B	B	C	D
Rec. Institutional Civic Center	Amphitheatre, Concert Auditorium, Meeting Hall	B	B	C	C	D	D	D
Commercial Recreation	Amusement Park, Miniature Golf, Sports Club, Equestrian Center	A	A	A	B	B	D	D
Commercial, General, Special, Industrial, and Institutional	Auto Service Station, Auto Dealer, Manu-facturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
Institutional General	Hospital, Church, Library, Schools' Classroom	A	A	B	C	C	D	D
Open Space	Local, Community, and Regional Parks	A	A	A	B	C	D	D
Open Space	Golf Course, Cemetery, Nature Centers Wildlife Reserves and Habitat	A	A	A	A	B	C	C

Zone A: Clearly Compatible: Specified land use is satisfactory, based on the assumption that any buildings involved are of conventional construction without any special noise insulation requirements.
Zone B: Normally Compatible: New construction should be undertaken only after detailed analysis of the noise reduction requirements and needed noise insulation features are determined. Conventional construction, with closed windows and fresh air supply or air conditioning, will normally suffice.
Zone C: Normally Incompatible: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.
Zone D: Clearly Incompatible: New development should generally not be undertaken.

EXHIBIT 3-B: INTERIOR AND EXTERIOR NOISE STANDARDS

Land Use Categories		Average CNEL	
Categories	**Uses**	**Interior[1]**	**Exterior[2]**
Residential	Single Family, Duplex, Multiple Family	45[3]	65
	Mobile Home	NA	65[4]
Commercial; Industrial; and Institutional	Hotel, Motel, Transient Lodging	45	65[5]
	Commercial Retail, Bank, Restaurant; Sports Club	55	NA
	Office Building, Research and Develop. Professional Offices, City Offices	50	NA
	Amphitheatre, Concert Hall Auditorium, Meeting Hall	45	NA
	Gymnasium (Multipurpose)	50	NA
	Manufacturing, Warehousing, Wholesale, Utilities	65	NA
	Movie Theatres	45	NA
Institutional	Hospital, Schools' classroom	45	65
	Church, Library	45	NA
	Parks	NA	65

Notes:
1. Indoor environment excluding bathrooms, toilets, closets, corridors.
2. Outdoor environment limited to: private yard of single family, multi-family private patio or balcony that is served by a means of exit from inside, mobile home park, hospital patio, park's picnic area, school's playground, and hotel and motel recreation area.
3. Noise level requirement with closed windows. Mechanical ventilating system or other means of natural ventilation shall be provided as of Chapter 12, Section 1205 of UBC.
4. Exterior noise level should be such that interior noise level will not exceed 45 CNEL.
5. Except those areas affected by aircraft noise.

3.3 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from the Magnolia Avenue Business Center, operational source noise such as loading dock activity, roof-top air conditioning units, trash enclosure activity, parking lot vehicle movements, trash compactor, and truck movements are typically evaluated against standards established under a City's Municipal Code. The City of Corona Municipal Code, Section 17.84.040 *Noise*, provides noise control guidelines for determining and mitigating non-transportation or stationary-source noise impacts from operations at private properties. The City of Corona Municipal Code defines *Stationary Noise Source Standards* in Section 17.84.040[C][2], Table 1, for different land uses. For noise-sensitive residential properties, the Municipal Code identifies operational noise level limits for the daytime (7:00 a.m. to 10:00 p.m.) hours of 55 dBA L_{50} and 50 dBA L_{50} during the nighttime (10:00 p.m. to 7:00 a.m.) hours. (11) These standards shall apply for a cumulative period of 30 minutes in any hour, as well as plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes in any hour, or the standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour, or the standard plus 15 dBA for a cumulative period of more than 1 minute in any hour, or the standard plus 20 dBA for any

period of time. The City of Corona Municipal Code noise standards are shown on Table 3-1 and included in Appendix 3.1.

TABLE 3-1: OPERATIONAL NOISE STANDARDS

Jurisdiction	Land Use	Time Period	Exterior Noise Level Standards (dBA Leq)[2]				
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
City of Corona[1]	Residential	Daytime	55	60	65	70	75
		Nighttime	50	55	60	65	70
	Industrial	Daytime	75	80	85	90	95
		Nighttime	70	75	80	85	90

[1] City of Corona Municipal Code, Section 17.84.040 Noise (Appendix 3.1).
[2] The percent noise level is the level exceeded "n" percent of the time during the measurement period. L50 is the noise level exceeded 50% of the time.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

The percentile noise descriptors are provided to ensure that the duration of the noise source is fully considered. However, due to the relatively constant intensity of the Project operational activities, the L_{50} or average L_{eq} noise level metrics best describe the loading dock activity, roof-top air conditioning units, trash enclosure activity, parking lot vehicle movements, trash compactor, and truck movements. In addition, the L_{eq} noise level metric accounts for noise fluctuations over time by averaging the louder and quieter events and giving more weight to the louder events. In addition, due to the mathematical relationship between the median (L_{50}) and the mean (L_{eq}), the L_{eq} will always be larger than or equal to the L_{50}. The more variable the noise becomes, the larger the L_{eq} becomes in comparison to the L_{50}. Therefore, this noise study conservatively relies on the average L_{eq} sound level limits to describe the Project operational noise levels.

3.4 CONSTRUCTION NOISE STANDARDS

To analyze noise impacts originating from the construction of the Magnolia Avenue Business Center, noise from construction activities is typically evaluated against standards established under a City's Municipal Code. To analyze noise impacts originating from the construction of the Magnolia Avenue Business Center Project, noise from construction activities is typically evaluated against standards established under a City's Municipal Code. The City of Corona Municipal Code, Section 17.84.040[D][2], states that construction noise is prohibited between the hours of 8:00 p.m. to 7:00 a.m., Monday through Saturday and 6:00 p.m. to 10:00 a.m. on Sundays and federal holidays. While the City establishes limits to the hours during which construction activity may take place, neither the City's General Plan nor Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers. Therefore, a numerical construction threshold based on Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* is used for analysis of daytime construction impacts, as discussed below.

According to the FTA, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should account for the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. Due to the lack of standardized construction noise thresholds, the FTA provides guidelines that can be considered reasonable criteria for construction noise assessment. The FTA considers a daytime exterior construction noise level of 80 dBA L_{eq} and a nighttime exterior construction noise level of 70 dBA L_{eq} as a reasonable threshold for noise sensitive residential land use (8 p. 179).

3.5 CONSTRUCTION VIBRATION STANDARDS

To analyze the vibration impacts originating from the construction of the Project, vibration from construction activities is typically evaluated against standards established under a City's Municipal Code. The City of Corona Municipal Code, Section 17.84.050, identifies a vibration velocity standard of 0.05 in/sec root-mean-square (RMS) for sensitive land uses which is used in this analysis as the basis for determining the relative significance of potential Project related vibration impacts. Typically, the human response at the perception threshold for vibration includes annoyance in residential areas as previously shown on Exhibit 2-B, when vibration levels expressed in vibration decibels (VdB) approach 75 VdB. The City of Corona, however, identifies a vibration perception threshold of 0.05 in/sec at any point on the affected property. For vibration levels expressed in velocity, the human body responds to the average vibration amplitude often described as the root-mean-square (RMS). Therefore, the City of Corona vibration standard of 0.05 in/sec in RMS velocity levels is used in this analysis to assess the human perception of vibration levels due to Project-related construction activities.

4 SIGNIFICANCE CRITERIA

The following significance criteria are based on currently adopted guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1) For the purposes of this report, impacts would be potentially significant if the Project results in or causes:

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

B. Generation of excessive ground-borne vibration or ground-borne 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?

4.1 NOISE LEVEL INCREASES (THRESHOLD A)

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines. Under CEQA, consideration must be given to the magnitude of the increase, the existing baseline ambient noise levels, and the location of receivers to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (12) This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged.

The Federal Interagency Committee on Noise (FICON) (13) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (CNEL) and equivalent continuous noise level (L_{eq}).

As previously stated, the approach used in this noise study recognizes *that there is no single noise increase that renders the noise impact significant*, based on a 2008 California Court of Appeal ruling on Gray v. County of Madera. (12) For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria may be exceeded. Therefore, for this analysis, a *readily perceptible* 5 dBA or greater project-related noise level increase is considered a significant impact when the without project noise levels are below 60 dBA. Per the FICON, in areas where the without project noise levels range from 60 to 65 dBA, a 3 dBA *barely perceptible* noise level increase appears to be appropriate for most people. When the without project noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if

the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance. The FICON guidance provides an established source of criteria to assess the impacts of substantial temporary or permanent increase in baseline ambient noise levels. Based on the FICON criteria, the amount to which a given noise level increase is considered acceptable is reduced when the without Project (baseline) noise levels are already shown to exceed certain land-use specific exterior noise level criteria. The specific levels are based on typical responses to noise level increases of 5 dBA or *readily perceptible*, 3 dBA or *barely perceptible*, and 1.5 dBA depending on the underlying without Project noise levels for noise-sensitive uses. These levels of increases and their perceived acceptance are consistent with guidance provided by both the Federal Highway Administration (4 p. 9) and Caltrans (14 p. 2_48).

4.2 VIBRATION (THRESHOLD B)

As described in Section 3.5, the vibration impacts originating from the construction of the Magnolia Avenue Business Center are appropriately evaluated against the thresholds of significance outlined in the City of Corona Municipal Code (15). These guidelines identify a vibration velocity standard of 0.05 in/sec root-mean-square (RMS) for sensitive land uses which is used in this analysis as the basis for determining the relative significance of potential Project related vibration impacts.

4.3 CEQA GUIDELINES NOT FURTHER ANALYZED (THRESHOLD C)

CEQA Noise Threshold C applies when there are nearby public and private airports and/or air strips and focuses on land use compatibility of the Project to nearby airports and airstrips. The Project site is not located within two miles of an airport or airstrip. The closest airport is the Corona Municipal Airport located roughly 3.4 miles northwest of the Project site. As such, the Project site would not be exposed to excessive noise levels from airport operations, and therefore, impacts are considered *less than significant,* and no further noise analysis is conducted in relation to Appendix G to the CEQA Guidelines, Noise Threshold C.

4.4 SIGNIFICANCE CRITERIA SUMMARY

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed Project. Table 4-1 shows the significance criteria summary matrix that includes the allowable criteria used to identify potentially significant incremental noise level increases.

TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Receiving Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Operational	Noise-Sensitive	Exterior Noise Level Standards[1]	See Table 3-1	
		if ambient is < 60 dBA L_{eq}[2]	≥ 5 dBA L_{eq} Project increase	
		if ambient is 60 - 65 dBA L_{eq}[2]	≥ 3 dBA L_{eq} Project increase	
		if ambient is > 65 dBA L_{eq}[2]	≥ 1.5 dBA L_{eq} Project increase	
Construction	Noise-Sensitive	Prohibited between the hours of 8:00 p.m. to 7:00 a.m., Monday through Saturday and 6:00 p.m. to 10:00 a.m. on Sundays and federal holidays.[3]		
		Noise Level Threshold[4]	80 dBA L_{eq}	70 dBA L_{eq}
		Vibration Level Threshold[5]	0.05 in/sec RMS	

[1] City of Corona Municipal Code, Section 17.84.040 Noise[C][2] (Appendix 3.1).
[2] FICON, 1992.
[3] City of Corona Municipal Code, Section 17.84.040[D][2] Noise (Appendix 3.1).
[4] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, 2018.
[5] City of Corona Municipal Code, Section 17.84.050 Vibration (Appendix 3.1).
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.; "RMS" = root-mean-square

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at five locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Wednesday, January 12th, 2022. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the equivalent daytime and nighttime hourly noise levels. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (16)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (2) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (8)

Based on recommendations of Caltrans and the FTA, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. (8) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after Project noise levels

and is necessary to assess potential noise impacts due to the Project's contribution to the ambient noise levels.

5.3 NOISE MEASUREMENT RESULTS

The noise measurements presented below focus on the average or equivalent sound levels (L_{eq}). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 5-1 identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location.

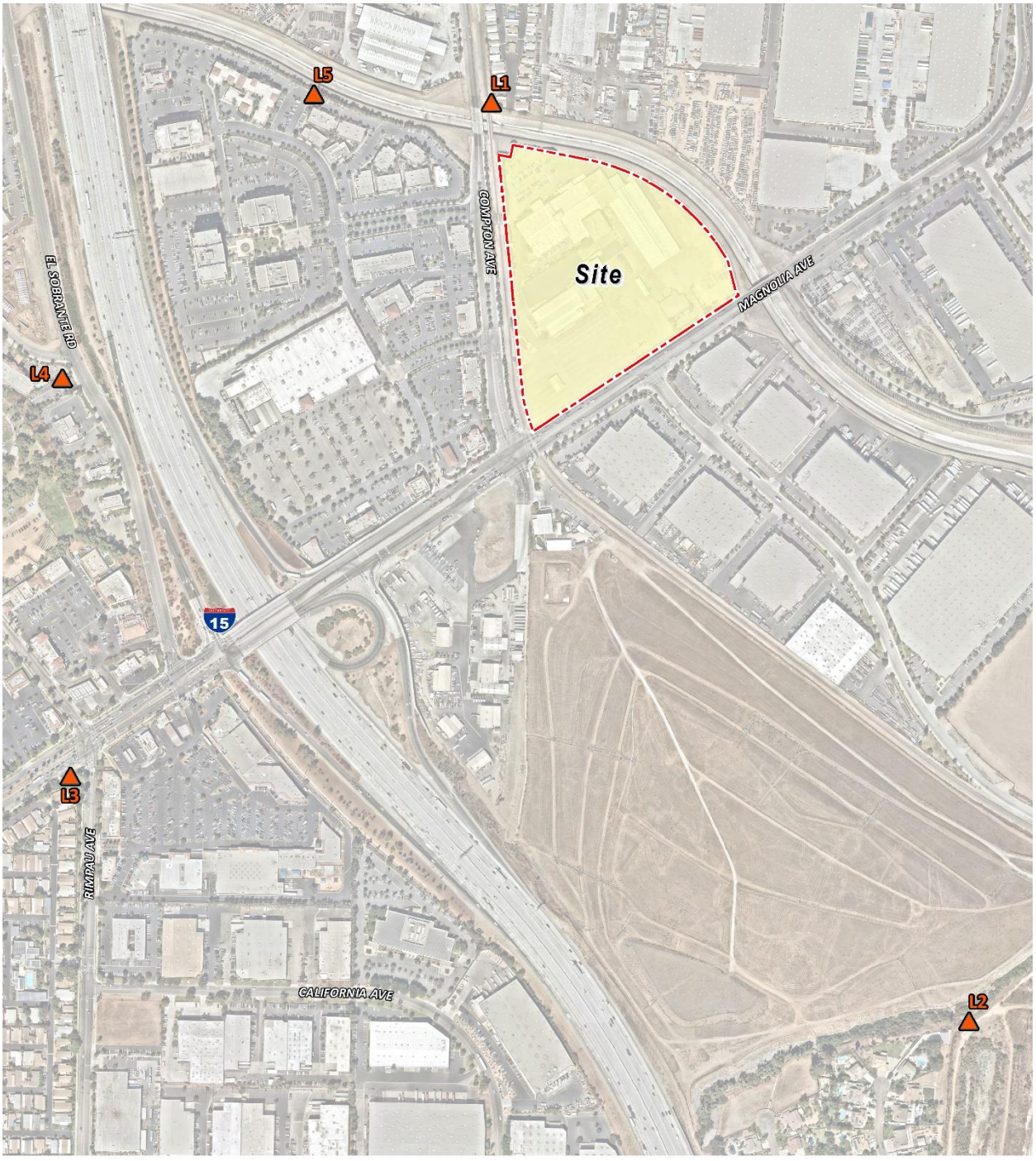
TABLE 5-1: 24-HOUR AMBIENT NOISE LEVEL MEASUREMENTS

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]	
		Daytime	Nighttime
L1	Located north of the Project site near single-family residence at 1410 East 6th Street.	59.3	54.7
L2	Located southeast of the Project site near single-family residence at 1661 Laurel Canyon Way.	52.3	53.1
L3	Located southwest of the Project site near single-family residence at 1550 Rimpau Avenue.	65.7	61.1
L4	Located west of the Project site near Holiday Inn Express and Suites Corona at 1550 Circle City Drive.	70.2	68.1
L5	Located northwest of the Project site near Residence Inn by Marriott Corona Riverside at 1015 Montecito Drive.	59.1	57.5

[1] See Exhibit 5-A for the noise level measurement locations.
[2] Energy (logarithmic) average levels. The long-term 24-hour measurement worksheets are included in Appendix 5.2.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

Table 5-1 provides the (energy average) noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Appendix 5.2 provides summary worksheets of the noise levels for each hour as well as the minimum, maximum, L_1, L_2, L_5, L_8, L_{25}, L_{50}, L_{90}, L_{95}, and L_{99} percentile noise levels observed during the daytime and nighttime periods.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS



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6 RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following sensitive receiver locations, as shown on Exhibit 6-A, were identified as representative locations for analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

To describe the potential off-site Project noise levels, five receiver locations in the vicinity of the Project site were identified. All distances are measured from the Project site boundary to the outdoor living areas (e.g., private backyards) or at the building façade, whichever is closer to the Project site. The selection of receiver locations is based on FHWA guidelines and is consistent with additional guidance provided by Caltrans and the FTA, as previously described in Section 5.2. Other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures. Distance is measured in a straight line from the project boundary to each receiver location.

R1: Location R1 represents existing noise sensitive residence at 1410 East 6th Street, approximately 149 feet north of the Project site. Receiver R1 is place in the private outdoor living areas (backyards) facing the Project site. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the existing noise sensitive residence at 1661 Laurel Canyon Way, approximately 2,846 feet southeast of the Project site. Receiver R2 is place in the private outdoor living areas (backyards) facing the Project site. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents the existing noise sensitive residence at 1550 Rimpau Avenue, approximately 2,430 feet southwest of the Project site. Receiver R3 is place in the private outdoor living areas (backyards) facing the Project site. A 24-hour noise measurement was taken near this location, L3, to describe the existing ambient noise environment.

R4: Location R4 represents the existing noise sensitive Holiday Inn Express and Suites Corona at 1550 Circle City, approximately 2,000 feet west of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receiver R4 is placed at the building façade. A 24-hour noise measurement was taken near this location, L4, to describe the existing ambient noise environment.

R5: Location R5 represents the existing noise sensitive Residence Inn by Marriott Corona Riverside at 1015 Montecito Drive, approximately 969 feet west of the Project site. Since

there are no private outdoor living areas (backyards) facing the Project site, receiver R5 is placed at the building façade. A 24-hour noise measurement was taken near this location, L5, to describe the existing ambient noise environment.

EXHIBIT 6-A: RECEIVER LOCATIONS

7 OPERATIONAL NOISE ANALYSIS

This section analyzes the potential stationary-source operational noise impacts at the nearby receiver locations, identified in Section 6, resulting from the operation of the proposed Magnolia Avenue Business Center Project. Exhibit 7-A identifies the noise source locations used to assess the operational noise levels.

7.1 OPERATIONAL NOISE SOURCES

This operational noise analysis is intended to describe noise level impacts associated with the expected typical of daytime and nighttime activities at the Project site. To present the potential worst-case noise conditions, this analysis assumes the Project would be operational 24 hours per day, seven days per week. Consistent with similar warehouse and industrial uses, the Project business operations would primarily be conducted within the enclosed buildings, except for traffic movement, parking, as well as loading and unloading of trucks at designated loading bays. The on-site Project-related noise sources are expected to include: loading dock activity, roof-top air conditioning units, trash enclosure activity, parking lot vehicle movements, trash compactor, and truck movements.

7.2 REFERENCE NOISE LEVELS

To estimate the Project operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. This section provides a detailed description of the reference noise level measurements shown on Table 7-1 used to estimate the Project operational noise impacts. It is important to note that the following projected noise levels assume the worst-case noise environment with the loading dock activity, roof-top air conditioning units, trash enclosure activity, parking lot vehicle movements, trash compactor, and truck movements all operating at the same time. These sources of noise activity will likely vary throughout the day.

7.2.1 MEASUREMENT PROCEDURES

The reference noise level measurements presented in this section were collected using a Larson Davis LxT Type 1 precisions sound level meter (serial number 01146). The LxT sound level meter was calibrated using a Larson-Davis calibrator, Model CAL 200, was programmed in "slow" mode to record noise levels in "A" weighted form and was located at approximately five feet above the ground elevation for each measurement. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (16)

EXHIBIT 7-A: OPERATIONAL NOISE SOURCE LOCATIONS

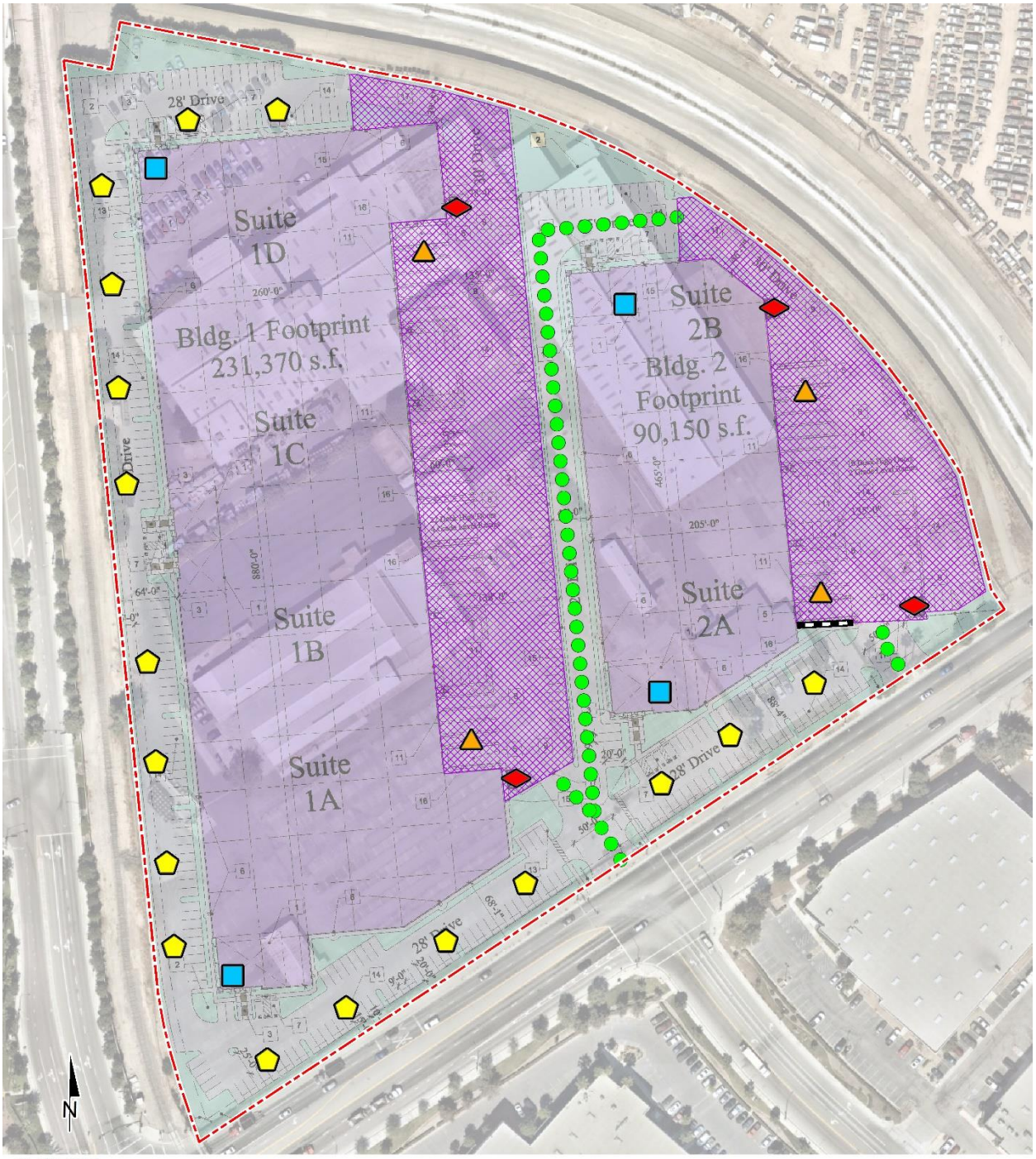

TABLE 7-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source[1]	Noise Source Height (Feet)	Min./ Hour[2]		Reference Noise Level (dBA L_{eq}) @ 50 Feet	Sound Power Level (dBA)[3]
		Day	Night		
Loading Dock Activity	8'	60	60	62.8	103.4
Roof-Top Air Conditioning Units	5'	39	28	57.2	88.9
Trash Enclosure Activity	5'	10	10	57.3	89.0
Parking Lot Vehicle Movements	5'	60	60	56.1	87.8
Trash Compactor	5'	20	20	55.5	87.2
Truck Movements	8'	60	60	58.0	93.2

[1] As measured by Urban Crossroads, Inc.
[2] Anticipated duration (minutes within the hour) of noise activity during typical hourly conditions expected at the Project site. "Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 7:00 a.m.
[3] Sound power level represents the total amount of acoustical energy (noise level) produced by a sound source independent of distance or surroundings. Sound power levels calculated using the CadnaA noise model at the reference distance to the noise source.
[4] Truck Movements are calculated based on the number of events by time of day (See Table 7-2).

7.2.2 LOADING DOCK ACTIVITY

The reference loading dock activities are intended to describe the typical operational noise source levels associated with the Project. This includes truck idling, deliveries, backup alarms, unloading/loading, docking including a combination of tractor trailer semi-trucks, two-axle delivery trucks, and background forklift operations. At a uniform reference distance of 50 feet, Urban Crossroads collected a reference noise level of 62.8 dBA L_{eq}. The loading dock activity noise level measurement was taken over a fifteen-minute period and represents multiple noise sources taken from the center of activity. The reference noise level measurement includes employees unloading a docked truck container included the squeaking of the truck's shocks when weight was removed from the truck, employees playing music over a radio, as well as a forklift horn and backup alarm. In addition, during the noise level measurement a truck entered the loading dock area and proceeded to reverse and dock in a nearby loading bay, adding truck engine, idling, air brakes noise, in addition to on-going idling of an already docked truck.

7.2.3 ROOF-TOP AIR CONDITIONING UNITS

The noise level measurements describe a single mechanical roof-top air conditioning unit. The reference noise level represents a Lennox SCA120 series 10-ton model packaged air conditioning unit. At the uniform reference distance of 50 feet, the reference noise levels are 57.2 dBA L_{eq}. Based on the typical operating conditions observed over a four-day measurement period, the roof-top air conditioning units are estimated to operate for and average 39 minutes per hour during the daytime hours, and 28 minutes per hour during the nighttime hours. These operating conditions reflect peak summer cooling requirements with measured temperatures approaching 96 degrees Fahrenheit (°F) with average daytime temperatures of 82°F. For this noise analysis, the air conditioning units are expected to be located on the roof of the Project buildings.

7.2.5 TRASH ENCLOSURE ACTIVITY

To describe the noise levels associated with a trash enclosure activity, Urban Crossroads collected a reference noise level measurement at an existing trash enclosure containing two dumpster bins. The trash enclosure noise levels describe metal gates opening and closing, metal scraping against concrete floor sounds, dumpster movement on metal wheels, and trash dropping into the metal dumpster. The reference noise levels describe trash enclosure noise activities when trash is dropped into an empty metal dumpster, as would occur at the Project Site. The measured reference noise level at the uniform 50-foot reference distance is 57.3 dBA L_{eq} for the trash enclosure activity. The reference noise level describes the expected noise source activities associated with the trash enclosures for the Project's proposed building. Typical trash enclosure activities are estimated to occur for 10 minutes per hour.

7.2.6 PARKING LOT VEHICLE MOVEMENTS

To describe the on-site parking lot activity, a long-term 29-hour reference noise level measurement was collected in the center of activity within the staff parking lot of a warehouse distribution center. At 50 feet from the center of activity, the parking lot produced a reference noise level of 56.1 dBA L_{eq}. Parking activities are expected to take place during the full hour (60 minutes) throughout the daytime and evening hours. The parking lot noise levels are mainly due cars pulling in and out of parking spaces in combination with car doors opening and closing.

7.2.6 TRASH COMPACTOR

To assess the noise levels created by the trash compactor planned on the Project site, reference noise levels were gathered by Urban Crossroads Inc. At the uniform reference distance of 50 feet, the reference noise levels are 55.5 dBA Leq. It is expected the trash compactor will operate for a maximum of 20 minutes per hour during typical operating hours.

7.2.7 TRUCK MOVEMENTS

The truck movements reference noise level measurement was collected over a period of 1 hour and 28 minutes and represents multiple heavy trucks entering and exiting the outdoor loading dock area producing a reference noise level of 59.8 dBA L_{eq} at 50 feet. The noise sources included at this measurement location account for trucks entering and existing the Project driveways and maneuvering in and out of the outdoor loading dock activity area.

7.3 CADNAA NOISE PREDICTION MODEL

To fully describe the exterior operational noise levels from the Project, Urban Crossroads, Inc. developed a noise prediction model using the CadnaA (Computer Aided Noise Abatement) computer program. CadnaA can analyze multiple types of noise sources using the spatially accurate Project site plan, georeferenced Nearmap aerial imagery, topography, buildings, and barriers in its calculations to predict outdoor noise levels.

Using the ISO 9613-2 protocol, CadnaA will calculate the distance from each noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation

inputs to provide a summary of noise level at each receiver and the partial noise level contributions by noise source. Consistent with the ISO 9613-2 protocol, the CadnaA noise prediction model relies on the reference sound power level (L_w) to describe individual noise sources. While sound pressure levels (e.g., L_{eq}) quantify in decibels the intensity of given sound sources at a reference distance, sound power levels (L_w) are connected to the sound source and are independent of distance. Sound pressure levels vary substantially with distance from the source and diminish because of intervening obstacles and barriers, air absorption, wind, and other factors. Sound power is the acoustical energy emitted by the sound source and is an absolute value that is not affected by the environment.

The operational noise level calculations provided in this noise study account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. A default ground attenuation factor of 0.5 was used in the CadnaA noise analysis to account for mixed ground representing a combination of hard and soft surfaces. Appendix 7.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section.

7.4 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed Project operations that include loading dock activity, roof-top air conditioning units, trash enclosure activity, parking lot vehicle movements, trash compactor, and truck movements, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the Project site and the Project-related noise level increases that would be experienced at each of the sensitive receiver locations. Table 7-2 shows the Project operational noise levels during the daytime hours of 7:00 a.m. to 10:00 p.m. The daytime hourly noise levels at the off-site receiver locations are expected to range from 33.6 to 49.3 dBA L_{eq}.

TABLE 7-2: DAYTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA Leq)				
	R1	R2	R3	R4	R5
Loading Dock Activity	45.2	35.1	24.2	15.5	30.6
Roof-Top Air Conditioning Units	38.7	21.2	22.3	24.8	29.6
Trash Enclosure Activity	19.1	17.0	11.6	0.0	1.2
Parking Lot Vehicle Movements	46.3	28.5	31.7	33.2	37.7
Trash Compactor	9.7	13.6	0.0	0.0	1.5
Truck Movements	31.7	28.1	25.7	6.7	10.7
Total (All Noise Sources)	**49.3**	**36.8**	**33.6**	**33.9**	**39.0**

[1] See Exhibit 7-A for the noise source locations. CadnaA noise model calculations are included in Appendix 7.1.

Table 7-3 shows the Project operational noise levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. The nighttime hourly noise levels at the off-site receiver locations are expected to range from 32.5 to 48.2 dBA L_{eq}. The differences between the daytime and nighttime noise levels

are largely related to the estimated duration of noise activity as outlined in Table 7-1 and Appendix 7.1.

TABLE 7-3: NIGHTTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA Leq)				
	R1	R2	R3	R4	R5
Loading Dock Activity	44.2	34.1	23.2	14.5	29.7
Roof-Top Air Conditioning Units	36.3	18.8	19.9	22.4	27.2
Trash Enclosure Activity	18.1	16.0	10.6	0.0	0.2
Parking Lot Vehicle Movements	45.3	27.5	30.7	32.2	36.8
Trash Compactor	8.7	12.6	0.0	0.0	0.5
Truck Movements	30.8	27.1	24.7	5.8	9.8
Total (All Noise Sources)	**48.2**	**35.8**	**32.5**	**32.7**	**38.0**

[1] See Exhibit 7-A for the noise source locations. CadnaA noise model calculations are included in Appendix 7.1.

7.5 PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level thresholds based on the City of Corona exterior noise level standards at nearby noise-sensitive receiver locations. Table 7-4 shows the operational noise levels associated with Magnolia Avenue Business Center Project will satisfy the City of Corona daytime and nighttime exterior noise level standards at the nearby noise-sensitive receiver locations. Therefore, the operational noise impacts are considered *less than significant* at the nearby noise-sensitive receiver locations.

TABLE 7-4: OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Project Operational Noise Levels (dBA Leq)[2]		Noise Level Standards (dBA Leq)[3]		Noise Level Standards Exceeded?[4]	
	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
R1	49.3	48.2	55	50	No	No
R2	36.8	35.8	55	50	No	No
R3	33.6	32.5	55	50	No	No
R4	33.9	32.7	55	50	No	No
R5	39.0	38.0	55	50	No	No

[1] See Exhibit 6-A for the receiver locations.
[2] Proposed Project operational noise levels as shown on Tables 7-2 and 7-3.
[3] Exterior noise level standards, as shown on Table 4-1.
[4] Do the estimated Project operational noise source activities exceed the noise level standards?
"Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 7:00 a.m.

7.6 PROJECT OPERATIONAL NOISE LEVEL INCREASES

To describe the Project operational noise level increases, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations potentially impacted by Project operational noise sources. Since the units used to measure noise, decibels (dB), are logarithmic units, the Project-operational and existing ambient noise levels cannot be combined using standard arithmetic equations. (2) Instead, they must be logarithmically added using the following base equation:

$$SPL_{Total} = 10\log_{10}[10^{SPL1/10} + 10^{SPL2/10} + \ldots 10^{SPLn/10}]$$

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describes the Project noise level increases to the existing ambient noise environment. As indicated on Tables 7-5 and 7-6, the Project is not expected to generate a measurable daytime and nighttime operational noise level increase dBA L_{eq} at the nearest receiver locations. Project-related operational noise level increases will satisfy the operational noise level increase significance criteria presented on Table 4-1. Therefore, the incremental Project operational noise level increase is considered *less than significant* at all receiver locations.

7.7 OFF-SITE TRAFFIC NOISE ANALYSIS

Traffic generated by the operation of the proposed Project will influence the traffic noise levels in surrounding off-site areas and at the Project site. According to the February 2022*, Magnolia Avenue Business Center Trip Generation Assessment prepared by Urban Crossroads, Inc*., the proposed Project is anticipated to generate 184 more two-way (non-passenger car equivalent [PCE]) trips per day with 15 fewer AM and 24 fewer PM peak hour trips as compared to the existing use (17). The Trip Generation Assessment determined that no traffic analysis is required since the Project is anticipated to result in a net reduction to the AM and PM peak hours in comparison to the existing use and would contribute fewer than 50 net new peak hour trips to any driveway or off-site study area intersection.

TABLE 7-5: DAYTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria[7]	Increase Criteria Exceeded?
R1	49.3	L1	59.3	59.7	0.4	5.0	No
R2	36.8	L2	52.3	52.4	0.1	5.0	No
R3	33.6	L3	65.7	65.7	0.0	1.5	No
R4	33.9	L4	70.2	70.2	0.0	1.5	No
R5	39.0	L5	59.1	59.1	0.0	5.0	No

[1] See Exhibit 6-A for the receiver locations.
[2] Total Project daytime operational noise levels as shown on Table 7-2.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance increase criteria as shown on Table 4-1.

TABLE 7-6: NIGHTTIME OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria[7]	Increase Criteria Exceeded?
R1	48.2	L1	54.7	55.6	0.9	5.0	No
R2	35.8	L2	53.1	53.2	0.1	5.0	No
R3	32.5	L3	61.1	61.1	0.0	5.0	No
R4	32.7	L4	68.1	68.1	0.0	1.5	No
R5	38.0	L5	57.5	57.5	0.0	5.0	No

[1] See Exhibit 6-A for the receiver locations.
[2] Total mitigated Project nighttime operational noise levels as shown on Table 7-3.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed nighttime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance increase criteria as shown on Table 4-1.

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8 CONSTRUCTION ANALYSIS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 8-A shows the construction activity boundaries in relation to the nearest sensitive receiver locations previously described in Section 6. To prevent high levels of construction noise from impacting noise-sensitive land uses, the City of Corona Municipal Code, Section 17.84.040[D][2], states that construction noise is prohibited between the hours of 8:00 p.m. to 7:00 a.m., Monday through Saturday and 6:00 p.m. to 10:00 a.m. on Sundays and federal holidays.

In addition, since neither the City of Corona General Plan or County Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers for CEQA analysis purposes. Therefore, a numerical construction threshold based on Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual is used for analysis of daytime construction impacts. The FTA considers a daytime exterior construction noise level of 80 dBA L_{eq} and a nighttime exterior construction noise level of 70 dBA L_{eq} as a reasonable threshold for noise sensitive residential land use. (8 p. 179).

8.1 CONSTRUCTION NOISE LEVELS

The FTA *Transit Noise and Vibration Impact Assessment Manual* recognizes that construction projects are accomplished in several different stages and outlines the procedures for assessing noise impacts during construction. Each stage has a specific equipment mix, depending on the work to be completed during that stage. As a result of the equipment mix, each stage has its own noise characteristics; some stages have higher continuous noise levels than others, and some have higher impact noise levels than others. The Project construction activities are expected to occur in the following stages:

- Demolition
- Site Preparation
- Grading
- Building Construction
- Paving
- Architectural Coating

8.2 CONSTRUCTION REFERENCE NOISE LEVELS

To describe construction noise activities, this construction noise analysis was prepared using reference construction equipment noise levels from the Federal Highway Administration (FHWA) published the Roadway Construction Noise Model (RCNM), which includes a national database of construction equipment reference noise emission levels. (18) The RCNM equipment database, provides a comprehensive list of the noise generating characteristics for specific types of construction equipment. In addition, the database provides an acoustical usage factor to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

EXHIBIT 8-A: CONSTRUCTION NOISE SOURCE LOCATIONS

8.3 CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearby sensitive receiver locations were completed. Consistent with FTA guidance for general construction noise assessment, Table 8-1 presents the combined noise levels for the loudest construction equipment, assuming they operate at the same time. As shown on Table 8-2, the construction noise levels are expected to range from 38.4 to 60.7 dBA L_{eq} at the nearby receiver locations. Appendix 8.1 includes the detailed CadnaA construction noise model inputs.

TABLE 8-1: CONSTRUCTION REFERENCE NOISE LEVELS

Construction Stage	Reference Construction Activity	Reference Noise Level @ 50 Feet (dBA L_{eq})[1]	Combined Noise Level (dBA L_{eq})[2]	Combined Sound Power Level (PWL)[3]
Demolition	Demolition Equipment	82	83	115
	Backhoes	74		
	Hauling Trucks	72		
Site Preparation	Crawler Tractors	78	80	112
	Hauling Trucks	72		
	Rubber Tired Dozers	75		
Grading	Graders	81	83	115
	Excavators	77		
	Compactors	76		
Building Construction	Cranes	73	81	113
	Tractors	80		
	Welders	70		
Paving	Pavers	74	83	115
	Paving Equipment	82		
	Rollers	73		
Architectural Coating	Cranes	73	77	109
	Air Compressors	74		
	Generator Sets	70		

[1] FHWA Roadway Construction Noise Model (RCNM).
[2] Represents the combined noise level for all equipment assuming they operate at the same time consistent with FTA Transit Noise and Vibration Impact Assessment guidance.
[3] Sound power level represents the total amount of acoustical energy (noise level) produced by a sound source independent of distance or surroundings. Sound power levels calibrated using the CadnaA noise model at the reference distance to the noise source.

TABLE 8-2: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})						
	Demolition	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Highest Levels[2]
R1	60.7	57.7	60.7	58.7	60.7	54.7	60.7
R2	44.4	41.4	44.4	42.4	44.4	38.4	44.4
R3	45.4	42.4	45.4	43.4	45.4	39.4	45.4
R4	47.9	44.9	47.9	45.9	47.9	41.9	47.9
R5	52.0	49.0	52.0	50.0	52.0	46.0	52.0

[1] Noise receiver locations are shown on Exhibit 8-A.
[2] Construction noise level calculations based on distance from the construction activity, which is measured from the Project site boundary to the nearest receiver locations. CadnaA construction noise model inputs are included in Appendix 8.1.

8.4 CONSTRUCTION NOISE LEVEL COMPLIANCE

To evaluate whether the Project will generate potentially significant short-term noise levels at nearest receiver locations, a construction-related daytime noise level threshold of 80 dBA L_{eq} is used as a reasonable threshold to assess the daytime construction noise level impacts. The construction noise analysis shows that the nearest receiver locations will satisfy the reasonable daytime 80 dBA L_{eq} significance threshold during Project construction activities as shown on Table 8-3. Therefore, the noise impacts due to Project construction noise are considered *less than significant* at all receiver locations.

TABLE 8-3: CONSTRUCTION NOISE LEVEL COMPLIANCE

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})		
	Highest Construction Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	60.7	80	No
R2	44.4	80	No
R3	45.4	80	No
R4	47.9	80	No
R5	52.0	80	No

[1] Noise receiver locations are shown on Exhibit 8-A.
[2] Highest construction noise level calculations based on distance from the construction noise source activity to the nearest receiver locations as shown on Table 8-2.
[3] Construction noise level thresholds as shown on Table 4-1.
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

8.5 CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. Ground-borne vibration levels resulting from typical construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration (FTA). (8) However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 8-4. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential Project construction vibration levels using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 8-4: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	PPV (in/sec) at 25 feet
Small bulldozer	0.003
Jackhammer	0.035
Loaded Trucks	0.076
Large bulldozer	0.089

Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual

Using the vibration source level of construction equipment provided on Table 8-4 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 8-5 presents the expected Project related vibration levels at the nearby receiver locations. At distances ranging from 149 to 2,846 feet from Project construction activities, construction vibration velocity levels are estimated to be 0.004 in/sec RMS and will remain below the City of Corona threshold of 0.05 in/sec RMS at all receiver locations, as shown on Table 8-5. Therefore, the Project-related vibration impacts are considered *less than significant* during the construction activities at the Project site.

TABLE 8-5: PROJECT CONSTRUCTION VIBRATION LEVELS

Receiver[1]	Distance to Const. Activity (Feet)	Receiver Levels (in/sec) RMS[2]					Threshold (in/sec) RMS[3]	Threshold Exceeded?[4]
		Small Bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer	Peak Vibration		
R1	149'	0.000	0.002	0.004	0.004	0.004	0.05	No
R2	2,846'	0.000	0.000	0.000	0.000	0.000	0.05	No
R3	2,430'	0.000	0.000	0.000	0.000	0.000	0.05	No
R4	2,000'	0.000	0.000	0.000	0.000	0.000	0.05	No
R5	969'	0.000	0.000	0.000	0.000	0.000	0.05	No

[1] Receiver locations are shown on Exhibit 8-A.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 8-4. Vibration levels in PPV are converted to RMS velocity using a 0.71 conversion factor identified in the Caltrans Transportation and Construction Vibration Guidance Manual, September 2013.
[3] City of Corona Municipal Code, Section 17.84.050 Vibration.
[4] Does the vibration level exceed the maximum acceptable vibration threshold?

Moreover, the impacts at the site of the nearest sensitive receiver locations are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating adjacent to the Project site perimeter.

9 REFERENCES

1. **State of California.** *California Environmental Quality Act, Environmental Checklist Form Appendix G.* 2021.
2. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
3. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March 1974. EPA/ONAC 550/9/74-004.
4. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* December 2011.
5. **U.S. Department of Transportation Federal Highway Administration.** *Highway Noise Barrier Design Handbook.* 2001.
6. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
7. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.
8. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment Manual.* September 2018.
9. **Office of Planning and Research.** *State of California General Plan Guidlines.* October 2019.
10. **City of Corona.** *General Plan 2020-2040 Noise Element.*
11. —. *Municipal Code, Section 17.84.040 Noise.*
12. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
13. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.
14. **California Department of Transportation.** *Technical Noise Supplement.* November 2009.
15. **City of Corona.** *Municipal Code Section 17.84.050 Vibration.*
16. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
17. **Urban Crossroads, Inc.** *Magnolia Avenue Business Center Trip Generation Assessment.* February 2022.
18. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning.** *FHWA Roadway Construction Noise Model.* January, 2006.

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10 CERTIFICATIONS

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Magnolia Avenue Business Center Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5979.

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EDUCATION

Master of Science in Civil and Environmental Engineering
California Polytechnic State University, San Luis Obispo • December, 1993

Bachelor of Science in City and Regional Planning
California Polytechnic State University, San Luis Obispo • June, 1992

PROFESSIONAL REGISTRATIONS

PE – Registered Professional Traffic Engineer – TR 2537 • January, 2009
AICP – American Institute of Certified Planners – 013011 • June, 1997–January 1, 2012
PTP – Professional Transportation Planner • May, 2007 – May, 2013
INCE – Institute of Noise Control Engineering • March, 2004

PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
ITE – Institute of Transportation Engineers

PROFESSIONAL CERTIFICATIONS

Certified Acoustical Consultant – County of Orange • February, 2011
FHWA-NHI-142051 Highway Traffic Noise Certificate of Training • February, 2013

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APPENDIX 3.1:

CITY OF CORONA COUNTY CODE

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17.84.040 Noise.

(A) **Purpose and intent**.

(1) The purpose of this section is to regulate noise and vibration in the interest of the public health, safety and general welfare. The city finds that certain noise levels and vibrations are detrimental to the public health, safety and general welfare and that the primary sources of noise in the city are freeways, highways, manufacturing uses, railroads, the airport and construction noise. The noise element of the General Plan contains the city's policies regarding noise and identifies noise contours for existing and future roadways and the Corona Municipal Airport, which are implemented by this chapter. The General Plan noise element shall govern all noise standards and policies.

(2) In order to control unnecessary, excessive and annoying noise and vibration in the city, it is hereby declared to be the policy of the city to prohibit such noise and vibration generated from or by all sources as specified in this chapter. It shall be the policy of the city to maintain quiet in those areas which exhibit low noise levels and to implement programs to reduce noise in those areas within the city where noise levels are above acceptable values. It is the intent of the city to minimize noise impacts to adjacent land uses pursuant to the standards identified herein.

(B) **Definitions**. Terms found in this chapter shall be defined as follows. Additional definitions are found in the noise element of the General Plan.

(1) "**A-weighted sound level**." The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter network is designed to simulate the response of the human ear. The A-weighted sound level is expressed by the symbol dBA.

(2) "**Ambient noise**." The composite of noise from all existing sources near and far. The ambient noise level constitutes the normal or existing level of environmental noise at a given location, excluding any alleged offensive noise.

(3) "**Cumulative period**." An additive period of time composed of individual time segments which may be continuous or interrupted.

(4) "**Community noise equivalent level (CNEL)**." The average equivalent A-weighted sound level during a 24 hour day, obtained after addition of five decibels to sound levels between 7:00 p.m. and 10:00 p.m. and the addition of ten decibels to sound levels between 10:00 p.m. and 7:00 a.m.

(5) "**Decibel (dB)**." A unit for measuring the amplitude of a 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, which is 20 micropascals.

(6) "**Impulsive noise**." A noise of short duration, usually less than one second, and of high intensity, with an abrupt onset and rapid decay.

(7) "**Noise study**." An acoustical analysis performed by a qualified noise engineer which determines the potential noise impacts of a roadway, land use or operation of equipment. The noise study will generate noise contours and recommend mitigation for noise impacts which exceed the city's noise standards.

(8) "**Sensitive land uses**." Those specific land uses which have associated human activities that may be subject to stress or significant interference from noise. Sensitive land uses include single family residential, multiple family residential, churches, hospitals and similar health care institutions, convalescent homes, libraries and school classroom areas.

(9) "**Simple tone noise**." A noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished. When measured, a simple tone noise shall exist if the one-third octave band sound pressure levels in the band with the tone exceeds the arithmetic average of the sound pressure levels of the two continuous one-third octave bands as follows: 5 dB for frequencies of 500 hertz or above or by 15 dB for frequencies less than or equal to 125 hertz.

(10) "**Sound attenuation device**." An enclosure, blanket, vault, box, wall, fence, panel, baffle, coating, material, silencer, or other appurtenance, mechanism, or device intended to reduce the noise level of mechanical equipment.

(C) **Noise standards**.

(1) The noise ordinance identifies two separate types of noise sources: transportation and stationary. Transportation related noise sources, such as freeways, airports and railroads, are identified within this chapter and are mainly for the planning stages of project development. The noise metrics used for this noise type is the Community Noise Equivalent Level (CNEL) which is a 24 hour time weighted average noise level. The other type of noise standard is for stationary noise sources, such as industrial or construction noise, that may be intrusive to a neighboring private property. The noise metric used for stationary sources is defined as noise levels that cannot be exceeded for certain percentages of time. The noise standards shown in Table 1 are for regulating the impact of stationary noise sources to a neighboring private property. Standards for transportation related noise are found in Table 2.

(2) Stationary noise sources.

TABLE 1 STATIONARY NOISE SOURCE STANDARDS

TYPE OF LAND USE	MAXIMUM ALLOWABLE NOISE LEVELS			
	Exterior Noise Level		Interior Noise Level	
	7 a.m. to 10 p.m.	10 p.m. to 7 a.m.	7 a.m. to 10 p.m.	10 p.m. to 7 a.m.
Single-, Double- and Multi-Family Residential	55 dBA	50 dBA	45 dBA	35 dBA
Other Sensitive Land Uses	55 dBA	50 dBA	45 dBA	35 dBA
Commercial Uses	65 dBA	60 dBA	Not applicable	Not applicable
Industrial, Manufacturing or Agricultural	75 dBA	70 dBA	Not applicable	Not applicable

(a) Each of the noise limits specified here shall be reduced by 5 dBA for impulse or simple tone noises; provided, however, that if the ambient noise level exceeds the resulting standards, the ambient shall be the standard.

(b) If the measurement location is on the boundary between two different zones, the lower noise level standard applicable to the zone shall apply.

(c) If the intruding noise is continuous and cannot be reasonably discontinued or stopped for a time period whereby the ambient noise level can be determined, the measured noise level obtained while the source is in operation shall be compared directly to the allowable noise level standards as specified respective to the measurement location's designated land use and for the time of the day the noise level is measured. The reasonableness of temporarily discontinuing the noise generation by an intruding noise source shall be determined by the Code Enforcement Officer for the purpose of establishing the existing ambient noise level at the measurement location.

(d) Exterior noise:

1. It shall be unlawful for any person, entity or operation at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level when measured on any other property to exceed:

   a. The noise standard for a cumulative period of more than 30 minutes in any hour;

   b. The noise standard plus 5 dB for a cumulative period of more than 15 minutes in any hour;

   c. The noise standard plus 10 dB for a cumulative period of more than five minutes in any hour;

   d. The noise standard plus 15 dB for a cumulative period of more than one minute in any hour; or

   e. The noise standard plus 20 dB for any period of time.

2. In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to the category shall be increased to reflect the ambient noise level. In the event the ambient noise level exceeds the fifth noise category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

(e) Interior noise. It shall be unlawful for any person at any location within the incorporated area of the city to create any noise or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such a person which causes the noise level when measured within any other residential dwelling unit or sensitive land use to exceed:

1. The noise standard for a cumulative period of more than five minutes in any hour;

2. The noise standard plus 5 dB for a cumulative period of more than one minute in any hour; or

3. The noise standard plus 10 dB, or the maximum measured ambient, for any period of time.

(3) Transportation noise sources.

TABLE 2 TRANSPORTATION NOISE SOURCE STANDARDS		
TYPE OF LAND USE	EXTERIOR NOISE LEVEL	INTERIOR NOISE LEVEL
	(Private Outdoor Living Areas)	
Residential (Roadway)	65 CNEL	45 CNEL
Residential (Airport)	65 CNEL	45 CNEL
Other sensitive land uses (Roadway)	65 CNEL	45 CNEL

Other sensitive land uses (Airport)	65 CNEL	45 CNEL
Hotels/Motels (Roadway)	65 CNEL	45 CNEL
Hotels/Motels (Airport)	65 CNEL	45 CNEL

(a) **Roadway noise**. A noise study shall be performed prior to the construction of new master planned roads, roadway improvements, rail lines and/or prior to the construction of residential or sensitive land uses adjacent to existing or master planned roads or railways. The noise study shall identify the existing and future noise contours for the roadway and propose mitigation measures to reduce the noise impacts to a maximum of 65 dBA CNEL in the private outdoor living area of residences and to a maximum interior noise level of 45 dBA CNEL for residential and sensitive land uses, as shown in Table 2.

(b) **Airport noise**. Sensitive land uses, site-built homes and institutional uses are prohibited in airport noise contours above 65 dBA CNEL. All subdivisions within two miles of the Corona Municipal Airport or within the 65 dBA CNEL contour shall show and record an avigation easement for the benefit of the airport. The avigation easement shall provide notification to potential buyers and occupants of the presence of the easement and the potential for over flights and aircraft noise.

(D) **Special provisions**.

(1) **Mechanical equipment in residential zones.** Upon application for a building permit to install mechanical equipment, such as air conditioner and pool equipment, in a residential zone, the equipment shall be setback at least ten feet from an adjoining property line except where a five foot high block sound wall is maintained extending a distance of two feet on each side of such equipment and situated either between such equipment and the property line or on said property line. Exception: Mechanical equipment in residential zones shall be permitted closer than ten feet from an adjoining property line without a five foot high block sound wall when sound attenuation devices approved by the Building Official are installed. The noise level with sound attenuation devices installed shall comply with the limits and conditions specified in § 17.84.040(C)(2) when measured from any adjoining property. The approved sound attenuation devices shall be maintained and any approvals shall not be construed to permit violations of this code.

(2) **Construction noise**. Construction noise is prohibited between the hours of 8:00 p.m. to 7:00 a.m., Monday through Saturday and 6:00 p.m. to 10:00 a.m. on Sundays and federal holidays. Construction noise is defined as noise which is disturbing, excessive or offensive and constitutes a nuisance involving discomfort or annoyance to persons of normal sensitivity residing in the area, which is generated by the use of any tools, machinery or equipment used in connection with construction operations.

(3) **Noise devices**. In accordance with Chapter 9.24, no loudspeaker, bells, gongs, buzzers, mechanical equipment or other sounds, attention-attracting or communication device associated with any use adjacent to residential or sensitive land uses shall be discernible beyond the boundary line of the parcel, except fire protection devices, burglar alarms and church bells. Noise generated by these sources shall be enforced by the Police Department.

(4) **Noisy animals**. Noise generated by animals shall be regulated by the Police Department in accordance with Chapter 6.11.

(E) **Exemptions**. The following activities shall be exempt from these noise standards:

(1) Special events pursuant to an approved special use permit. Noise impacts shall be evaluated and conditioned as part of the special use permit;

(2) Filming pursuant to a film permit. Noise impacts shall be evaluated and conditioned as part of the film permit;

(3) Activities conducted on public parks, public playgrounds and public or private school grounds, including school athletic and entertainment events that are conducted under the sanction of the school or which a license or permit has been duly issued pursuant to any provision of city code;

(4) Noise sources associated with the maintenance of real property, provided the activities take place between the hours of 7:00 a.m. to 8:00 p.m. on any day except Sunday or between the hours of 9:00 a.m. to 8:00 p.m. on Sunday;

(5) Any activity too the extent regulation thereof has been preempted by state or federal law;

(6) Repairs to and replacement of mechanical equipment in residential zones installed by permit prior to May 20, 1993 shall be exempt from the requirements in division (D) of this section;

(7) Noise variances granted pursuant to subsection (H)(1) below;

(8) Short-term, non-continuous operations associated with government and public utility facilities that are necessary to maintain the delivery of services for the benefit of public health and safety.

(F) **Noise level measurements**. All noise shall be measured in accordance with the following standards. Measurements shall be taken of the ambient noise level and any alleged offensive noise. If the measurement location is on the boundary of two different noise zones, the lower noise level standard shall apply.

(1) **Sound level meter**. A sound level meter shall mean an instrument meeting the American National Standards Institute's S1.4 - 1971 for Type 1 sound level meters or an instrument and the associated recording and analyzing

equipment which will provide equivalent data.

(2) **Ambient noise**. A measurement of the ambient noise level shall be taken according to the procedures in this chapter. If the ambient noise level exceeds the standard, the ambient level shall be the standard. If an alleged intruding noise source is continuous and cannot be reasonably discontinued or stopped for a time period whereby the ambient noise level can be determined, the measured noise level obtained while the alleged intruding noise source is in operation shall be compared directly to the applicable noise level standard.

(G) **Noise studies required**. As referenced in division (C) of this section, there are essentially two different types of noise sources that have been identified in Corona and each has its own noise metrics as well as its own required noise studies. The noise metrics used for transportation related noise sources is the CNEL which is a 24 hour time weighted average noise level. The noise metrics used for stationary sources are defined as noise levels that cannot be exceeded for certain percentages of time.

(1) **Predevelopment noise studies**. A predevelopment noise study is performed prior to development and is designed to project future noise levels and recommend mitigation measures to be implemented in project development. All noise studies shall be prepared by a registered noise engineer as approved by the city. Noise studies will be required for the construction of master planned roadways, for development adjacent to master planned roadways, when a noise generating use, such as a factory, is proposed in proximity to residential uses and when residential uses are proposed in proximity to an existing noise source. The need for a noise study will be determined at development plan review. Predevelopment noise studies shall project future noise levels based on proposed uses, traffic volumes and other relevant future conditions. Existing and projected noise shall be evaluated pursuant to the noise standards within this chapter and the noise element of the General Plan. Mitigation measures shall be proposed to bring noise levels into compliance with these standards. Mitigation measures may consist of walls, berms, setbacks, landscaping, building materials, construction methods and any other means whereby noise can be reduced to the maximum amounts within this chapter.

(2) **Studies of existing stationary noise**. At times it will be necessary to study the noise generated by an existing source, either due to alleged violations of the noise ordinance or for monitoring purposes. These noise studies shall be prepared by a registered noise engineer as approved by the city in accordance with the standards in Table 1.

(H) **Noise variance**.

(1) The owner or operator of a noise or vibration source which violates any of the provisions of this chapter may file an application with the Community Development Department for a variance from the provisions thereof wherein said owner or operator shall set forth all actions taken to comply with the provisions, the reasons why immediate compliance cannot be achieved, a proposed method of achieving compliance and a proposed time schedule for its accomplishment. The application shall be accompanied by a fee as determined by City Council resolution. A separate application shall be filed for each noise source; provided, however, that several fixed sources on a single property may be combined into one application. An application for a variance shall remain subject to prosecution under the terms of this chapter until a variance is granted.

(2) The Board of Zoning Adjustment shall evaluate all applications for variance from the requirements of this chapter and may grant the variances with respect to time for compliance, subject to such terms, conditions and requirements as it may deem reasonable to achieve maximum compliance with the provisions of this chapter. The terms, conditions and requirements may include, but shall not be limited to, limitations on noise levels and operating hours. Each such variance shall set forth in detail the approved method of achieving maximum compliance and a time schedule for its accomplishment. In its determinations, the Board shall consider the following:

(a) The magnitude of the nuisance caused by the offensive noise;

(b) The uses of property within the area of impingement by the noise;

(c) The time factors related to study, design, financing and construction of remedial work;

(d) The economic factors related to age and useful life of the equipment;

(e) The general public interest, welfare and safety.

(3) Any variance granted by the Board shall be by resolution and shall be transmitted to the Code Enforcement Officer for enforcement. Any violation of the terms of the variance shall be unlawful and enforced pursuant to division (I) of this section.

(I) **Enforcement**.

(1) It shall be unlawful for any person at any location within the City of Corona to create any exterior noise or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level when measured according to this chapter to exceed the maximum allowable noise levels in Table 1 of § 17.84.040(C).

(2) No person shall interfere with, oppose or resist any authorized person charged with the enforcement of this chapter while such person is engaged in the performance of his or her duty.

(3) Any person violating any provision of this chapter shall be deemed guilty of a misdemeanor.

(4) The operation or maintenance of any device, instrument, vehicle or machinery in violation of any noise standard identified in this chapter is declared to be a public nuisance and may be abated pursuant to the nuisance abatement

procedure in Chapter 8.32 of this code.

(5) Pursuant to § 1.08.020(A) of this code, each person shall be deemed guilty of a separate offense for each and every day during any portion of which any violation of any provision of this chapter is committed, continued or permitted by such person and shall be punished accordingly.

(`78 Code, § 17.84.040.) (Ord. 3277 §§ 4, 5, 2018; Ord. 3188 § 3, 2015; Ord. 2372 § 2, 1999; Ord. 2161 § 1 (part), 1993.)

17.84.050 Vibration.

It shall be unlawful for any person to create, maintain or cause any ground vibration which is perceptible without instruments at any point on any affected property adjoining the property on which the vibration source is located. For the purposes of this section, the perception threshold shall be presumed to be more than 0.05 inches per second RMS vertical velocity.

(`78 Code, § 17.84.050.) (Ord. 2161 § 1 (part), 1993.)

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APPENDIX 5.1:

STUDY AREA PHOTOS

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JN: 13566 Study Area Photos

L1_E
33, 52' 18.480000"117, 32' 21.450000"

L1_N
33, 52' 18.460000"117, 32' 21.480000"

L1_S
33, 52' 18.460000"117, 32' 21.480000"

L1_W
33, 52' 18.480000"117, 32' 21.450000"

L2_E
33, 51' 41.260000"117, 31' 57.470000"

L2_N
33, 51' 41.170000"117, 31' 57.580000"

JN: 13566 Study Area Photos

L2_S
33, 51' 41.250000"117, 31' 57.500000"

L2_W
33, 51' 41.260000"117, 31' 57.530000"

L3_E
33, 51' 50.810000"117, 32' 41.640000"

L3_N
33, 51' 50.830000"117, 32' 41.660000"

L3_S
33, 51' 50.790000"117, 32' 41.640000"

L3_W
33, 51' 50.810000"117, 32' 41.610000"

JN: 13566 Study Area Photos

L4_E
33, 52' 7.050000"117, 32' 42.240000"

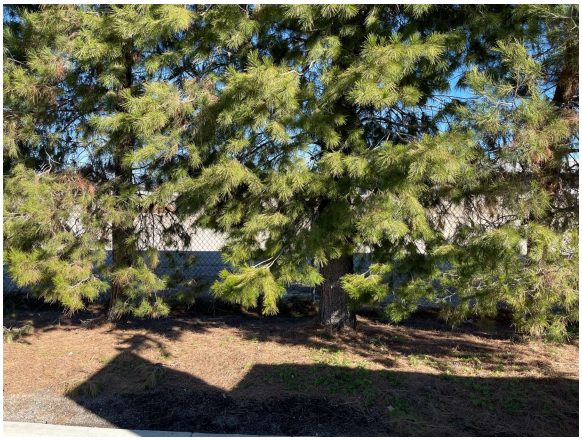
L4_N
33, 52' 7.020000"117, 32' 42.270000"

L4_S
33, 52' 7.050000"117, 32' 42.240000"

L4_W
33, 52' 7.050000"117, 32' 42.380000"

L5_E
33, 52' 18.730000"117, 32' 30.130000"

L5_N
33, 52' 18.590000"117, 32' 30.160000"



JN: 13566 Study Area Photos

L5_S
33, 52' 18.620000"117, 32' 30.160000"

L5_W
33, 52' 18.730000"117, 32' 30.130000"

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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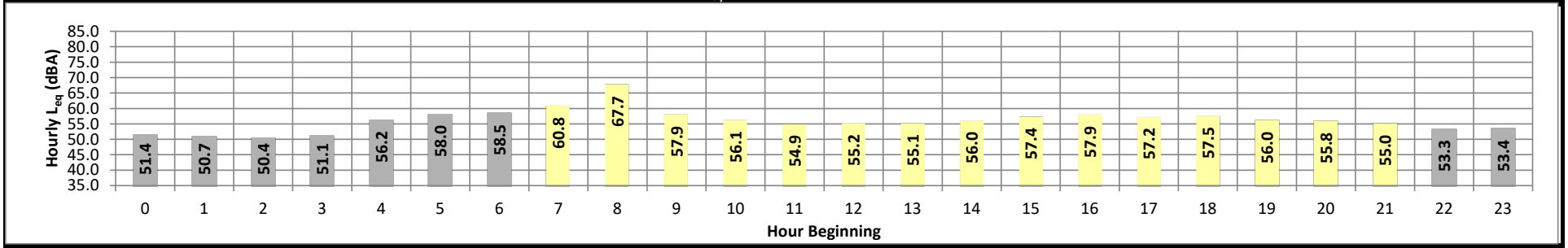
24-Hour Noise Level Measurement Summary

Date: Wednesday, January 12, 2022 *Location:* L1 - Located north of the Project site near single-family *Meter:* Piccolo II *JN:* 13566

Project: 1375 Magnolia Avenue *Source:* residence at 1410 East 6th Street. *Analyst:* A. Khan

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	51.4	58.8	48.0	58.5	58.0	56.0	54.7	51.2	49.9	48.6	48.3	48.1	51.4	10.0	61.4
	1	50.7	59.4	46.4	58.8	58.1	56.7	54.9	50.0	48.4	47.0	46.7	46.5	50.7	10.0	60.7
	2	50.4	57.0	47.4	56.6	56.1	54.5	53.3	50.5	49.3	48.0	47.7	47.5	50.4	10.0	60.4
	3	51.1	80.3	57.0	79.6	78.6	75.5	73.8	68.1	64.3	60.0	59.3	58.6	51.1	10.0	61.1
	4	56.2	64.6	52.1	64.0	63.3	61.4	59.7	55.9	54.3	52.7	52.4	52.2	56.2	10.0	66.2
	5	58.0	63.9	54.9	63.6	63.2	61.8	60.8	58.3	56.9	55.5	55.2	55.0	58.0	10.0	68.0
	6	58.5	65.4	55.1	64.9	64.3	62.5	61.5	58.6	57.2	55.7	55.5	55.2	58.5	10.0	68.5
Day	7	60.8	66.8	58.1	66.5	66.1	64.3	63.2	61.1	59.8	58.7	58.4	58.2	60.8	0.0	60.8
	8	67.7	74.7	56.3	74.4	74.2	73.5	72.8	68.6	64.4	57.1	56.7	56.4	67.7	0.0	67.7
	9	57.9	70.7	53.4	70.3	70.0	69.2	68.5	65.8	60.0	55.7	54.4	53.5	57.9	0.0	57.9
	10	56.1	65.8	49.2	65.1	64.3	62.0	60.4	56.0	53.1	50.0	49.6	49.3	56.1	0.0	56.1
	11	54.9	63.9	48.1	63.5	62.8	60.8	59.2	55.0	52.0	49.0	48.6	48.2	54.9	0.0	54.9
	12	55.2	63.6	48.0	63.2	62.6	60.8	59.5	55.9	52.4	48.9	48.5	48.1	55.2	0.0	55.2
	13	55.1	63.3	47.1	62.9	62.4	60.7	59.5	55.8	52.4	48.1	47.6	47.2	55.1	0.0	55.1
	14	56.0	63.2	49.9	62.8	62.3	60.8	59.7	56.7	54.1	50.9	50.5	50.0	56.0	0.0	56.0
	15	57.4	66.6	49.3	66.0	65.2	63.0	61.5	57.6	54.6	50.7	50.1	49.5	57.4	0.0	57.4
	16	57.9	66.5	49.2	66.1	65.5	63.8	62.4	58.4	54.9	50.4	49.9	49.4	57.9	0.0	57.9
	17	57.2	65.1	52.0	64.7	64.2	62.1	60.7	57.5	55.3	52.8	52.4	52.1	57.2	0.0	57.2
	18	57.5	66.4	53.6	65.7	64.7	62.5	60.5	57.1	55.6	54.2	53.9	53.7	57.5	0.0	57.5
	19	56.0	62.2	52.6	61.8	61.5	60.0	59.1	56.3	54.8	53.3	53.0	52.7	56.0	5.0	61.0
	20	55.8	62.4	52.4	62.0	61.6	60.2	58.8	55.9	54.6	53.1	52.8	52.5	55.8	5.0	60.8
	21	55.0	61.4	51.6	61.0	60.4	58.8	57.9	55.3	53.9	52.4	52.1	51.7	55.0	5.0	60.0
Night	22	53.3	60.2	49.9	59.8	59.3	57.6	56.2	53.5	51.9	50.5	50.3	50.0	53.3	10.0	63.3
	23	53.4	60.5	50.1	60.0	59.4	57.5	56.2	53.5	52.1	50.7	50.5	50.2	53.4	10.0	63.4

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	54.9	61.4	47.1	61.0	60.4	58.8	57.9	55.0	52.0	48.1	47.6	47.2
	Max	67.7	74.7	58.1	74.4	74.2	73.5	72.8	68.6	64.4	58.7	58.4	58.2
Energy Average		59.3	Average:		65.1	64.5	62.8	61.6	58.2	55.5	52.3	51.9	51.5
Night	Min	50.4	57.0	46.4	56.6	56.1	54.5	53.3	50.0	48.4	47.0	46.7	46.5
	Max	58.5	80.3	57.0	79.6	78.6	75.5	73.8	68.1	64.3	60.0	59.3	58.6
Energy Average		54.7	Average:		62.9	62.2	60.4	59.0	55.5	53.8	52.1	51.8	51.5

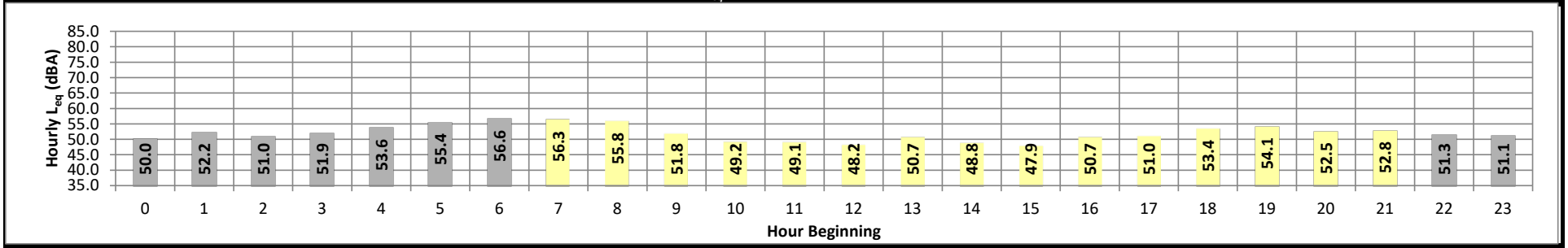
L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
58.1	**59.3**	**54.7**

24-Hour Noise Level Measurement Summary

Date: Wednesday, January 12, 2022 *Location:* L2 - Located southeast of the Project site near single-family *Meter:* Piccolo II *JN:* 13566

Project: 1375 Magnolia Avenue *Source:* residence at 1661 Laurel Canyon Way. *Analyst:* A. Khan

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	50.0	53.4	47.7	53.2	52.8	52.2	51.7	50.5	49.5	48.3	48.1	47.8	50.0	10.0	60.0
	1	52.2	57.1	49.2	56.7	56.3	55.0	54.3	52.6	51.5	50.0	49.7	49.4	52.2	10.0	62.2
	2	51.0	54.7	48.6	54.4	54.0	53.4	52.8	51.5	50.5	49.2	49.0	48.7	51.0	10.0	61.0
	3	51.9	57.8	49.4	57.0	56.0	54.7	54.0	52.3	51.3	50.0	49.8	49.5	51.9	10.0	61.9
	4	53.6	56.6	51.6	56.4	56.1	55.4	55.1	54.2	53.4	52.2	52.0	51.7	53.6	10.0	63.6
	5	55.4	58.3	53.3	58.0	57.7	57.1	56.7	55.9	55.1	54.0	53.7	53.4	55.4	10.0	65.4
	6	56.6	59.7	54.4	59.4	59.0	58.5	58.1	57.1	56.3	55.1	54.8	54.5	56.6	10.0	66.6
Day	7	56.3	58.9	54.7	58.6	58.4	57.8	57.5	56.7	56.2	55.2	55.0	54.8	56.3	0.0	56.3
	8	55.8	58.5	54.0	58.3	57.9	57.4	57.0	56.2	55.6	54.6	54.4	54.1	55.8	0.0	55.8
	9	51.8	58.9	49.1	58.5	57.8	56.0	54.6	51.4	50.6	49.6	49.5	49.2	51.8	0.0	51.8
	10	49.2	55.2	45.4	54.9	54.4	53.5	52.6	49.7	47.5	46.0	45.8	45.6	49.2	0.0	49.2
	11	49.1	55.1	44.0	54.8	54.4	53.9	53.3	50.1	46.9	44.7	44.4	44.1	49.1	0.0	49.1
	12	48.2	52.9	44.4	52.6	52.3	51.6	51.0	49.1	47.3	45.2	44.8	44.5	48.2	0.0	48.2
	13	50.7	57.0	44.4	56.6	56.1	55.4	54.9	51.8	48.4	45.3	44.9	44.5	50.7	0.0	50.7
	14	48.8	53.0	45.5	52.6	52.3	51.7	51.3	49.8	48.1	46.2	45.9	45.6	48.8	0.0	48.8
	15	47.9	52.7	44.5	52.4	52.1	51.3	50.7	48.7	46.9	45.2	44.9	44.6	47.9	0.0	47.9
	16	50.7	55.9	46.2	55.6	55.3	54.4	53.9	52.0	49.2	46.8	46.6	46.3	50.7	0.0	50.7
	17	51.0	55.5	48.6	55.1	54.7	53.7	53.2	51.5	50.5	49.2	49.0	48.7	51.0	0.0	51.0
	18	53.4	57.0	51.4	56.6	56.1	55.3	54.8	53.9	53.1	52.0	51.8	51.5	53.4	0.0	53.4
	19	54.1	60.2	51.2	59.5	58.9	57.5	56.5	54.3	53.3	51.9	51.6	51.3	54.1	5.0	59.1
	20	52.5	56.0	50.0	55.8	55.4	54.8	54.5	53.2	52.1	50.7	50.4	50.1	52.5	5.0	57.5
	21	52.8	59.5	49.4	58.7	57.7	56.1	55.4	53.2	51.8	50.1	49.8	49.5	52.8	5.0	57.8
Night	22	51.3	58.9	46.6	58.1	57.3	55.8	55.0	51.9	49.5	47.4	47.1	46.7	51.3	10.0	61.3
	23	51.1	55.5	48.2	55.2	54.8	53.9	53.3	51.6	50.5	49.0	48.6	48.3	51.1	10.0	61.1

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	47.9	52.7	44.0	52.4	52.1	51.3	50.7	48.7	46.9	44.7	44.4	44.1
	Max	56.3	60.2	54.7	59.5	58.9	57.8	57.5	56.7	56.2	55.2	55.0	54.8
Energy Average		52.3	Average:		56.0	55.6	54.7	54.1	52.1	50.5	48.8	48.6	48.3
Night	Min	50.0	53.4	46.6	53.2	52.8	52.2	51.7	50.5	49.5	47.4	47.1	46.7
	Max	56.6	59.7	54.4	59.4	59.0	58.5	58.1	57.1	56.3	55.1	54.8	54.5
Energy Average		53.1	Average:		56.5	56.0	55.1	54.6	53.1	52.0	50.6	50.3	50.0

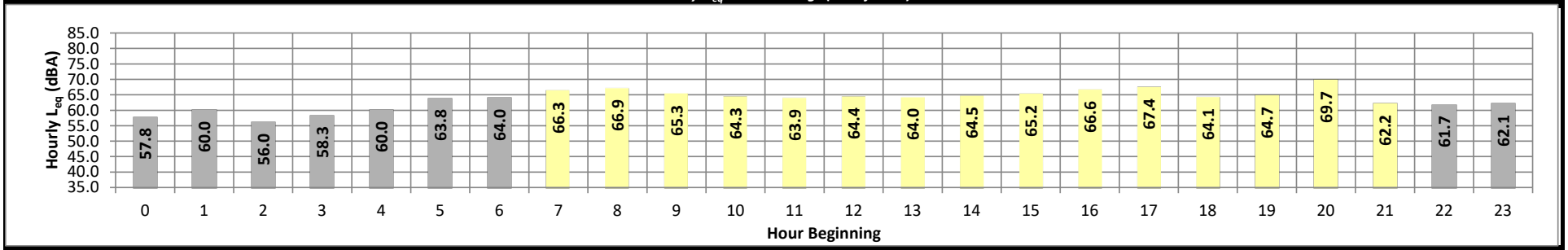
L_{eq} (dBA)	24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
	52.6	**52.3**	**53.1**

24-Hour Noise Level Measurement Summary

Date: Wednesday, January 12, 2022 *Location:* L3 - Located southwest of the Project site near single-family *Meter:* Piccolo II *JN:* 13566

Project: 1375 Magnolia Avenue *Source:* residence at 1550 Rimpau Avenue. *Analyst:* A. Khan

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	57.8	67.7	51.0	67.1	66.3	64.6	62.5	56.8	54.1	51.9	51.5	51.1	57.8	10.0	67.8
	1	60.0	72.1	50.0	71.5	70.5	68.0	65.1	56.6	53.4	50.8	50.5	50.1	60.0	10.0	70.0
	2	56.0	65.5	49.0	65.1	64.5	62.5	60.7	55.6	52.2	49.7	49.4	49.1	56.0	10.0	66.0
	3	58.3	68.6	50.7	68.1	67.3	65.0	63.0	57.5	54.1	51.5	51.1	50.8	58.3	10.0	68.3
	4	60.0	69.0	53.8	68.5	67.8	65.9	64.5	59.9	57.1	54.6	54.3	53.9	60.0	10.0	70.0
	5	63.8	73.4	55.5	73.0	72.6	70.4	68.7	63.2	60.0	56.5	56.0	55.6	63.8	10.0	73.8
	6	64.0	72.2	56.7	71.8	71.3	69.6	68.2	64.3	61.5	57.8	57.3	56.8	64.0	10.0	74.0
Day	7	66.3	74.4	59.2	74.0	73.4	71.7	70.1	66.7	64.3	60.5	59.8	59.3	66.3	0.0	66.3
	8	66.9	76.9	59.7	76.2	75.5	73.0	70.9	66.4	64.1	60.7	60.1	59.8	66.9	0.0	66.9
	9	65.3	74.7	57.4	74.1	73.2	70.8	69.3	65.5	62.8	58.9	58.3	57.6	65.3	0.0	65.3
	10	64.3	73.1	55.8	72.5	71.8	69.9	68.6	64.8	62.0	57.1	56.4	55.9	64.3	0.0	64.3
	11	63.9	71.5	56.3	71.0	70.4	69.1	67.9	64.7	62.0	57.7	57.1	56.4	63.9	0.0	63.9
	12	64.4	72.3	56.7	71.8	71.2	69.9	68.8	64.8	62.1	58.1	57.4	56.9	64.4	0.0	64.4
	13	64.0	71.8	56.5	71.4	70.9	69.2	68.1	64.7	61.9	57.9	57.3	56.7	64.0	0.0	64.0
	14	64.5	72.6	57.3	72.1	71.5	69.9	68.5	65.1	62.5	58.6	58.0	57.5	64.5	0.0	64.5
	15	65.2	74.2	58.0	73.6	73.0	70.9	69.3	65.3	62.7	59.2	58.7	58.2	65.2	0.0	65.2
	16	66.6	75.9	58.1	75.4	74.6	72.5	71.3	66.4	63.3	59.3	58.7	58.2	66.6	0.0	66.6
	17	67.4	77.5	58.0	77.1	76.5	74.3	72.5	65.7	62.9	59.1	58.6	58.1	67.4	0.0	67.4
	18	64.1	72.5	57.0	72.0	71.4	69.7	68.5	64.4	61.7	58.1	57.6	57.1	64.1	0.0	64.1
	19	64.7	74.2	56.4	73.7	73.1	71.5	69.9	64.2	60.9	57.4	56.9	56.6	64.7	5.0	69.7
	20	69.7	82.8	55.1	82.4	81.4	77.9	73.6	64.6	59.8	56.1	55.6	55.2	69.7	5.0	74.7
	21	62.2	72.8	53.6	72.3	71.6	68.9	67.0	61.1	57.9	54.7	54.2	53.7	62.2	5.0	67.2
Night	22	61.7	72.0	52.8	71.7	71.1	68.8	67.2	60.2	57.0	53.8	53.3	52.9	61.7	10.0	71.7
	23	62.1	73.8	51.1	73.4	72.7	70.1	67.6	58.6	54.8	51.9	51.5	51.2	62.1	10.0	72.1

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	62.2	71.5	53.6	71.0	70.4	68.9	67.0	61.1	57.9	54.7	54.2	53.7
	Max	69.7	82.8	59.7	82.4	81.4	77.9	73.6	66.7	64.3	60.7	60.1	59.8
Energy Average		65.7	Average:		74.0	73.3	71.3	69.6	65.0	62.1	58.2	57.6	57.1
Night	Min	56.0	65.5	49.0	65.1	64.5	62.5	60.7	55.6	52.2	49.7	49.4	49.1
	Max	64.0	73.8	56.7	73.4	72.7	70.4	68.7	64.3	61.5	57.8	57.3	56.8
Energy Average		61.1	Average:		70.0	69.3	67.2	65.3	59.2	56.0	53.2	52.8	52.4

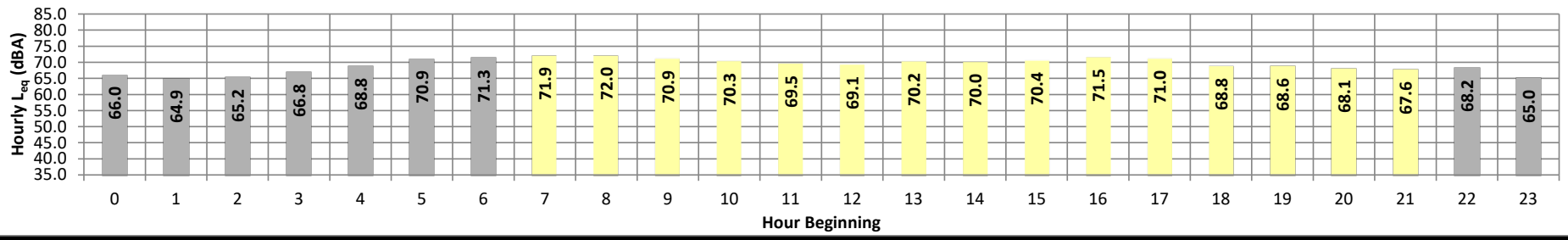
L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
64.5	**65.7**	**61.1**

24-Hour Noise Level Measurement Summary

Date: Wednesday, January 12, 2022 *Location:* L4 - Located west of the Project site near Holiday Inn Express *Meter:* Piccolo II *JN:* 13566

Project: 1375 Magnolia Avenue *Source:* and Suites Corona at 1550 Circle City. *Analyst:* A. Khan

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	66.0	73.4	58.8	73.1	72.7	71.2	70.0	66.6	64.0	60.2	59.5	58.9	66.0	10.0	76.0
	1	64.9	71.0	58.7	70.6	70.2	69.1	68.3	66.0	63.6	60.2	59.5	58.9	64.9	10.0	74.9
	2	65.2	72.2	57.9	71.9	71.6	70.3	69.1	66.2	63.2	59.3	58.7	58.1	65.2	10.0	75.2
	3	66.8	72.8	60.7	72.4	71.9	70.8	70.1	67.9	65.7	62.2	61.5	60.9	66.8	10.0	76.8
	4	68.8	73.2	64.4	73.0	72.7	71.9	71.3	69.7	68.1	65.6	65.1	64.5	68.8	10.0	78.8
	5	70.9	75.6	67.0	75.3	75.0	74.1	73.3	71.6	70.4	68.2	67.7	67.2	70.9	10.0	80.9
	6	71.3	75.3	67.9	75.0	74.7	73.8	73.4	72.0	70.9	68.8	68.4	68.0	71.3	10.0	81.3
Day	7	71.9	75.7	69.0	75.4	75.1	74.3	73.8	72.6	71.6	69.9	69.5	69.1	71.9	0.0	71.9
	8	72.0	75.9	69.0	75.6	75.3	74.5	73.9	72.6	71.6	69.9	69.5	69.1	72.0	0.0	72.0
	9	70.9	75.8	67.3	75.5	75.1	74.1	73.2	71.5	70.4	68.5	67.9	67.4	70.9	0.0	70.9
	10	70.3	76.1	66.5	75.7	75.2	73.7	72.6	70.7	69.5	67.6	67.1	66.6	70.3	0.0	70.3
	11	69.5	74.5	65.4	74.3	73.9	72.8	72.0	70.1	68.9	66.7	66.1	65.5	69.5	0.0	69.5
	12	69.1	75.2	65.1	74.8	74.1	73.2	72.5	69.4	68.1	66.1	65.7	65.2	69.1	0.0	69.1
	13	70.2	76.1	66.4	75.8	75.3	73.9	72.7	70.5	69.3	67.4	67.0	66.6	70.2	0.0	70.2
	14	70.0	75.5	66.7	75.2	74.7	73.4	72.2	70.3	69.3	67.6	67.2	66.8	70.0	0.0	70.0
	15	70.4	75.0	67.2	74.6	74.2	73.2	72.4	70.9	69.9	68.2	67.8	67.3	70.4	0.0	70.4
	16	71.5	77.4	68.0	76.8	76.0	74.7	73.7	71.8	70.8	69.0	68.6	68.2	71.5	0.0	71.5
	17	71.0	78.1	67.3	77.7	77.0	75.2	73.5	71.0	69.9	68.2	67.8	67.4	71.0	0.0	71.0
	18	68.8	72.6	65.9	72.4	72.2	71.3	70.7	69.4	68.4	66.7	66.3	66.0	68.8	0.0	68.8
	19	68.6	73.5	64.7	73.2	72.8	71.8	71.0	69.3	68.1	66.0	65.4	64.9	68.6	5.0	73.6
	20	68.1	74.6	63.9	73.9	73.1	71.5	70.6	68.7	67.3	65.1	64.6	64.0	68.1	5.0	73.1
	21	67.6	73.1	62.8	72.7	72.4	71.4	70.6	68.4	66.8	64.2	63.6	62.9	67.6	5.0	72.6
Night	22	68.2	77.3	62.3	76.8	76.3	73.5	71.2	68.0	66.3	63.6	63.0	62.5	68.2	10.0	78.2
	23	65.0	71.5	59.4	71.2	70.7	69.6	68.7	65.6	63.5	60.8	60.1	59.6	65.0	10.0	75.0

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	67.6	72.6	62.8	72.4	72.2	71.3	70.6	68.4	66.8	64.2	63.6	62.9
	Max	72.0	78.1	69.0	77.7	77.0	75.2	73.9	72.6	71.6	69.9	69.5	69.1
Energy Average		70.2	Average:		74.9	74.4	73.3	72.4	70.5	69.3	67.4	67.0	66.5
Night	Min	64.9	71.0	57.9	70.6	70.2	69.1	68.3	65.6	63.2	59.3	58.7	58.1
	Max	71.3	77.3	67.9	76.8	76.3	74.1	73.4	72.0	70.9	68.8	68.4	68.0
Energy Average		68.1	Average:		73.3	72.9	71.6	70.6	68.2	66.2	63.2	62.6	62.0

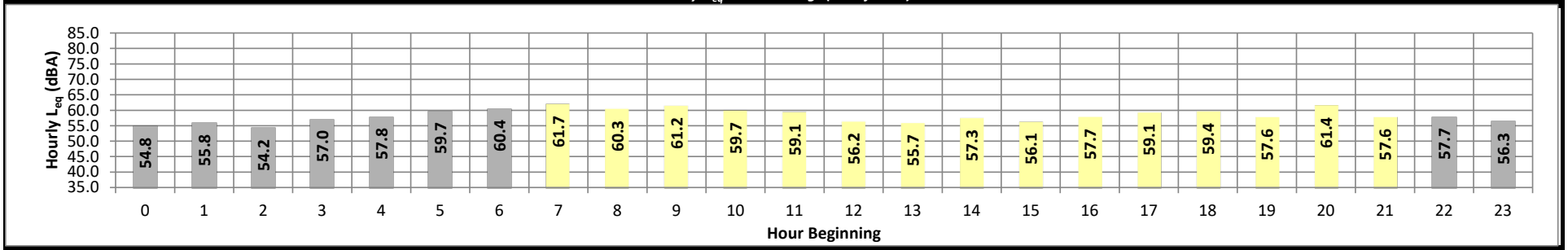
L_{eq} (dBA)	Daytime (7am-10pm)	Nighttime (10pm-7am)
69.5	**70.2**	**68.1**

24-Hour Noise Level Measurement Summary

Date: Wednesday, January 12, 2022 *Location:* L5 - Located west of the Project site near Residence Inn by *Meter:* Piccolo II *JN:* 13566

Project: 1375 Magnolia Avenue *Source:* Marriott Corona Riverside at 1015 Montecito Drive. *Analyst:* A. Khan

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	54.8	59.8	51.9	59.5	59.2	57.9	57.1	55.2	54.1	52.6	52.3	52.0	54.8	10.0	64.8
	1	55.8	63.3	52.6	63.1	62.1	59.2	58.5	55.8	54.4	53.1	52.9	52.7	55.8	10.0	65.8
	2	54.2	58.6	51.6	58.3	57.8	56.9	56.4	54.7	53.7	52.2	52.0	51.7	54.2	10.0	64.2
	3	57.0	65.2	52.9	64.6	63.6	61.7	60.9	57.0	55.0	53.7	53.3	53.0	57.0	10.0	67.0
	4	57.8	61.3	55.9	61.0	60.6	59.8	59.3	58.3	57.5	56.4	56.2	56.0	57.8	10.0	67.8
	5	59.7	61.8	58.1	61.6	61.4	60.9	60.7	60.1	59.5	58.7	58.5	58.2	59.7	10.0	69.7
	6	60.4	63.0	59.0	62.7	62.4	61.9	61.6	60.7	60.2	59.4	59.3	59.1	60.4	10.0	70.4
Day	7	61.7	66.8	60.1	66.3	65.5	64.1	63.4	61.9	61.2	60.4	60.3	60.1	61.7	0.0	61.7
	8	60.3	63.3	58.9	63.0	62.6	61.9	61.5	60.6	60.0	59.3	59.2	59.0	60.3	0.0	60.3
	9	61.2	77.4	61.4	77.1	76.7	75.4	75.0	72.3	67.0	63.2	62.3	61.6	61.2	0.0	61.2
	10	59.7	80.0	64.6	79.8	79.3	78.4	77.6	73.0	70.1	66.2	65.7	64.7	59.7	0.0	59.7
	11	59.1	79.5	63.7	78.8	78.1	76.5	75.5	71.6	68.3	64.9	64.4	63.8	59.1	0.0	59.1
	12	56.2	59.6	54.3	59.3	59.0	58.3	57.8	56.7	55.8	54.7	54.6	54.3	56.2	0.0	56.2
	13	55.7	59.6	53.8	59.2	58.6	57.7	57.3	56.2	55.3	54.2	54.0	53.8	55.7	0.0	55.7
	14	57.3	61.8	55.0	61.4	61.0	60.1	59.6	57.6	56.6	55.6	55.3	55.1	57.3	0.0	57.3
	15	56.1	60.5	54.1	60.1	59.6	58.7	58.0	56.5	55.6	54.6	54.4	54.2	56.1	0.0	56.1
	16	57.7	61.5	55.5	61.2	60.9	60.1	59.7	58.2	57.1	56.1	55.8	55.6	57.7	0.0	57.7
	17	59.1	62.9	57.3	62.6	62.1	61.1	60.5	59.4	58.7	57.9	57.7	57.4	59.1	0.0	59.1
	18	59.4	66.8	57.3	66.1	65.5	62.3	60.5	59.3	58.5	57.7	57.5	57.3	59.4	0.0	59.4
	19	57.6	60.7	55.9	60.4	60.1	59.5	59.0	58.0	57.3	56.4	56.2	56.0	57.6	5.0	62.6
	20	61.4	66.8	59.0	66.1	65.6	64.1	63.4	61.8	60.6	59.6	59.2	59.1	61.4	5.0	66.4
	21	57.6	63.0	55.1	62.6	62.0	60.2	59.7	58.1	56.9	55.7	55.5	55.2	57.6	5.0	62.6
Night	22	57.7	62.4	55.3	61.9	61.2	60.4	59.7	58.1	57.2	55.9	55.6	55.4	57.7	10.0	67.7
	23	56.3	59.6	54.1	59.3	59.0	58.4	57.9	56.8	56.0	54.7	54.4	54.2	56.3	10.0	66.3

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	55.7	59.6	53.8	59.2	58.6	57.7	57.3	56.2	55.3	54.2	54.0	53.8
	Max	61.7	80.0	64.6	79.8	79.3	78.4	77.6	73.0	70.1	66.2	65.7	64.7
Energy Average		59.1	Average:		65.6	65.1	63.9	63.2	61.4	59.9	58.4	58.1	57.8
Night	Min	54.2	58.6	51.6	58.3	57.8	56.9	56.4	54.7	53.7	52.2	52.0	51.7
	Max	60.4	65.2	59.0	64.6	63.6	61.9	61.6	60.7	60.2	59.4	59.3	59.1
Energy Average		57.5	Average:		61.3	60.8	59.7	59.1	57.4	56.4	55.2	54.9	54.7

L_{eq} (dBA)	Daytime (7am-10pm)	Nighttime (10pm-7am)
58.6	**59.1**	**57.5**

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APPENDIX 7.1:

CADNAA OPERATIONAL NOISE MODEL INPUTS

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13566 - Magnolia Avenue Business Center

CadnaA Noise Prediction Model: 13566_03.cna
Date: 08.02.22
Analyst: S. Shami

Calculation Configuration

Configuration	
Parameter	**Value**
General	
Country	**(user defined)**
Max. Error (dB)	**0.00**
Max. Search Radius (#(Unit,LEN))	**2000.01**
Min. Dist Src to Rcvr	**0.00**
Partition	
Raster Factor	**0.50**
Max. Length of Section (#(Unit,LEN))	**999.99**
Min. Length of Section (#(Unit,LEN))	**1.01**
Min. Length of Section (%)	**0.00**
Proj. Line Sources	**On**
Proj. Area Sources	**On**
Ref. Time	
Reference Time Day (min)	**960.00**
Reference Time Night (min)	**480.00**
Daytime Penalty (dB)	**0.00**
Recr. Time Penalty (dB)	**5.00**
Night-time Penalty (dB)	**10.00**
DTM	
Standard Height (m)	**0.00**
Model of Terrain	**Triangulation**
Reflection	
max. Order of Reflection	**2**
Search Radius Src	**100.00**
Search Radius Rcvr	**100.00**
Max. Distance Source - Rcvr	**1000.00 1000.00**
Min. Distance Rvcr - Reflector	**1.00 1.00**
Min. Distance Source - Reflector	**0.10**
Industrial (ISO 9613)	
Lateral Diffraction	**some Obj**
Obst. within Area Src do not shield	**On**
Screening	**Incl. Ground Att. over Barrier**
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	**3.0 20.0 0.0**
Temperature (#(Unit,TEMP))	**10**
rel. Humidity (%)	**70**
Ground Absorption G	**0.50**
Wind Speed for Dir. (#(Unit,SPEED))	**3.0**
Roads (TNM)	
Railways (FTA/FRA)	
Aircraft (???)	
Strictly acc. to AzB	

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
RECEIVERS		R1	49.3	48.2	54.6	55.0	50.0	0.0				5.00	a	1880755.87	689834.37	5.00
RECEIVERS		R2	36.8	35.8	42.2	55.0	50.0	0.0				5.00	a	1881125.86	688644.35	5.00
RECEIVERS		R3	33.6	32.5	39.0	55.0	50.0	0.0				5.00	a	1880175.37	688981.53	5.00
RECEIVERS		R4	33.9	32.8	39.2	55.0	50.0	0.0				5.00	a	1880134.79	689493.65	5.00
RECEIVERS		R5	39.0	37.9	44.4	55.0	50.0	0.0				5.00	a	1880424.97	689817.01	5.00

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(m)		(m)	(m)	(m)
POINTSOURCE		TRASH04	89.0	89.0	89.0	Lw	89.0		150.00	0.00	90.00	5.00	a	1880864.28	689548.53	5.00
POINTSOURCE		TRASH03	89.0	89.0	89.0	Lw	89.0		150.00	0.00	90.00	5.00	a	1880845.23	689732.02	5.00
POINTSOURCE		TRASH02	89.0	89.0	89.0	Lw	89.0		150.00	0.00	90.00	5.00	a	1880947.22	689699.74	5.00
POINTSOURCE		TRASH01	89.0	89.0	89.0	Lw	89.0		150.00	0.00	90.00	5.00	a	1880992.20	689603.96	5.00
POINTSOURCE		AC01	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	1880899.37	689700.91	50.00
POINTSOURCE		AC02	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	1880910.54	689576.34	50.00
POINTSOURCE		AC03	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	1880773.33	689485.25	50.00
POINTSOURCE		AC04	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	1880748.65	689744.69	50.00
POINTSOURCE		COMP01	87.2	87.2	87.2	Lw	87.2		300.00	0.00	180.00	5.00	a	1880957.26	689673.00	5.00
POINTSOURCE		COMP02	87.2	87.2	87.2	Lw	87.2		300.00	0.00	180.00	5.00	a	1880962.25	689608.36	5.00
POINTSOURCE		COMP03	87.2	87.2	87.2	Lw	87.2		300.00	0.00	180.00	5.00	a	1880850.01	689561.06	5.00
POINTSOURCE		COMP04	87.2	87.2	87.2	Lw	87.2		300.00	0.00	180.00	5.00	a	1880834.73	689717.96	5.00

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(m)		(m)	(m)	(m)
POINTSOURCE		PARK01	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880758.93	689760.27	5.00
POINTSOURCE		PARK02	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880787.72	689763.50	5.00
POINTSOURCE		PARK03	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880841.79	689496.42	5.00
POINTSOURCE		PARK04	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880867.35	689514.93	5.00
POINTSOURCE		PARK05	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880809.76	689474.97	5.00
POINTSOURCE		PARK06	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880784.49	689458.22	5.00
POINTSOURCE		PARK07	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880754.52	689494.66	5.00
POINTSOURCE		PARK08	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880752.17	689521.39	5.00
POINTSOURCE		PARK09	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880748.65	689554.01	5.00
POINTSOURCE		PARK10	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880746.00	689586.03	5.00
POINTSOURCE		PARK11	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880739.24	689643.33	5.00
POINTSOURCE		PARK12	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880736.60	689674.18	5.00
POINTSOURCE		PARK13	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880734.54	689707.38	5.00
POINTSOURCE		PARK14	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880731.31	689739.11	5.00
POINTSOURCE		PARK15	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880911.13	689546.95	5.00
POINTSOURCE		PARK16	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880933.16	689562.53	5.00
POINTSOURCE		PARK17	87.8	87.8	87.8	Lw	87.8		900.00	0.00	540.00	5.00	a	1880960.19	689579.27	5.00

Line Source(s)

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Operating Time			Moving Pt. Src				Height	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	Number			Speed		
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	Day	Evening	Night	(km/h)	(ft)	
LINESOURCE		TRUCK01	93.2	93.2	93.2	69.2	69.2	69.2	Lw	93.2		900.00	0.00	540.00					8	a
LINESOURCE		TRUCK02	93.2	93.2	93.2	80.3	80.3	80.3	Lw	93.2		900.00	0.00	540.00					8	a
LINESOURCE		TRUCK03	93.2	93.2	93.2	80.3	80.3	80.3	Lw	93.2		900.00	0.00	540.00					8	a

Name	Height				Coordinates			
	Begin		End		x	y	z	Ground
	(m)		(m)		(m)	(m)	(m)	(m)
LINESOURCE	8.00	a			1880916.29	689728.84	8.00	0.00
					1880871.46	689724.42	8.00	0.00
					1880889.68	689536.38	8.00	0.00
					1880898.39	689521.54	8.00	0.00
LINESOURCE	8.00	a			1880876.09	689550.06	8.00	0.00
					1880889.68	689536.38	8.00	0.00
LINESOURCE	8.00	a			1880982.15	689598.95	8.00	0.00
					1880981.94	689592.50	8.00	0.00
					1880989.52	689581.84	8.00	0.00

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li			Operating Time			Height	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	(ft)	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)		
AREASOURCE		DOCK01	103.4	103.4	103.4	64.0	64.0	64.0	Lw	103.4		900.00	0.00	540.00	8	a
AREASOURCE		DOCK02	103.4	103.4	103.4	66.0	66.0	66.0	Lw	103.4		900.00	0.00	540.00	8	a

Name	Height				Coordinates			
	Begin		End		x	y	z	Ground
	(m)		(m)		(m)	(m)	(m)	(m)
AREASOURCE	8.00	a			1880812.14	689756.78	8.00	0.00
					1880810.80	689774.70	8.00	0.00
					1880812.13	689774.83	8.00	0.00
					1880841.50	689769.14	8.00	0.00
					1880861.60	689763.45	8.00	0.00
					1880882.74	689553.95	8.00	0.00
					1880860.71	689541.06	8.00	0.00
					1880859.71	689551.72	8.00	0.00
					1880841.22	689549.96	8.00	0.00
					1880824.20	689726.95	8.00	0.00
					1880842.10	689728.42	8.00	0.00
					1880838.87	689759.23	8.00	0.00
AREASOURCE	8.00	a			1880916.96	689714.75	8.00	0.00
					1880916.00	689734.93	8.00	0.00
					1880920.90	689735.33	8.00	0.00
					1880941.40	689720.51	8.00	0.00
					1880955.03	689708.74	8.00	0.00
					1880968.79	689695.37	8.00	0.00
					1880985.06	689676.46	8.00	0.00
					1880998.42	689657.54	8.00	0.00
					1881005.70	689645.50	8.00	0.00
					1881015.22	689608.59	8.00	0.00
					1881006.23	689602.77	8.00	0.00
					1880995.91	689601.98	8.00	0.00
					1880996.30	689599.60	8.00	0.00
					1880954.51	689597.68	8.00	0.00

Name	Height				Coordinates			
	Begin		End		x	y	z	Ground
	(m)		(m)		(m)	(m)	(m)	(m)
					1880944.10	689702.17	8.00	0.00
					1880927.43	689715.67	8.00	0.00

Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height				Coordinates			
			left	right		horz.	vert.	Begin		End		x	y	z	Ground
					(m)	(m)	(m)	(m)		(m)		(m)	(m)	(m)	(m)
BARRIERTEMP		0						12.00	a			1880954.51	689597.68	12.00	0.00
												1880972.68	689598.51	12.00	0.00

Building(s)

Name	M.	ID	RB	Residents	Absorption	Height		Coordinates			
						Begin		x	y	z	Ground
						(m)		(m)	(m)	(m)	(m)
BUILDING		BUILDING00001	x	0		45.00	a	1880742.89	689750.43	45.00	0.00
								1880838.87	689759.23	45.00	0.00
								1880842.10	689728.42	45.00	0.00
								1880824.20	689726.95	45.00	0.00
								1880841.22	689549.96	45.00	0.00
								1880859.71	689551.72	45.00	0.00
								1880862.36	689523.54	45.00	0.00
								1880827.72	689500.65	45.00	0.00
								1880797.19	689498.00	45.00	0.00
								1880798.66	689481.86	45.00	0.00
								1880767.84	689481.27	45.00	0.00
								1880748.18	689686.44	45.00	0.00
								1880743.48	689730.18	45.00	0.00
BUILDING		BUILDING00002	x	0		45.00	a	1880881.79	689710.64	45.00	0.00
								1880894.36	689711.70	45.00	0.00
								1880894.36	689712.76	45.00	0.00
								1880927.43	689715.67	45.00	0.00
								1880944.10	689702.17	45.00	0.00
								1880955.08	689591.97	45.00	0.00
								1880922.27	689570.54	45.00	0.00
								1880908.51	689569.48	45.00	0.00
								1880908.51	689570.01	45.00	0.00
								1880895.28	689569.62	45.00	0.00
								1880893.96	689585.89	45.00	0.00
								1880893.17	689586.02	45.00	0.00
								1880882.05	689693.57	45.00	0.00
								1880883.11	689693.97	45.00	0.00

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APPENDIX 8.1:

CADNAA CONSTRUCTION NOISE MODEL INPUTS

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13566 - Magnolia Avenue Business Center

CadnaA Noise Prediction Model: 13566_03_Construction.cna
Date: 08.02.22
Analyst: S. Shami

Calculation Configuration

Configuration	
Parameter	**Value**
General	
Country	**(user defined)**
Max. Error (dB)	**0.00**
Max. Search Radius (#(Unit,LEN))	**2000.01**
Min. Dist Src to Rcvr	**0.00**
Partition	
Raster Factor	**0.50**
Max. Length of Section (#(Unit,LEN))	**999.99**
Min. Length of Section (#(Unit,LEN))	**1.01**
Min. Length of Section (%)	**0.00**
Proj. Line Sources	**On**
Proj. Area Sources	**On**
Ref. Time	
Reference Time Day (min)	**960.00**
Reference Time Night (min)	**480.00**
Daytime Penalty (dB)	**0.00**
Recr. Time Penalty (dB)	**5.00**
Night-time Penalty (dB)	**10.00**
DTM	
Standard Height (m)	**0.00**
Model of Terrain	**Triangulation**
Reflection	
max. Order of Reflection	**2**
Search Radius Src	**100.00**
Search Radius Rcvr	**100.00**
Max. Distance Source - Rcvr	**1000.00 1000.00**
Min. Distance Rvcr - Reflector	**1.00 1.00**
Min. Distance Source - Reflector	**0.10**
Industrial (ISO 9613)	
Lateral Diffraction	**some Obj**
Obst. within Area Src do not shield	**On**
Screening	**Incl. Ground Att. over Barrier**
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	**3.0 20.0 0.0**
Temperature (#(Unit,TEMP))	**10**
rel. Humidity (%)	**70**
Ground Absorption G	**0.50**
Wind Speed for Dir. (#(Unit,SPEED))	**3.0**
Roads (TNM)	
Railways (FTA/FRA)	
Aircraft (???)	
Strictly acc. to AzB	

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
RECEIVERS		R1	60.7	60.7	67.4	55.0	50.0	0.0				5.00	a	1880755.87	689834.37	5.00
RECEIVERS		R2	44.4	44.4	51.1	55.0	50.0	0.0				5.00	a	1881125.86	688644.35	5.00
RECEIVERS		R3	45.4	45.4	52.1	55.0	50.0	0.0				5.00	a	1880175.37	688981.53	5.00
RECEIVERS		R4	47.9	47.9	54.5	55.0	50.0	0.0				5.00	a	1880134.79	689493.65	5.00
RECEIVERS		R5	52.0	52.0	58.7	55.0	50.0	0.0				5.00	a	1880424.97	689817.01	5.00

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li			Operating Time			Height	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	(ft)	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)		
SITEBOUNDARY		CONSTRUCTION	115.0	115.0	115.0	66.8	66.8	66.8	Lw	115					8	a

Name	Height				Coordinates			
	Begin		End		x	y	z	Ground
	(m)		(m)		(m)	(m)	(m)	(m)
SITEBOUNDARY	8.00	a			1880719.01	689779.38	8.00	0.00
					1880734.25	689776.36	8.00	0.00
					1880737.10	689791.60	8.00	0.00
					1880776.31	689783.98	8.00	0.00
					1880815.37	689776.20	8.00	0.00
					1880839.81	689771.60	8.00	0.00
					1880854.10	689767.47	8.00	0.00

Name	Height		Coordinates			
	Begin	End	x	y	z	Ground
	(m)	(m)	(m)	(m)	(m)	(m)
			1880866.80	689763.66	8.00	0.00
			1880882.52	689757.47	8.00	0.00
			1880899.98	689749.37	8.00	0.00
			1880916.49	689740.17	8.00	0.00
			1880932.52	689729.37	8.00	0.00
			1880949.35	689716.35	8.00	0.00
			1880968.24	689698.57	8.00	0.00
			1880981.58	689683.65	8.00	0.00
			1880993.01	689668.73	8.00	0.00
			1881007.30	689646.34	8.00	0.00
			1881016.98	689609.20	8.00	0.00
			1881021.27	689602.85	8.00	0.00
			1880762.56	689431.66	8.00	0.00
			1880756.12	689450.53	8.00	0.00
			1880753.08	689461.25	8.00	0.00
			1880751.22	689468.66	8.00	0.00
			1880749.27	689479.44	8.00	0.00