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# **Oleander & Santa Ana Warehouses (PAM22-013)**

## **NOISE AND VIBRATION ANALYSIS**

### **CITY OF FONTANA**

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## **LIST OF ABBREVIATED TERMS**

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
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
mph	Miles per hour
OPR	Office of Planning and Research
PPV	Peak Particle Velocity
Project	Oleander & Santa Ana Warehouses
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 Oleander & Santa Ana Warehouses development (“Project”). The proposed Project includes the development of 540,849 square feet of warehouse use between 3 warehouse buildings. This study has been prepared to satisfy applicable City of Fontana 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 Oleander & Santa Ana Warehouses Noise and Vibration 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
Off-Site Traffic Noise	7	<i>Less Than Significant</i>	-
Operational Noise	9	<i>Less Than Significant</i>	-
Construction Noise	10	<i>Less Than Significant</i>	-
Nighttime Concrete Pour		<i>Less Than Significant</i>	-
Construction Vibration		<i>Potentially Significant</i>	<i>Less Than Significant</i>

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# 1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed Oleander & Santa Ana Warehouses (“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 transportation related CNEL traffic 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 north of Santa Ana Avenue and on either side of Oleander Avenue as well as the northeast corner of Citrus Avenue at Santa Ana Avenue in the City of Fontana as shown on Exhibit 1-A.

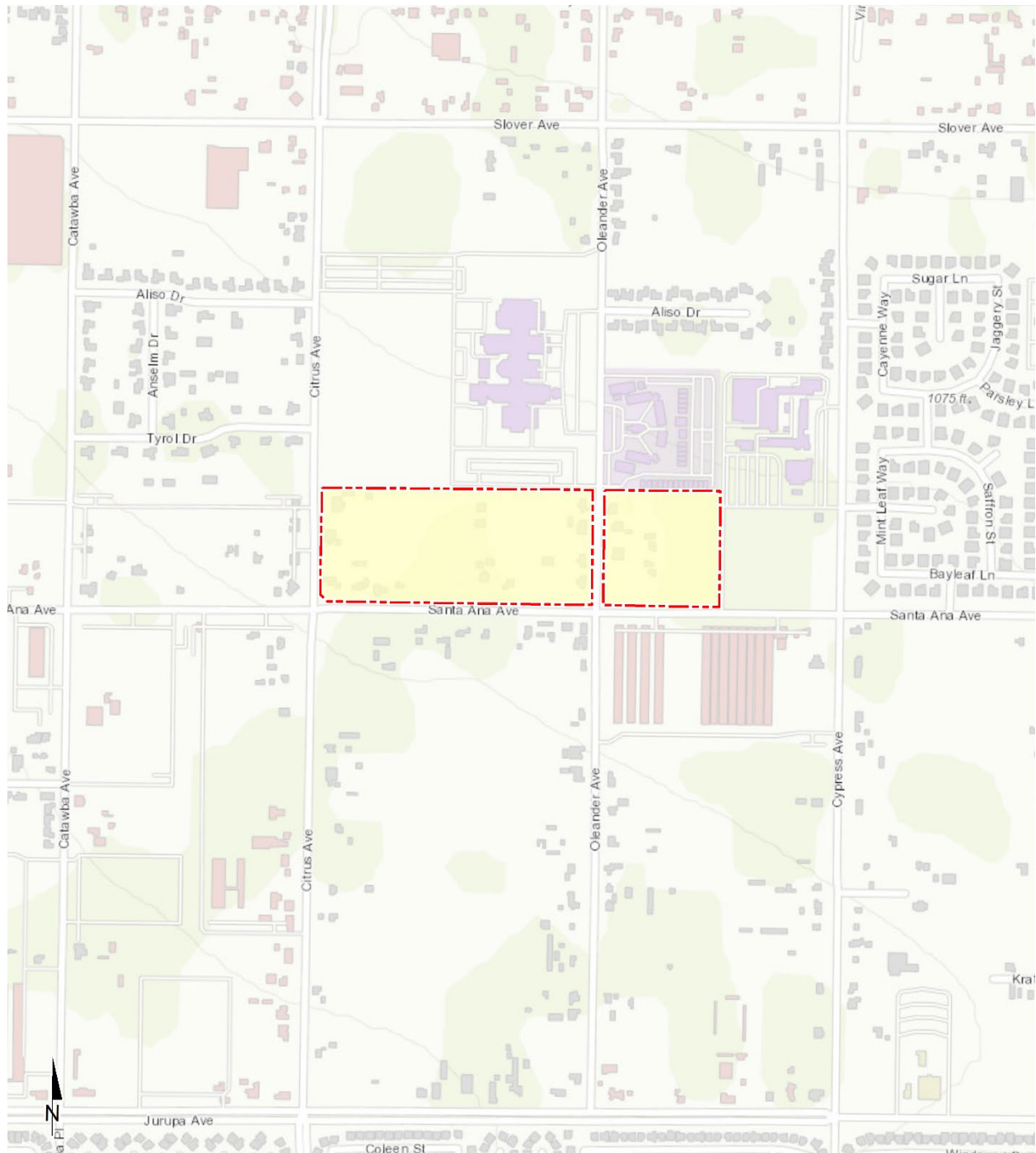
## 1.2 PROJECT DESCRIPTION

The proposed Project is to consist of the development of 540,849 square feet of warehouse use between 3 warehouse buildings:

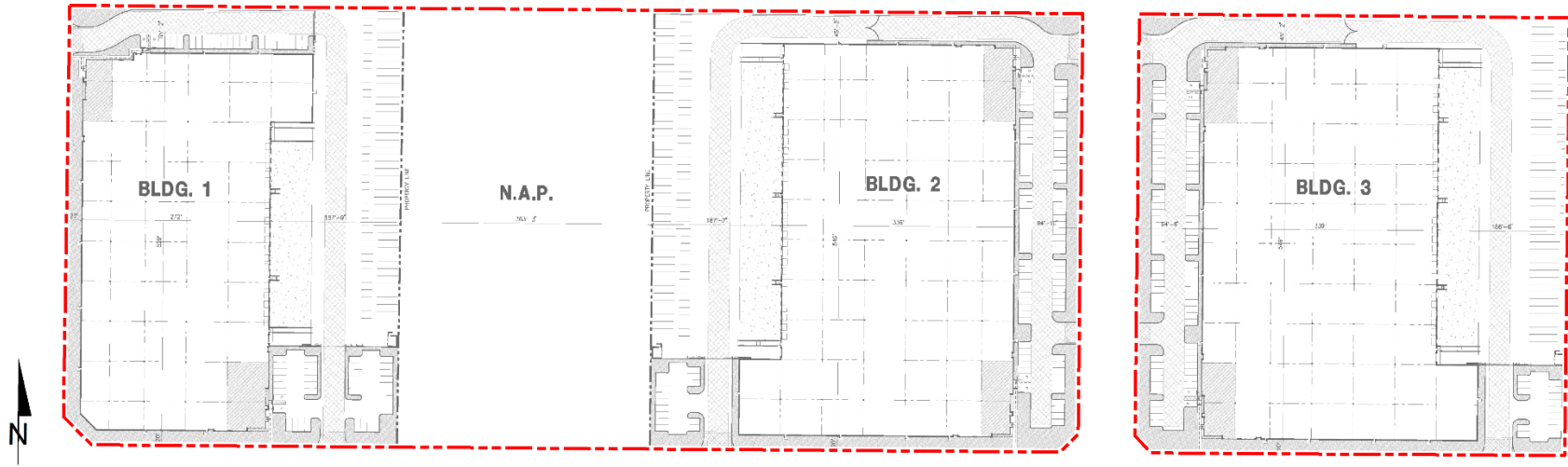
- Warehouse building 1: 151,618 square feet
- Warehouse building 2: 196,336 square feet
- Warehouse building 3: 192,895 square feet

The Project is anticipated to be constructed by the year 2025. The preliminary site plan for the proposed Project is shown on Exhibit 1-B. 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, 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**

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

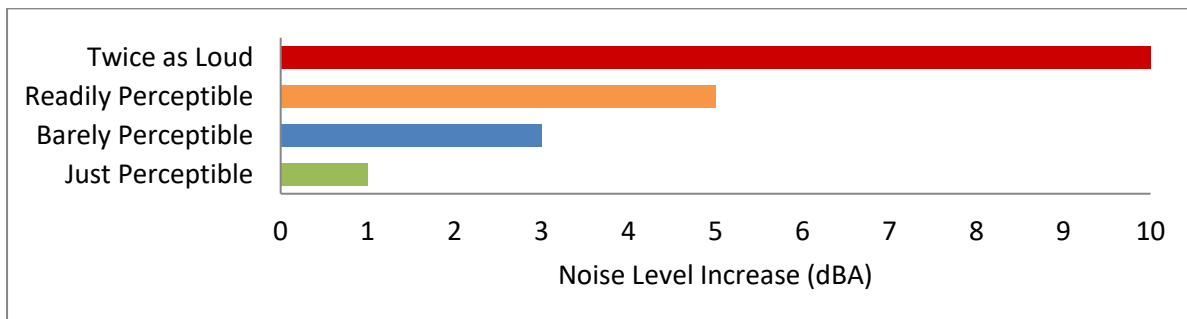
Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, 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**





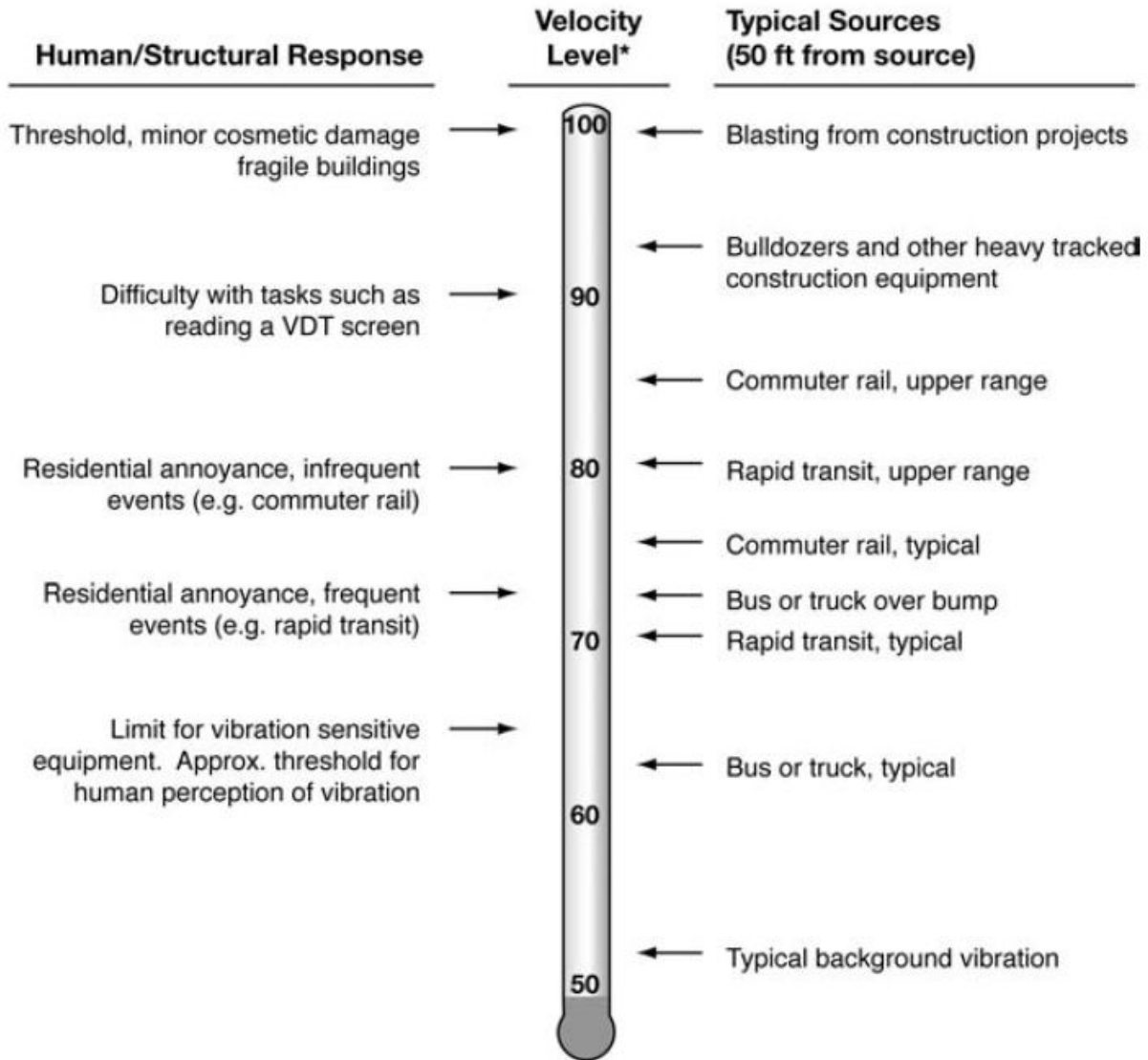
## 2.8 VIBRATION

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

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

The City of Fontana General Plan was updated on November 13, 2018. (11) To protect residents from the negative effect of "spillover" noise (Goal #10), the City of Fontana has identified the following policies in the General Plan Noise and Safety Element:

##### **Policy**

*Residential land uses and areas identified as noise-sensitive shall be protected from excessive noise from non-transportation sources including industrial, commercial, and residential activities and equipment.*

##### **Actions**

- A. *Projects located in commercial areas shall not exceed stationary- source noise standards at the property line of proximate residential or commercial uses.*
- B. *Industrial uses shall not exceed commercial or residential stationary source noise standards at the most proximate land uses.*
- C. *Non-transportation noise shall be considered in land use planning decisions.*
- D. *Construction shall be performed as quietly as feasible when performed in proximity to residential or other noise sensitive land uses.*

### 3.3 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Oleander & Santa Ana Warehouses Project, stationary-source (operational) noise such as the expected loading dock activity, roof-top air conditioning units, trash enclosure activity, parking lot vehicle movements, and truck movements are typically evaluated against standards established under a jurisdiction’s Municipal Code.

The City of Fontana noise control guidelines for determining and mitigating non-transportation or stationary noise source impacts from operations in neighboring residential areas are found in the Zoning and Development Code [Section 30-543], provided in Appendix 3.1. For industrial zoning districts, Section 30-543 indicates that *no person shall create or cause to be created any sound which exceeds the noise levels in this section as measured at the property line of any residentially zoned property*. The performance standards found in Section 30-543 limit the exterior noise level to 70 dBA  $L_{eq}$  during the daytime hours, and 65 dBA  $L_{eq}$  during the nighttime hours at sensitive receiver locations as shown on Table 3-1. (12)

**TABLE 3-1: OPERATIONAL NOISE STANDARDS**

Jurisdiction	Land use	Noise Level Standards (dBA $L_{eq}$ ) <sup>2</sup>	
		Daytime	Nighttime
City of Fontana <sup>1</sup>	Residential	70	65

<sup>1</sup> Section 30-543 of the City of Fontana Development Code (Appendix 3.1).

<sup>2</sup>  $L_{eq}$  represents a steady state sound level containing the same total energy as a time varying signal over a given sample period.

"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

### 3.4 CONSTRUCTION NOISE STANDARDS

The City of Fontana has set restrictions to control noise impacts associated with the construction of the proposed Project. According to Section 18-63[b][7] of the city’s Municipal Code, *Construction or repairing of buildings or structures*, construction activity is limited: *between the hours of 7:00 a.m. and 6:00 p.m. on weekdays and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays except in the case of urgent necessity*. (13) Project construction noise levels are, therefore, considered exempt from municipal regulation if activities occur within the hours specified in the City of Fontana Municipal Code, Section 18-63[7] of 7:00 a.m. to 6:00 p.m. on weekdays and between the hours of 8:00 a.m. to 5:00 p.m. on Saturdays. However, neither the General Plan nor the Municipal 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, 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  $L_{eq}$  as a reasonable threshold for noise sensitive residential land use with a nighttime exterior construction noise level of 70 dBA  $L_{eq}$  (8 p. 179).

### **3.5 CONSTRUCTION VIBRATION STANDARDS**

Construction activity can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration (8). To analyze vibration impacts originating from the operation and construction of the Oleander & Santa Ana Warehouses, vibration-generating activities are appropriately evaluated against standards established under the Municipal Code, if such standards exist. However, the City of Fontana does not identify specific construction vibration level limits. Therefore, for analysis purposes, the Caltrans *Transportation and Construction Vibration Guidance Manual*, (12 p. 38) Table 19, vibration damage are used in this noise study to assess potential temporary construction-related impacts at adjacent building locations. The nearest noise sensitive buildings adjacent to the Project site can best be described as “older residential structures” with a maximum acceptable continuous vibration threshold of 0.3 PPV (in/sec).

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## 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.* (15) 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) (16) 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*. (15) 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 (17 p. 2\_48).

#### **4.2 VIBRATION (THRESHOLD B)**

As described in Section 3.5, the vibration impacts originating from the construction of Oleander & Santa Ana Warehouses, vibration-generating activities are appropriately evaluated using the Caltrans vibration damage thresholds to assess potential temporary construction-related impacts at adjacent building locations. The nearest noise sensitive buildings adjacent to the Project site can best be described as “older residential structures” with a maximum acceptable continuous vibration threshold of 0.3 PPV (in/sec).

#### **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 Ontario International Airport located roughly 7 miles west 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**

Even though Section 30-543 of the Zoning and Development Code identifies exterior noise level standards that are limited to residential use, this same exterior noise level standard has been used to assess the potential noise impacts at the nearby Jurupa Hills High School, Fontana Adult School and Citrus High School. Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 4-1 shows the significance criteria summary matrix.

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	Condition(s)	Significance Criteria	
		Daytime	Nighttime
Off-Site	if ambient is < 60 dBA CNEL <sup>1</sup>	≥ 5 dBA CNEL Project increase	
	if ambient is 60 - 65 dBA CNEL <sup>1</sup>	≥ 3 dBA CNEL Project increase	
	if ambient is > 65 dBA CNEL <sup>1</sup>	≥ 1.5 dBA CNEL Project increase	
Operational	At residential land use <sup>2,6</sup>	70 dBA Leq	65 dBA Leq
	If ambient is < 60 dBA Leq <sup>1</sup>	≥ 5 dBA Leq Project increase	
	If ambient is 60 - 65 dBA Leq <sup>1</sup>	≥ 3 dBA Leq Project increase	
	If ambient is > 65 dBA Leq <sup>1</sup>	≥ 1.5 dBA Leq Project increase	
Construction	Exempt from the exterior noise level standards between the hours 7:00 a.m. to 6:00 p.m. on weekdays and between the hours of 8:00 a.m. to 5:00 p.m. on Saturdays <sup>3</sup>		
	Noise Level Threshold <sup>4</sup>	80 dBA Leq	70 dBA Leq
	Vibration Level Threshold <sup>5</sup>	0.3 PPV (in/sec)	

<sup>1</sup> FICON, 1992.

<sup>2</sup> Based on Section 30-543 of the City of Fontana Municipal Code.

<sup>3</sup> Based on Sections 18-63[7] of the City of Fontana Municipal Code.

<sup>4</sup> Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual.

<sup>5</sup> Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, Table 19.

<sup>6</sup> Even though Section 30-543 of the Zoning and Development Code identifies exterior noise level standards that are limited to residential use, this same exterior noise level standard has been used to assess the potential noise impacts at the nearby Jurupa Hills High School, Fontana Adult School and Citrus High School  
 "Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

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## 5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at six 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 Thursday, February 24, 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. (17)

### 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, *that 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 equivalent or the energy average hourly 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: AMBIENT NOISE LEVEL MEASUREMENTS**

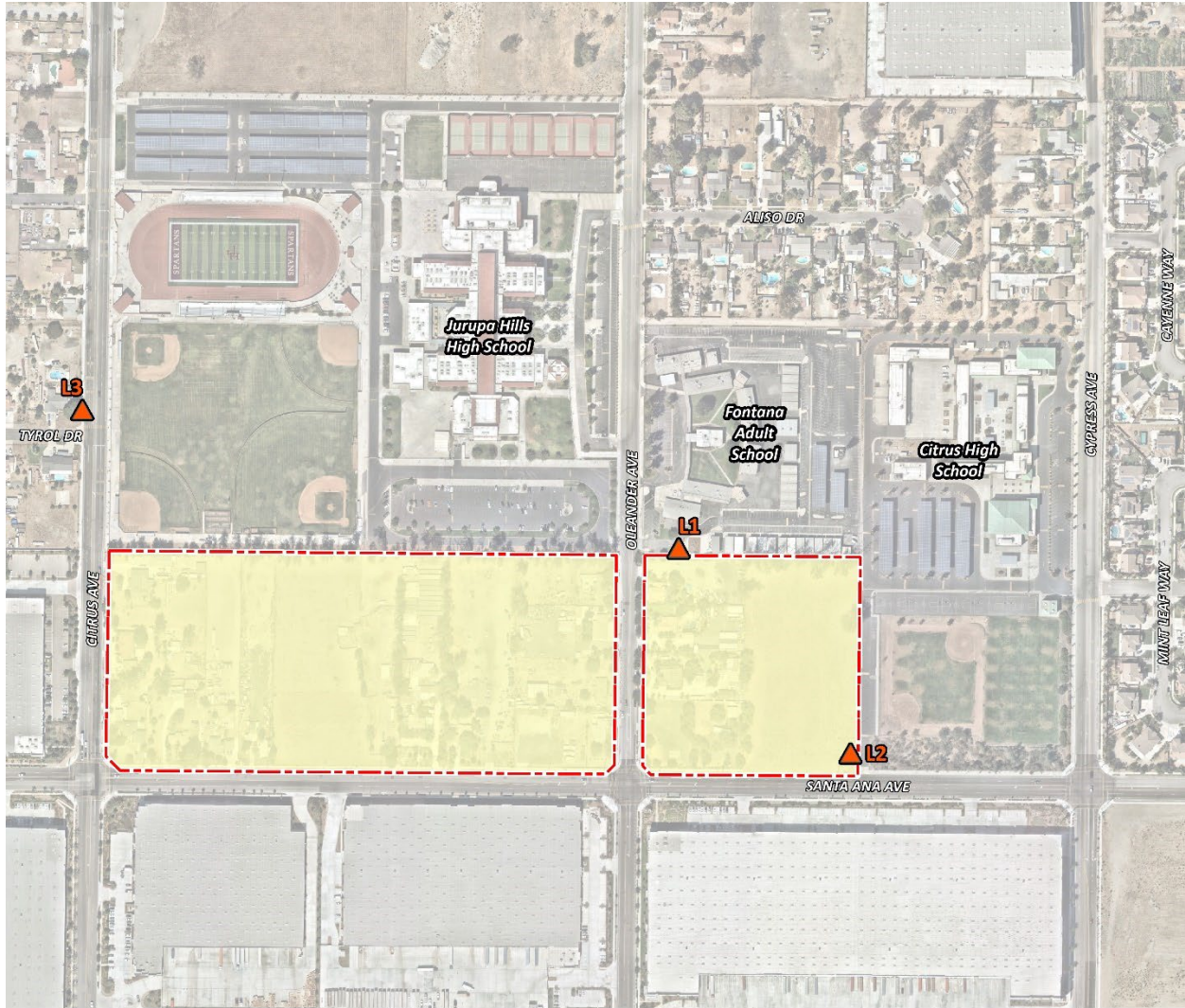
Location <sup>1</sup>	Description	Energy Average Noise Level (dBA $L_{eq}$ ) <sup>2</sup>	
		Daytime	Nighttime
L1	Located north of the Project site near Fontana Adult School at 10755 Oleander Avenue.	61.1	60.2
L2	Located east of the Project site near Citrus High School at 10760 Cypress Avenue.	61.5	59.8
L3	Located northwest of the Project site near single-family residence at 16078 Tyrol Drive.	62.9	61.0

<sup>1</sup> See Exhibit 5-A for the noise level measurement locations.

<sup>2</sup> 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 equivalent 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<sub>1</sub>, L<sub>2</sub>, L<sub>5</sub>, L<sub>8</sub>, L<sub>25</sub>, L<sub>50</sub>, L<sub>90</sub>, L<sub>95</sub>, and L<sub>99</sub> percentile noise levels observed during the daytime and nighttime periods.

**EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS**



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## 6 TRAFFIC NOISE METHODS AND PROCEDURES

The following section outlines the methods and procedures used to estimate and analyze the future traffic noise environment. Consistent with the *Land Use Compatibility Criteria*, all transportation related noise levels are presented in terms of the 24-hour CNEL's.

### 6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The expected roadway noise level increases from vehicular traffic were calculated by Urban Crossroads, Inc. using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (19) This methodology is commonly used to describe the off-site traffic noise levels throughout California and is consistent with the City of Fontana General Plan Noise Element.

The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (20) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (21)

#### 6.1.1 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. Table 6-1 identifies the 11 off-site study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of Fontana General Plan, and the posted vehicle speeds. The ADT volumes used in this study area presented on Table 6-2 are based on *Oleander & Santa Ana Warehouses Traffic Study by Urban Crossroads, Inc.* for the following traffic scenarios. (21)

1. Existing (E)
2. Existing with Project (EP)
3. Opening Year Cumulative (2025) without Project (OYC)
4. Opening Year Cumulative (2025) with Project (OYCP)
5. Horizon Year (2040) without Project (HY)
6. Horizon Year (2040) with Project (HYP)

The ADT volumes vary for each roadway segment based on the existing traffic volumes and the combination of project traffic distributions. This analysis relies on a comparative evaluation of the off-site traffic noise impacts at the boundary of the right-of-way of the receiving adjacent land use, without and with project ADT traffic volumes from the Project traffic study.

**TABLE 6-1: OFF-SITE ROADWAY PARAMETERS**

ID	Roadway	Segment	Receiving Land Use <sup>1</sup>	Classification <sup>2</sup>	Distance from Centerline to Receiving Land Use (Feet) <sup>3</sup>	Vehicle Speed (mph)
1	Citrus Av.	n/o I-10 WB Ramps	Non-sensitive	Major	66'	45
2	Citrus Av.	n/o Slover Av.	Sensitive	Major	66'	45
3	Citrus Av.	s/o Slover Av.	Sensitive	Secondary	46'	40
4	Citrus Av.	s/o Santa Ana Av.	Sensitive	Secondary	46'	40
5	Oleander Av.	n/o Santa Ana Av.	Sensitive	Collector	34'	40
6	Oleander Av.	s/o Santa Ana Av.	Non-sensitive	Collector	34'	40
7	Slover Av.	w/o Oleander Av.	Sensitive	Primary	52'	45
8	Slover Av.	e/o Oleander Av.	Sensitive	Primary	52'	45
9	Santa Ana Av.	w/o Citrus Av.	Sensitive	Secondary	46'	40
10	Santa Ana Av.	w/o Oleander Av.	Sensitive	Secondary	46'	40
11	Santa Ana Av.	e/o Oleander Av.	Sensitive	Secondary	46'	40

<sup>1</sup> Based on a review of existing aerial imagery. Noise sensitive uses limited to adjacent residential land uses.

<sup>2</sup> City of Fontana General Plan Community Mobility and Circulation Element roadway functional classification.

<sup>3</sup> Distance to receiving land use is based upon the right-of-way distances.

To quantify the off-site noise levels, the Project related truck trips were added to the heavy truck category in the FHWA noise prediction model. The addition of the Project related truck trips increases the percentage of heavy trucks in the vehicle mix. This approach recognizes that the FHWA noise prediction model is significantly influenced by the number of heavy trucks in the vehicle mix.

Table 6-3 provides the time of day (daytime, evening, and nighttime) vehicle splits. Table 6-4 shows the traffic flow by vehicle type (vehicle mix) used for all without Project traffic scenarios, and Tables 6-5 to 6-7 show the vehicle mixes used for the with Project traffic scenarios. Due to the added Project truck trips, the increase in Project traffic volumes and the distributions of trucks on the study area road segments, the percentage of autos, medium trucks and heavy trucks will vary for each of the traffic scenarios. This explains why the existing and future traffic volumes and vehicle mixes vary between seemingly identical study area roadway segments.



**TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES**

ID	Roadway	Segment	Average Daily Traffic Volumes <sup>1</sup>					
			Existing		OYC (2025)		HY (2040)	
			Without Project	With Project	Without Project	With Project	Without Project	With Project
1	Citrus Av.	n/o I-10 WB Ramps	33,377	33,407	33,377	33,407	37,359	37,389
2	Citrus Av.	n/o Slover Av.	24,810	25,438	24,810	25,438	34,459	35,087
3	Citrus Av.	s/o Slover Av.	13,484	14,022	13,484	14,022	21,641	22,179
4	Citrus Av.	s/o Santa Ana Av.	9,887	9,977	9,887	9,977	14,412	14,502
5	Oleander Av.	n/o Santa Ana Av.	4,663	4,813	4,663	4,813	4,955	5,105
6	Oleander Av.	s/o Santa Ana Av.	4,797	5,063	4,797	5,063	5,096	5,362
7	Slover Av.	w/o Oleander Av.	15,749	15,839	15,749	15,839	19,978	20,068
8	Slover Av.	e/o Oleander Av.	15,123	15,183	15,123	15,183	19,247	19,307
9	Santa Ana Av.	w/o Citrus Av.	5,530	5,560	5,530	5,560	9,472	9,502
10	Santa Ana Av.	w/o Oleander Av.	4,917	5,115	4,917	5,115	8,822	9,020
11	Santa Ana Av.	e/o Oleander Av.	4,743	4,833	4,743	4,833	8,638	8,728

<sup>1</sup> Oleander & Santa Ana Warehouses Traffic Analysis, Urban Crossroads, Inc.

**TABLE 6-3: TIME OF DAY VEHICLE SPLITS**

Vehicle Type	Time of Day Splits <sup>1</sup>			Total of Time of Day Splits
	Daytime	Evening	Nighttime	
Autos	69.80%	10.98%	19.22%	100.00%
Medium Trucks	77.55%	5.10%	17.35%	100.00%
Heavy Trucks	72.12%	7.16%	20.72%	100.00%

<sup>1</sup> Based on the May 18, 2022, 24-hour directional vehicle classification count collected on Citrus Avenue north of Santa Ana Avenue (Oleander & Santa Ana Warehouses Traffic Analysis, Urban Crossroads, Inc.)

"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

**TABLE 6-4: WITHOUT PROJECT VEHICLE MIX**

Classification	Total % Traffic Flow <sup>1</sup>			Total
	Autos	Medium Trucks	Heavy Trucks	
All Segments	89.75%	2.20%	8.05%	100.00%

<sup>1</sup> Based on the May 18, 2022, 24-hour directional vehicle classification count collected on Citrus Avenue north of Santa Ana Avenue (Oleander & Santa Ana Warehouses Traffic Analysis, Urban Crossroads, Inc.)

**TABLE 6-5: EXISTING WITH PROJECT VEHICLE MIX**

ID	Roadway	Segment	With Project <sup>1</sup>			
			Autos	Medium Trucks	Heavy Trucks	Total <sup>2</sup>
1	Citrus Av.	n/o I-10 WB Ramps	89.76%	2.20%	8.04%	100.00%
2	Citrus Av.	n/o Slover Av.	88.71%	2.36%	8.92%	100.00%
3	Citrus Av.	s/o Slover Av.	87.80%	2.51%	9.68%	100.00%
4	Citrus Av.	s/o Santa Ana Av.	89.84%	2.18%	7.98%	100.00%
5	Oleander Av.	n/o Santa Ana Av.	90.07%	2.13%	7.80%	100.00%
6	Oleander Av.	s/o Santa Ana Av.	85.62%	2.88%	11.50%	100.00%
7	Slover Av.	w/o Oleander Av.	89.81%	2.19%	8.01%	100.00%
8	Slover Av.	e/o Oleander Av.	89.79%	2.19%	8.02%	100.00%
9	Santa Ana Av.	w/o Citrus Av.	89.80%	2.19%	8.01%	100.00%
10	Santa Ana Av.	w/o Oleander Av.	90.14%	2.11%	7.74%	100.00%
11	Santa Ana Av.	e/o Oleander Av.	89.94%	2.16%	7.90%	100.00%

<sup>1</sup> Oleander & Santa Ana Warehouses Traffic Analysis, Urban Crossroads, Inc.

<sup>2</sup> Total of vehicle mix percentage values rounded to the nearest one-hundredth.

**TABLE 6-6: OPENING YEAR CUMULATIVE 2025 WITH PROJECT VEHICLE MIX**

ID	Roadway	Segment	With Project <sup>1</sup>			
			Autos	Medium Trucks	Heavy Trucks	Total <sup>2</sup>
1	Citrus Av.	n/o I-10 WB Ramps	89.76%	2.20%	8.05%	100.00%
2	Citrus Av.	n/o Slover Av.	89.00%	2.32%	8.68%	100.00%
3	Citrus Av.	s/o Slover Av.	88.52%	2.40%	9.08%	100.00%
4	Citrus Av.	s/o Santa Ana Av.	89.81%	2.19%	8.00%	100.00%
5	Oleander Av.	n/o Santa Ana Av.	90.05%	2.14%	7.82%	100.00%
6	Oleander Av.	s/o Santa Ana Av.	85.85%	2.84%	11.31%	100.00%
7	Slover Av.	w/o Oleander Av.	89.79%	2.19%	8.02%	100.00%
8	Slover Av.	e/o Oleander Av.	89.78%	2.19%	8.03%	100.00%
9	Santa Ana Av.	w/o Citrus Av.	89.78%	2.19%	8.03%	100.00%
10	Santa Ana Av.	w/o Oleander Av.	89.97%	2.15%	7.88%	100.00%
11	Santa Ana Av.	e/o Oleander Av.	89.85%	2.18%	7.97%	100.00%

<sup>1</sup> Oleander & Santa Ana Warehouses Traffic Analysis, Urban Crossroads, Inc.

<sup>2</sup> Total of vehicle mix percentage values rounded to the nearest one-hundredth.

**TABLE 6-7: HORIZON YEAR 2040 WITH PROJECT VEHICLE MIX**

ID	Roadway	Segment	With Project <sup>1</sup>			
			Autos	Medium Trucks	Heavy Trucks	Total <sup>2</sup>
1	Citrus Av.	n/o I-10 WB Ramps	89.76%	2.20%	8.05%	100.00%
2	Citrus Av.	n/o Slover Av.	89.06%	2.31%	8.63%	100.00%
3	Citrus Av.	s/o Slover Av.	88.63%	2.38%	8.99%	100.00%
4	Citrus Av.	s/o Santa Ana Av.	89.81%	2.19%	8.01%	100.00%
5	Oleander Av.	n/o Santa Ana Av.	90.02%	2.14%	7.84%	100.00%
6	Oleander Av.	s/o Santa Ana Av.	86.19%	2.78%	11.03%	100.00%
7	Slover Av.	w/o Oleander Av.	89.78%	2.19%	8.02%	100.00%
8	Slover Av.	e/o Oleander Av.	89.77%	2.19%	8.03%	100.00%
9	Santa Ana Av.	w/o Citrus Av.	89.78%	2.19%	8.03%	100.00%
10	Santa Ana Av.	w/o Oleander Av.	89.95%	2.16%	7.89%	100.00%
11	Santa Ana Av.	e/o Oleander Av.	89.75%	2.20%	8.05%	100.00%

<sup>1</sup> Oleander & Santa Ana Warehouses Traffic Analysis, Urban Crossroads, Inc.

<sup>2</sup> Total of vehicle mix percentage values rounded to the nearest one-hundredth.

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## 7 OFF-SITE TRAFFIC NOISE ANALYSIS

To assess the off-site transportation CNEL noise level impacts associated with the proposed Project, noise contours were developed based on the *Oleander & Santa Ana Warehouses Traffic Study*. (21) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway.

### 7.1 TRAFFIC NOISE CONTOURS

Noise contours were used to assess the Project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area. Tables 7-1 to 7-6 present a summary of the exterior traffic noise levels for each traffic condition. Appendix 7.1 includes the traffic noise level contours worksheets.

**TABLE 7-1: EXISTING WITHOUT PROJECT CONTOURS**

ID	Road	Segment	Receiving Land Use <sup>1</sup>	CNEL at Nearest Receiving Land Use (dBA) <sup>2</sup>	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Citrus Av.	n/o I-10 WB Ramps	Non-sensitive	78.0	225	484	1042
2	Citrus Av.	n/o Slover Av.	Sensitive	76.7	184	397	855
3	Citrus Av.	s/o Slover Av.	Sensitive	74.7	94	204	439
4	Citrus Av.	s/o Santa Ana Av.	Sensitive	73.3	77	166	357
5	Oleander Av.	n/o Santa Ana Av.	Sensitive	70.9	39	84	182
6	Oleander Av.	s/o Santa Ana Av.	Non-sensitive	71.0	40	86	185
7	Slover Av.	w/o Oleander Av.	Sensitive	75.6	123	265	570
8	Slover Av.	e/o Oleander Av.	Sensitive	75.4	120	258	555
9	Santa Ana Av.	w/o Citrus Av.	Sensitive	70.8	52	112	242
10	Santa Ana Av.	w/o Oleander Av.	Sensitive	70.3	48	104	224
11	Santa Ana Av.	e/o Oleander Av.	Sensitive	70.2	47	101	219

<sup>1</sup> Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.

<sup>2</sup> The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use. "RW" = Location of the respective noise contour falls within the right-of-way of the road.

**TABLE 7-2: EXISTING WITH PROJECT CONTOURS**

ID	Road	Segment	Receiving Land Use <sup>1</sup>	CNEL at Nearest Receiving Land Use (dBA) <sup>2</sup>	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Citrus Av.	n/o I-10 WB Ramps	Non-sensitive	78.0	225	484	1042
2	Citrus Av.	n/o Slover Av.	Sensitive	77.1	197	425	916
3	Citrus Av.	s/o Slover Av.	Sensitive	75.5	107	230	496
4	Citrus Av.	s/o Santa Ana Av.	Sensitive	73.3	77	166	357
5	Oleander Av.	n/o Santa Ana Av.	Sensitive	71.0	39	85	183
6	Oleander Av.	s/o Santa Ana Av.	Non-sensitive	72.5	50	108	233
7	Slover Av.	w/o Oleander Av.	Sensitive	75.6	123	265	571
8	Slover Av.	e/o Oleander Av.	Sensitive	75.4	120	258	555
9	Santa Ana Av.	w/o Citrus Av.	Sensitive	70.8	52	112	242
10	Santa Ana Av.	w/o Oleander Av.	Sensitive	70.3	48	104	225
11	Santa Ana Av.	e/o Oleander Av.	Sensitive	70.2	47	102	219

<sup>1</sup> Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.

<sup>2</sup> The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use. "RW" = Location of the respective noise contour falls within the right-of-way of the road.

**TABLE 7-3: OYC 2025 WITHOUT PROJECT CONTOURS**

ID	Road	Segment	Receiving Land Use <sup>1</sup>	CNEL at Nearest Receiving Land Use (dBA) <sup>2</sup>	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Citrus Av.	n/o I-10 WB Ramps	Non-sensitive	78.5	242	522	1124
2	Citrus Av.	n/o Slover Av.	Sensitive	78.1	229	494	1065
3	Citrus Av.	s/o Slover Av.	Sensitive	76.7	130	279	601
4	Citrus Av.	s/o Santa Ana Av.	Sensitive	75.0	99	213	458
5	Oleander Av.	n/o Santa Ana Av.	Sensitive	71.2	41	88	189
6	Oleander Av.	s/o Santa Ana Av.	Non-sensitive	71.3	42	90	193
7	Slover Av.	w/o Oleander Av.	Sensitive	76.6	144	310	668
8	Slover Av.	e/o Oleander Av.	Sensitive	76.5	140	302	652
9	Santa Ana Av.	w/o Citrus Av.	Sensitive	73.2	75	161	347
10	Santa Ana Av.	w/o Oleander Av.	Sensitive	72.8	71	153	330
11	Santa Ana Av.	e/o Oleander Av.	Sensitive	72.8	70	151	326

<sup>1</sup> Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.

<sup>2</sup> The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use. "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-4: OYC 2025 WITH PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use <sup>1</sup>	CNEL at Nearest Receiving Land Use (dBA) <sup>2</sup>	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Citrus Av.	n/o I-10 WB Ramps	Non-sensitive	78.5	242	522	1124
2	Citrus Av.	n/o Slover Av.	Sensitive	78.4	241	520	1119
3	Citrus Av.	s/o Slover Av.	Sensitive	77.3	140	302	651
4	Citrus Av.	s/o Santa Ana Av.	Sensitive	75.0	99	213	459
5	Oleander Av.	n/o Santa Ana Av.	Sensitive	71.2	41	88	190
6	Oleander Av.	s/o Santa Ana Av.	Non-sensitive	72.7	52	111	240
7	Slover Av.	w/o Oleander Av.	Sensitive	76.6	144	310	669
8	Slover Av.	e/o Oleander Av.	Sensitive	76.5	140	303	652
9	Santa Ana Av.	w/o Citrus Av.	Sensitive	73.2	75	161	347
10	Santa Ana Av.	w/o Oleander Av.	Sensitive	72.9	71	154	332
11	Santa Ana Av.	e/o Oleander Av.	Sensitive	72.8	70	151	326

<sup>1</sup> Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.

<sup>2</sup> The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use. "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-5: HY 2040 WITHOUT PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use <sup>1</sup>	CNEL at Nearest Receiving Land Use (dBA) <sup>2</sup>	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Citrus Av.	n/o I-10 WB Ramps	Non-sensitive	78.9	258	556	1197
2	Citrus Av.	n/o Slover Av.	Sensitive	78.5	244	527	1135
3	Citrus Av.	s/o Slover Av.	Sensitive	77.2	138	297	641
4	Citrus Av.	s/o Santa Ana Av.	Sensitive	75.4	105	227	489
5	Oleander Av.	n/o Santa Ana Av.	Sensitive	71.6	43	94	202
6	Oleander Av.	s/o Santa Ana Av.	Non-sensitive	71.7	44	95	206
7	Slover Av.	w/o Oleander Av.	Sensitive	77.7	170	367	790
8	Slover Av.	e/o Oleander Av.	Sensitive	77.6	168	361	778
9	Santa Ana Av.	w/o Citrus Av.	Sensitive	73.6	80	171	369
10	Santa Ana Av.	w/o Oleander Av.	Sensitive	73.3	76	163	352
11	Santa Ana Av.	e/o Oleander Av.	Sensitive	73.2	75	161	347

<sup>1</sup> Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.

<sup>2</sup> The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use. "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-6: HY 2040 WITH PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use <sup>1</sup>	CNEL at Nearest Receiving Land Use (dBA) <sup>2</sup>	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Citrus Av.	n/o I-10 WB Ramps	Non-sensitive	78.9	258	556	1197
2	Citrus Av.	n/o Slover Av.	Sensitive	78.8	256	551	1188
3	Citrus Av.	s/o Slover Av.	Sensitive	77.6	148	320	689
4	Citrus Av.	s/o Santa Ana Av.	Sensitive	75.4	105	227	489
5	Oleander Av.	n/o Santa Ana Av.	Sensitive	71.6	44	94	203
6	Oleander Av.	s/o Santa Ana Av.	Non-sensitive	73.0	54	117	251
7	Slover Av.	w/o Oleander Av.	Sensitive	77.7	170	367	790
8	Slover Av.	e/o Oleander Av.	Sensitive	77.6	168	361	778
9	Santa Ana Av.	w/o Citrus Av.	Sensitive	73.6	80	171	369
10	Santa Ana Av.	w/o Oleander Av.	Sensitive	73.3	76	164	353
11	Santa Ana Av.	e/o Oleander Av.	Sensitive	73.2	75	161	347

<sup>1</sup> Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.

<sup>2</sup> The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.

"RW" = Location of the respective noise contour falls within the right-of-way of the road.

## 7.2 EXISTING PROJECT TRAFFIC NOISE LEVEL INCREASES

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project has been included in this report for informational purposes and to fully analyze all the existing traffic scenarios identified in the Traffic Study. However, the analysis of existing off-site traffic noise levels plus traffic noise generated by the proposed Project scenario will not actually occur since the Project would not be fully constructed and operational until 2025 conditions. Table 7-1 shows the Existing without Project conditions CNEL noise levels. The Existing without Project exterior noise levels range from 70.2 to 78.0 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions ranging from 70.2 to 78.0 dBA CNEL. Table 7-5 shows that the Project off-site traffic noise level increases range from 0.0 to 1.5 dBA CNEL on the study area roadway segments.

Based on the significance criteria for off-site traffic noise presented in Section 4.1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level impacts due to unmitigated Project-related traffic noise levels.



**TABLE 7-7: EXISTING WITH PROJECT TRAFFIC NOISE LEVEL INCREASES**

ID	Road	Segment	Receiving Land Use <sup>1</sup>	CNEL at Receiving Land Use (dBA) <sup>2</sup>			Incremental Noise Level Increase Threshold <sup>3</sup>	
				No Project	With Project	Project Increment	Limit	Exceeded?
1	Citrus Av.	n/o I-10 WB Ramps	Non-sensitive	78.0	78.0	0.0	3.0	No
2	Citrus Av.	n/o Slover Av.	Sensitive	76.7	77.1	0.4	1.5	No
3	Citrus Av.	s/o Slover Av.	Sensitive	74.7	75.5	0.8	1.5	No
4	Citrus Av.	s/o Santa Ana Av.	Sensitive	73.3	73.3	0.0	1.5	No
5	Oleander Av.	n/o Santa Ana Av.	Sensitive	70.9	71.0	0.1	1.5	No
6	Oleander Av.	s/o Santa Ana Av.	Non-sensitive	71.0	72.5	1.5	3.0	No
7	Slover Av.	w/o Oleander Av.	Sensitive	75.6	75.6	0.0	1.5	No
8	Slover Av.	e/o Oleander Av.	Sensitive	75.4	75.4	0.0	1.5	No
9	Santa Ana Av.	w/o Citrus Av.	Sensitive	70.8	70.8	0.0	1.5	No
10	Santa Ana Av.	w/o Oleander Av.	Sensitive	70.3	70.3	0.0	1.5	No
11	Santa Ana Av.	e/o Oleander Av.	Sensitive	70.2	70.2	0.0	1.5	No

<sup>1</sup> Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.

<sup>2</sup> The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.

<sup>3</sup> Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?

"n/a" Per the County of Riverside General Plan Noise Element Table N-1, a barely perceptible 3 dBA or greater noise level increase is considered a significant impact when the ambient non-noise sensitive noise level is greater than the normally acceptable 70 dBA CNEL land use compatibility criteria.

### 7.3 OYC 2025 TRAFFIC NOISE LEVEL INCREASES

Table 7-3 presents the OYC 2025 without Project conditions CNEL noise levels. The OYC 2025 without Project exterior noise levels range from 71.2 to 78.5 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-4 shows that the OYC 2025 with Project conditions will range from 71.2 to 78.5 dBA CNEL. Table 7-6 shows that the Project off-site traffic noise level increases range from 0.0 to 1.4 dBA CNEL on the study area roadway segments.

Based on the significance criteria for off-site traffic noise presented in Section 4.1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level impacts due to unmitigated Project-related traffic noise levels.

**TABLE 7-8: OYC 2025 WITH PROJECT TRAFFIC NOISE LEVEL INCREASES**

ID	Road	Segment	Receiving Land Use <sup>1</sup>	CNEL at Receiving Land Use (dBA) <sup>2</sup>			Incremental Noise Level Increase Threshold <sup>3</sup>	
				No Project	With Project	Project Increment	Limit	Exceeded?
1	Citrus Av.	n/o I-10 WB Ramps	Non-sensitive	78.5	78.5	0.0	3.0	No
2	Citrus Av.	n/o Slover Av.	Sensitive	78.1	78.4	0.3	1.5	No
3	Citrus Av.	s/o Slover Av.	Sensitive	76.7	77.3	0.6	1.5	No
4	Citrus Av.	s/o Santa Ana Av.	Sensitive	75.0	75.0	0.0	1.5	No
5	Oleander Av.	n/o Santa Ana Av.	Sensitive	71.2	71.2	0.0	1.5	No
6	Oleander Av.	s/o Santa Ana Av.	Non-sensitive	71.3	72.7	1.4	3.0	No
7	Slover Av.	w/o Oleander Av.	Sensitive	76.6	76.6	0.0	1.5	No
8	Slover Av.	e/o Oleander Av.	Sensitive	76.5	76.5	0.0	1.5	No
9	Santa Ana Av.	w/o Citrus Av.	Sensitive	73.2	73.2	0.0	1.5	No
10	Santa Ana Av.	w/o Oleander Av.	Sensitive	72.8	72.9	0.1	1.5	No
11	Santa Ana Av.	e/o Oleander Av.	Sensitive	72.8	72.8	0.0	1.5	No

<sup>1</sup> Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.

<sup>2</sup> The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.

<sup>3</sup> Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?

"n/a" Per the County of Riverside General Plan Noise Element Table N-1, a barely perceptible 3 dBA or greater noise level increase is considered a significant impact when the ambient non-noise sensitive noise level is greater than the normally acceptable 70 dBA CNEL land use compatibility criteria.

## 7.4 HY 2040 TRAFFIC NOISE LEVEL INCREASES

Table 7-5 presents the HY 2040 without Project conditions CNEL noise levels. The HY 2040 without Project exterior noise levels range from 71.6 to 78.9 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-6 shows that the HY 2040 with Project conditions will range from 71.6 to 78.9 dBA CNEL. Table 7-9 shows that the Project off-site traffic noise level increases range from 0.0 to 1.3 dBA CNEL on the study area roadway segments.

Based on the significance criteria for off-site traffic noise presented in Section 4.1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level impacts due to unmitigated Project-related traffic noise levels.

**TABLE 7-9: HY 2040 WITH PROJECT TRAFFIC NOISE LEVEL INCREASES**

ID	Road	Segment	Receiving Land Use <sup>1</sup>	CNEL at Receiving Land Use (dBA) <sup>2</sup>			Incremental Noise Level Increase Threshold <sup>3</sup>	
				No Project	With Project	Project Increment	Limit	Exceeded?
1	Citrus Av.	n/o I-10 WB Ramps	Non-sensitive	78.9	78.9	0.0	3.0	No
2	Citrus Av.	n/o Slover Av.	Sensitive	78.5	78.8	0.3	1.5	No
3	Citrus Av.	s/o Slover Av.	Sensitive	77.2	77.6	0.4	1.5	No
4	Citrus Av.	s/o Santa Ana Av.	Sensitive	75.4	75.4	0.0	1.5	No
5	Oleander Av.	n/o Santa Ana Av.	Sensitive	71.6	71.6	0.0	1.5	No
6	Oleander Av.	s/o Santa Ana Av.	Non-sensitive	71.7	73.0	1.3	3.0	No
7	Slover Av.	w/o Oleander Av.	Sensitive	77.7	77.7	0.0	1.5	No
8	Slover Av.	e/o Oleander Av.	Sensitive	77.6	77.6	0.0	1.5	No
9	Santa Ana Av.	w/o Citrus Av.	Sensitive	73.6	73.6	0.0	1.5	No
10	Santa Ana Av.	w/o Oleander Av.	Sensitive	73.3	73.3	0.0	1.5	No
11	Santa Ana Av.	e/o Oleander Av.	Sensitive	73.2	73.2	0.0	1.5	No

<sup>1</sup> Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.

<sup>2</sup> The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.

<sup>3</sup> Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?

"n/a" Per the County of Riverside General Plan Noise Element Table N-1, a barely perceptible 3 dBA or greater noise level increase is considered a significant impact when the ambient non-noise sensitive noise level is greater than the normally acceptable 70 dBA CNEL land use compatibility criteria.

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## 8 RECEIVER LOCATIONS

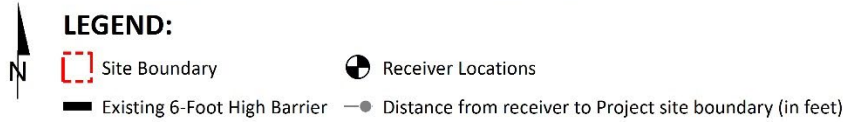
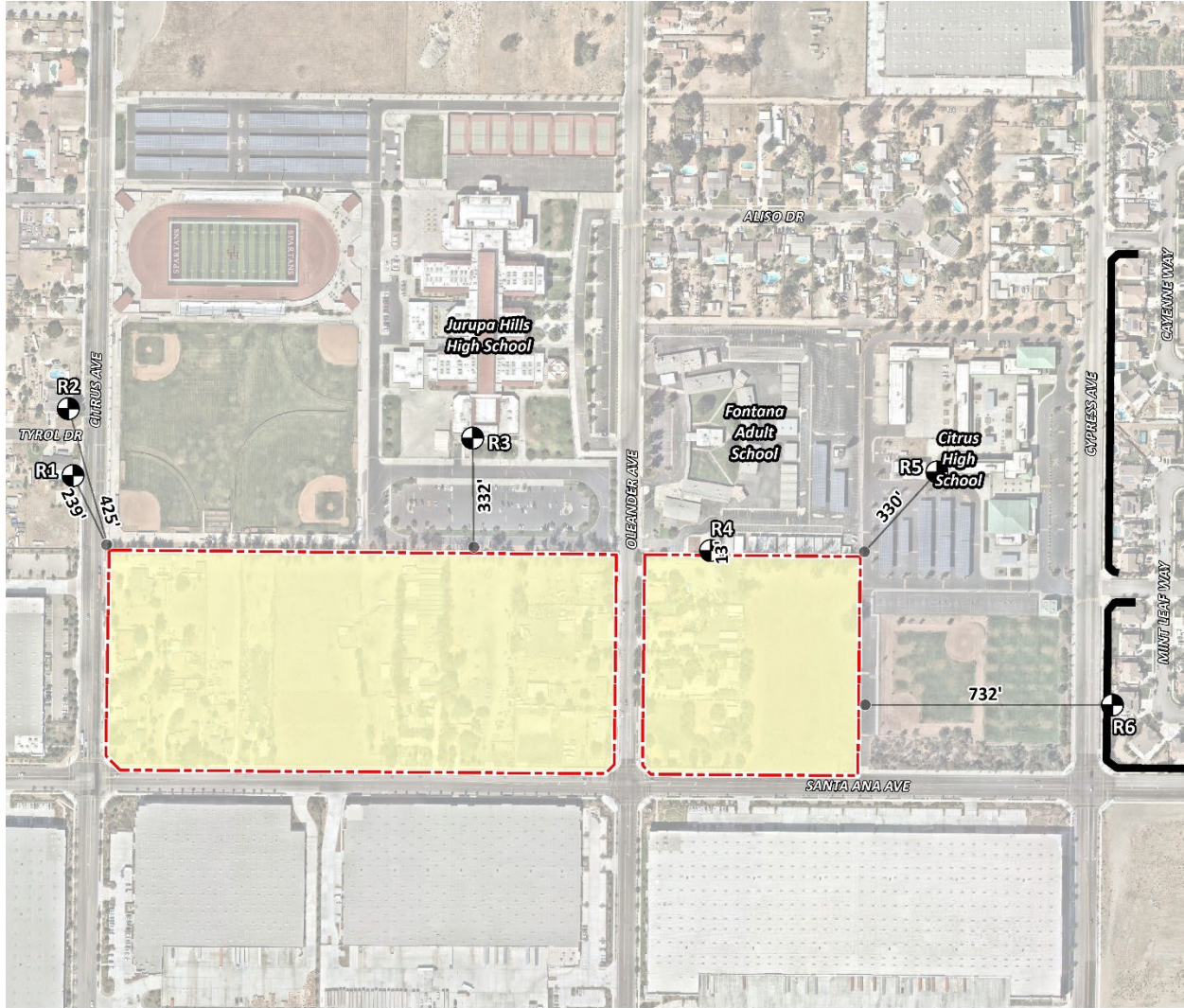
To assess the potential for long-term operational and short-term construction noise impacts, the following sensitive receiver locations, as shown on Exhibit 8-A, were identified as representative locations for analysis. Sensitive receivers are generally defined as locations where people reside or where 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, outpatient 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, seven receiver locations in the vicinity of the Project site were identified. 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 16079 Tyrol Drive, approximately 239 feet northwest of the Project site. Receiver R1 is placed in the private outdoor living area (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L3, to describe the existing ambient noise environment.
- R2: Location R2 represents the existing noise sensitive residence at 16078 Tyrol Drive, approximately 425 feet northwest of the Project site. Since there are no private outdoor living areas (backyard) facing the Project site, receiver R2 is placed at the building's façade. A 24-hour noise measurement was taken near this location, L3, to describe the existing ambient noise environment.
- R3: Location R3 represents the Jurupa Hills High School building facade, approximately 332 feet north of the Project site. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.
- R4: Location R4 represents the building façade of the Fontana Adult School relocatable classroom, approximately 13 feet north of the Project site. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.
- R5: Location R5 represents the Citrus High School building façade, approximately 330 feet northeast of the Project site. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.
- R6: Location R6 represents existing noise sensitive residence at 10862 Mint Leaf Way, approximately 732 feet east of the Project site. Receiver R6 is placed in the private

outdoor living area (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

**EXHIBIT 8-A: RECEIVER LOCATIONS**



## 9 OPERATIONAL NOISE ANALYSIS

This section analyzes the potential stationary-source operational noise impacts at the nearest receiver locations, identified in Section 8, resulting from the operation of the proposed Oleander & Santa Ana Warehouses Project. Exhibit 9-A identifies the noise source locations used to assess the operational noise levels. To reduce the noise exposure to the noise sensitive residential areas near the Project site, several design features were considered as part of the site planning process. These design features include, positioning the loading dock areas in a north-south orientation and placing the warehouse buildings between the loading docks and the noise sensitive residential areas west of Citrus Avenue and east of Cypress Avenue.

### 9.1 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. Consistent with similar warehouse uses, the Project business operations would primarily be conducted within the enclosed building, 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, and truck movements.

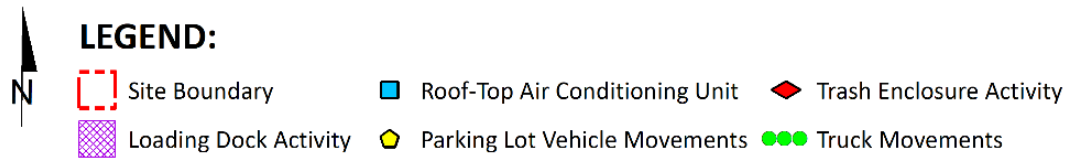
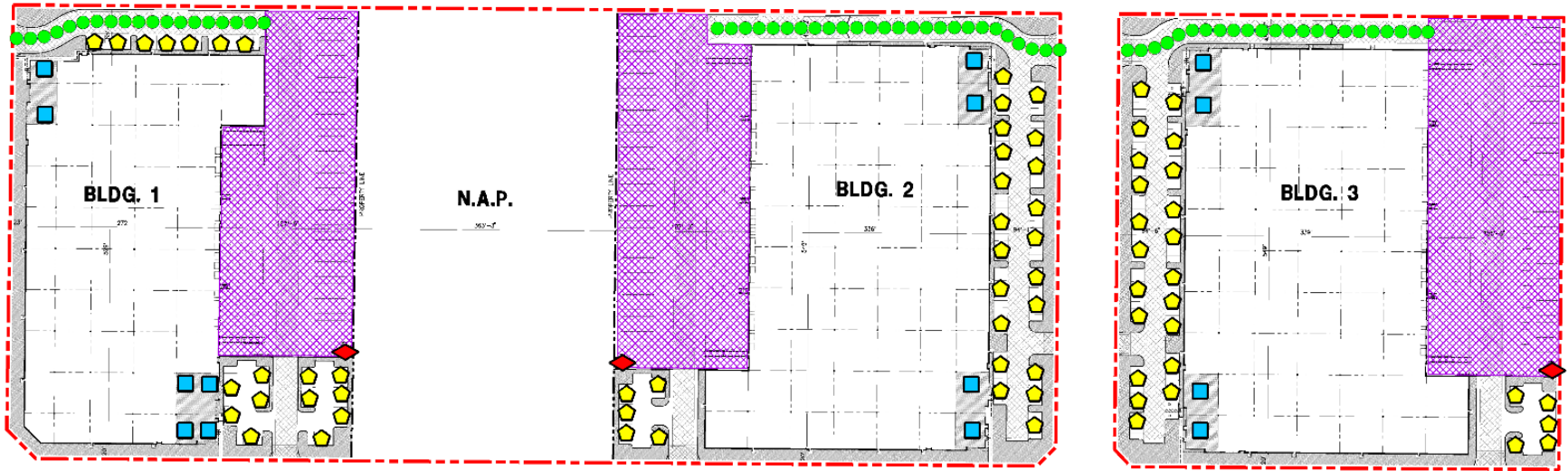
### 9.2 REFERENCE NOISE LEVELS

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 9-1 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, and truck movements all operating at the same time. These sources of noise activity will likely vary throughout the day.

#### 9.2.1 MEASUREMENT PROCEDURES

The reference noise level measurements presented in this section were collected using a Larson Davis LxT Type 1 precision 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. (17)

**EXHIBIT 9-A: OPERATIONAL NOISE SOURCE LOCATIONS**





**TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS**

Noise Source <sup>1</sup>	Noise Source Height (Feet)	Min./ Hour <sup>2</sup>		Reference Noise Level (dBA L <sub>eq</sub> ) @ 50 Feet	Sound Power Level (dBA) <sup>3</sup>
		Day	Night		
Loading Dock Activity	8'	60	60	65.7	111.5
Roof-Top Air Conditioning Units	5'	39	28	57.2	88.9
Trash Enclosure Activity	5'	60	60	57.3	89.0
Parking Lot Vehicle Movements	5'	60	60	52.6	81.1
Truck Movements	8'	60	60	59.8	93.2

<sup>1</sup> As measured by Urban Crossroads, Inc.

<sup>2</sup> 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.

<sup>3</sup> 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.

### 9.2.2 LOADING DOCK ACTIVITY

The reference loading dock activities are intended to describe the typical outdoor operational noise activities associated with the Project. This includes truck idling, reefer activity (refrigerator truck/cold storage), deliveries, backup alarms, trailer docking including a combination of tractor trailer semi-trucks, two-axle delivery trucks, and background operation activities. The reference noise level measurement was taken in the center of the loading dock activity area and represents multiple concurrent noise sources resulting in a combined noise level of 65.7 dBA L<sub>eq</sub> at a uniform distance of 50 feet. Specifically, the reference noise level measurement represents one truck located approximately 30 feet from the noise level meter with another truck passing by to park roughly 20 feet away, both with their engines idling. Throughout the reference noise level measurement, a separate docked and running reefer truck was located approximately 50 feet east of the measurement location. Additional background noise sources included truck pass-by noise, truck drivers talking to each other next to docked trucks, and air brake release noise when trucks parked.

### 9.2.3 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<sub>eq</sub>. Based on the typical operating conditions observed over a four-day measurement period, the roof-top air conditioning units are estimated to operate for an 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.

#### **9.2.4 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.

#### **9.2.5 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 an Amazon warehouse distribution center. At 50 feet from the center of activity, the parking lot produced a reference noise level of 52.6 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.

#### **9.2.6 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.

### **9.3 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 9.1 includes the detailed noise model inputs including the planned screenwall used to estimate the Project operational noise levels presented in this section.

#### 9.4 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, 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 9-2 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 46.6 to 57.2 dBA  $L_{eq}$ .

**TABLE 9-2: DAYTIME PROJECT OPERATIONAL NOISE LEVELS**

Noise Source <sup>1</sup>	Operational Noise Levels by Receiver Location (dBA Leq)					
	R1	R2	R3	R4	R5	R6
Loading Dock Activity	50.6	50.1	56.3	51.1	54.9	46.5
Roof-Top Air Conditioning Units	37.8	35.0	36.2	40.0	32.0	25.9
Trash Enclosure Activity	15.0	24.1	30.3	13.2	28.8	24.2
Parking Lot Vehicle Movements	33.9	31.6	34.1	35.5	28.5	22.3
Truck Movements	40.7	37.8	40.8	55.8	36.5	18.9
<b>Total (All Noise Sources)</b>	<b>51.3</b>	<b>50.5</b>	<b>56.5</b>	<b>57.2</b>	<b>55.0</b>	<b>46.6</b>

<sup>1</sup> See Exhibit 9-A for the noise source locations. CadnaA noise model calculations are included in Appendix 9.1.

Tables 9-3 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 46.6 to 57.1 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 9-1 and Appendix 9.1.

**TABLE 9-3: NIGHTTIME PROJECT OPERATIONAL NOISE LEVELS**

Noise Source <sup>1</sup>	Operational Noise Levels by Receiver Location (dBA Leq)					
	R1	R2	R3	R4	R5	R6
Loading Dock Activity	50.6	50.1	56.3	51.1	54.9	46.5
Roof-Top Air Conditioning Units	35.4	32.6	33.7	37.6	29.6	23.5
Trash Enclosure Activity	14.0	23.1	29.3	12.3	27.9	23.3
Parking Lot Vehicle Movements	33.9	31.6	34.1	35.5	28.5	22.3
Truck Movements	40.7	37.8	40.8	55.8	36.5	18.9
<b>Total (All Noise Sources)</b>	<b>51.2</b>	<b>50.5</b>	<b>56.5</b>	<b>57.1</b>	<b>55.0</b>	<b>46.6</b>

<sup>1</sup> See Exhibit 9-A for the noise source locations. CadnaA noise model calculations are included in Appendix 9.1.

### 9.5 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 Fontana exterior noise level standards at nearby noise-sensitive receiver locations. Table 9-4 shows the operational noise levels associated with Oleander & Santa Ana Warehouses Project will not exceed the City of Fontana daytime and nighttime exterior noise level standards. Therefore, the operational noise impacts are considered *less than significant* at the nearby noise-sensitive receiver locations.

**TABLE 9-4: OPERATIONAL NOISE LEVEL COMPLIANCE**

Receiver Location <sup>1</sup>	Land Use	Project Operational Noise Levels (dBA Leq) <sup>2</sup>		Noise Level Standards (dBA Leq) <sup>3</sup>		Noise Level Standards Exceeded? <sup>4</sup>	
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
R1	Residential	51.3	51.2	70	65	No	No
R2	Residential	50.5	50.5	70	65	No	No
R3	School	56.5	56.5	70	-. <sup>5</sup>	No	No
R4	School	57.2	57.1	70	-. <sup>5</sup>	No	No
R5	School	55.0	55.0	70	-. <sup>5</sup>	No	No
R6	Residential	46.6	46.6	70	65	No	No

<sup>1</sup> See Exhibit 8-A for the receiver locations.

<sup>2</sup> Proposed Project operational noise levels as shown on Tables 9-2 and 9-3.

<sup>3</sup> Exterior noise level standards, as shown on Table 4-1.

<sup>4</sup> Do the estimated Project operational noise source activities exceed the noise level standards?

<sup>5</sup> Receiver locations do not include any noise sensitive nighttime use.

"Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 7:00 a.m.

## 9.6 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:

$$\text{SPL}_{\text{Total}} = 10\log_{10}[10^{\text{SPL1}/10} + 10^{\text{SPL2}/10} + \dots + 10^{\text{SPLn}/10}]$$

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. Noise levels that would be experienced at receiver locations when Project-source noise is added to the daytime and nighttime ambient conditions are presented on Tables 9-5 and 9-6, respectively. As indicated on Tables 9-5, the Project will generate a daytime operational noise level increases ranging from 0.1 to 1.5 dBA  $L_{\text{eq}}$  at the nearest receiver locations. Table 9-6 shows that the Project will generate a nighttime operational noise level increases ranging from 0.2 to 0.6 dBA  $L_{\text{eq}}$  at the nearest receiver locations. Project-related operational noise level increases will not exceed the operational noise level increase significance criteria presented in Table 4-1, and, therefore, the increases at the sensitive receiver locations will be *less than significant*.

**TABLE 9-5: DAYTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES**

Receiver Location <sup>1</sup>	Land Use	Total Project Operational Noise Level <sup>2</sup>	Measurement Location <sup>3</sup>	Reference Ambient Noise Levels <sup>4</sup>	Combined Project and Ambient <sup>5</sup>	Project Increase <sup>6</sup>	Increase Criteria <sup>7</sup>	Increase Criteria Exceeded?
R1	Residential	51.3	L2	61.5	61.9	0.4	5.0	No
R2	Residential	50.5	L3	62.9	63.1	0.2	5.0	No
R3	School	56.5	L1	61.1	62.4	1.3	5.0	No
R4	School	57.2	L1	61.1	62.6	1.5	5.0	No
R5	School	55.0	L1	61.1	62.1	1.0	5.0	No
R6	Residential	46.6	L2	61.5	61.6	0.1	5.0	No

<sup>1</sup> See Exhibit 8-A for the receiver locations.

<sup>2</sup> Total Project daytime operational noise levels as shown on Table 9-2.

<sup>3</sup> Reference noise level measurement locations as shown on Exhibit 5-A.

<sup>4</sup> Observed daytime ambient noise levels as shown on Table 5-1.

<sup>5</sup> Represents the combined ambient conditions plus the Project activities.

<sup>6</sup> The noise level increase expected with the addition of the proposed Project activities.

<sup>7</sup> Significance increase criteria as shown on Table 4-1.

**TABLE 9-6: NIGHTTIME OPERATIONAL NOISE LEVEL INCREASES**

Receiver Location <sup>1</sup>	Land Use	Total Project Operational Noise Level <sup>2</sup>	Measurement Location <sup>3</sup>	Reference Ambient Noise Levels <sup>4</sup>	Combined Project and Ambient <sup>5</sup>	Project Increase <sup>6</sup>	Increase Criteria <sup>7</sup>	Increase Criteria Exceeded?
R1	Residential	51.2	L2	59.8	60.4	0.6	5.0	No
R2	Residential	50.5	L3	61.0	61.4	0.4	5.0	No
R3	School	-. <sup>8</sup>	L1	60.2	-. <sup>8</sup>	-. <sup>8</sup>	-. <sup>8</sup>	No
R4	School	-. <sup>8</sup>	L1	60.2	-. <sup>8</sup>	-. <sup>8</sup>	-. <sup>8</sup>	No
R5	School	-. <sup>8</sup>	L1	60.2	-. <sup>8</sup>	-. <sup>8</sup>	-. <sup>8</sup>	No
R6	Residential	46.6	L2	59.8	60.0	0.2	5.0	No

<sup>1</sup> See Exhibit 8-A for the receiver locations.

<sup>2</sup> Total Project nighttime operational noise levels as shown on Table 9-3.

<sup>3</sup> Reference noise level measurement locations as shown on Exhibit 5-A.

<sup>4</sup> Observed nighttime ambient noise levels as shown on Table 5-1.

<sup>5</sup> Represents the combined ambient conditions plus the Project activities.

<sup>6</sup> The noise level increase expected with the addition of the proposed Project activities.

<sup>7</sup> Significance increase criteria as shown on Table 4-1.

<sup>8</sup> Receiver locations do not include any noise sensitive nighttime use.

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## 10 CONSTRUCTION ANALYSIS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 10-A shows the construction activity boundaries in relation to the nearest sensitive receiver locations previously described in Section 8. The City of Fontana Municipal Code Section 18-63[7], states that project construction noise levels are considered exempt between 7:00 a.m. and 6:00 p.m. on weekdays and between the hours of 8:00 a.m. to 5:00 p.m. on Saturdays.

In addition, neither the General Plan nor the Municipal 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  $L_{eq}$  as a reasonable threshold for noise sensitive residential land use with a nighttime exterior construction noise level of 70 dBA  $L_{eq}$  (8 p. 179).

### 10.1 CONSTRUCTION NOISE LEVELS

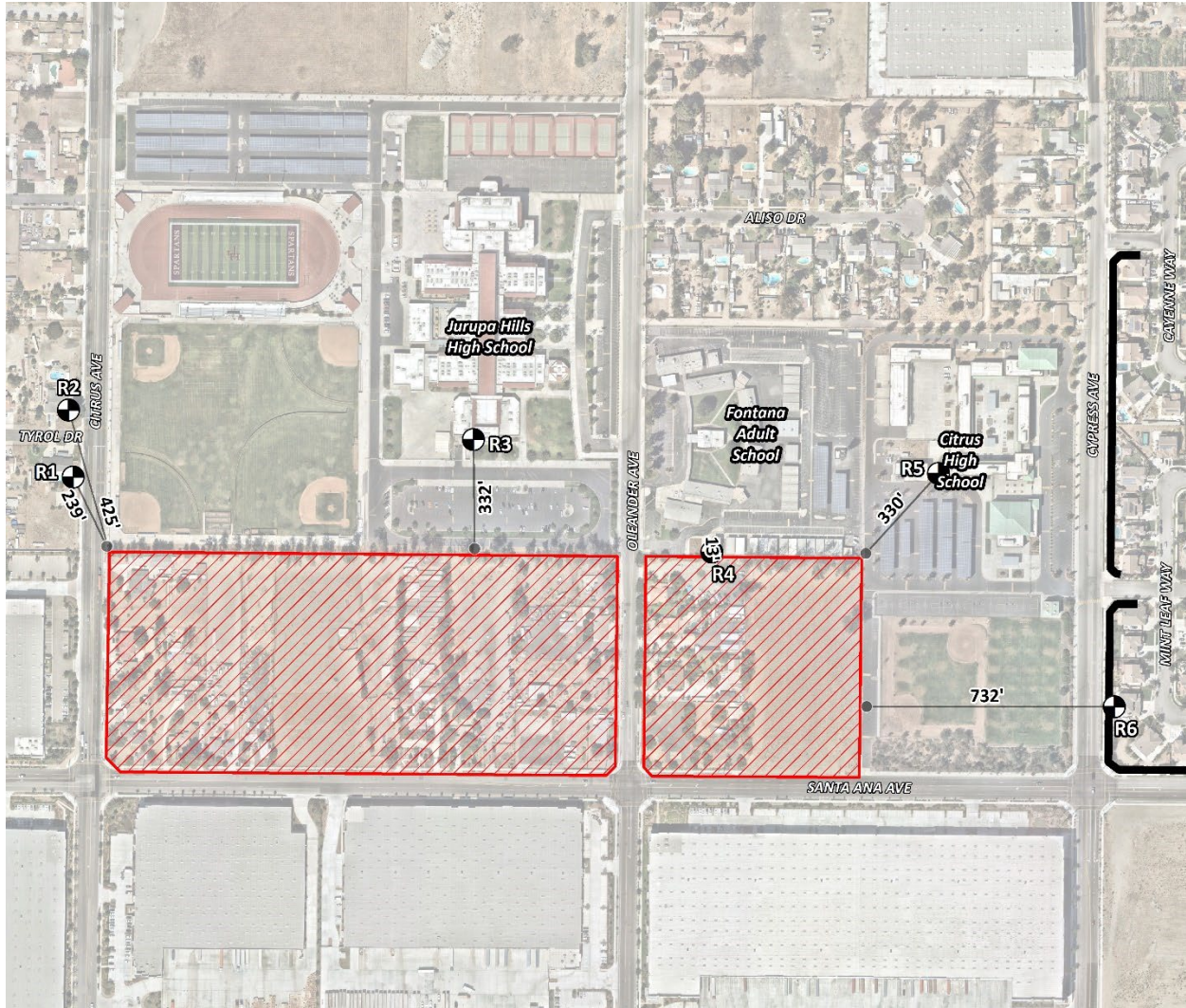
The FTA *Transit Noise and Vibration Impact Assessment Manual* recognizes that construction projects are accomplished in several different stages and outlines the procedures for assessing noise impacts during construction. Each stage has a specific equipment mix, depending on the work to be completed 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

### 10.2 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. (23) 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 10-A: CONSTRUCTION NOISE SOURCE AND RECEIVER LOCATIONS**



**10.3 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 10-1 presents the combined noise levels for the loudest construction equipment, assuming they operate at the same time. As shown on Table 10-2, the construction noise levels are expected to range from 51.0 to 75.9 dBA  $L_{eq}$  at the nearby receiver locations. Appendix 10.1 includes the detailed CadnaA construction noise model inputs.

**TABLE 10-1: CONSTRUCTION REFERENCE NOISE LEVELS**

Construction Stage	Reference Construction Activity	Reference Noise Level @ 50 Feet (dBA Leq) <sup>1</sup>	Combined Noise Level (dBA Leq) <sup>2</sup>	Combined Sound Power Level (PWL) <sup>3</sup>
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		

<sup>1</sup> FHWA Roadway Construction Noise Model (RCNM).

<sup>2</sup> 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.

<sup>3</sup> 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 10-2: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY**

Receiver Location <sup>1</sup>	Construction Noise Levels (dBA Leq)						Highest Levels <sup>2</sup>
	Demolition	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	
R1	66.6	63.6	66.6	64.6	66.6	60.6	66.6
R2	63.7	60.7	63.7	61.7	63.7	57.7	63.7
R3	67.0	64.0	67.0	65.0	67.0	61.0	67.0
R4	75.9	72.9	75.9	73.9	75.9	69.9	75.9
R5	65.2	62.2	65.2	63.2	65.2	59.2	65.2
R6	57.0	54.0	57.0	55.0	57.0	51.0	57.0

<sup>1</sup> Construction noise source and receiver locations are shown on Exhibit 10-A.

<sup>2</sup> 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 10.1.

## 10.4 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 not exceed the reasonable daytime 80 dBA  $L_{eq}$  significance threshold during Project construction activities as shown on Table 10-3. Therefore, the noise impacts due to Project construction noise are considered *less than significant* at all receiver locations.

**TABLE 10-3: TYPICAL CONSTRUCTION NOISE LEVEL COMPLIANCE**

Receiver Location <sup>1</sup>	Construction Noise Levels (dBA $L_{eq}$ )		
	Highest Construction Noise Levels <sup>2</sup>	Threshold <sup>3</sup>	Threshold Exceeded? <sup>4</sup>
R1	66.6	80	No
R2	63.7	80	No
R3	67.0	80	No
R4	75.9	80	No
R5	65.2	80	No
R6	57.0	80	No

<sup>1</sup> Construction noise source and receiver locations are shown on Exhibit 10-A.

<sup>2</sup> Highest construction noise level calculations based on distance from the construction noise source activity to the nearest receiver locations as shown on Table 10-2.

<sup>3</sup> Construction noise level thresholds as shown on Table 4-1.

<sup>4</sup> Do the estimated Project construction noise levels exceed the construction noise level threshold?

## 10.5 PROJECT CONSTRUCTION NOISE ABATEMENT MEASURES

While the analysis shows that the construction noise levels will not exceed the construction-related daytime noise level threshold of 80 dBA  $L_{eq}$ , additional noise abatement should be considered for the Fontana Adult School relocatable classrooms (receiver location R4). It is expected that the construction of a temporary 8-foot-high noise barrier separating the Project site and the Fontana Adult School relocatable classrooms will reduce the construction noise levels by approximately 5.7 dBA  $L_{eq}$ . With the temporary 8-foot-high noise barrier shown on Exhibit 10-B, the construction noise level will be further reduced to 70.2 dBA  $L_{eq}$ . Though construction noise is temporary and intermittent, and will not present any long-term impacts, the following project construction noise abatement measures should be provided.

- To reduce construction noise the contractor should install a minimum 8-foot-high temporary construction perimeter noise barrier for the duration of construction activities. The limits of the noise barrier are shown on Exhibit 10-B. The noise control barrier shall include the following:
  - The noise control barriers must present a solid face from top to bottom.
  - The noise barrier shall be constructed using one of the following materials with no decorative cutouts or line-of-sight openings between shielded areas and the noise source:



## 10.6 NIGHTTIME CONCRETE POUR NOISE ANALYSIS

It is our understanding that nighttime concrete pouring activities will occur as a part of Project building construction activities. Nighttime concrete pouring activities are often used to support reduced concrete mixer truck transit times and lower air temperatures than during the daytime hours and are generally limited to the actual building pad area. Since the nighttime concrete pours will take place outside the permitted City of Fontana Municipal Code, Section 18-63(b)(7) hours of 7:00 a.m. and 6:00 p.m. on weekdays and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays the Project Applicant will be required to obtain authorization for nighttime work from the City of Fontana. Any nighttime construction noise activities are evaluated against the FTA nighttime exterior construction noise level threshold of 70 dBA  $L_{eq}$  for noise sensitive residential land use (8 p. 179).

### 10.6.1 NIGHTTIME CONCRETE POUR REFERENCE NOISE LEVEL MEASUREMENTS

To estimate the noise levels due to nighttime concrete pour activities, sample reference noise level measurements were taken during a nighttime concrete pour at a construction site. Urban Crossroads, Inc. collected short-term nighttime concrete pour reference noise level measurements during the noise-sensitive nighttime hours between 1:00 a.m. to 2:00 a.m. at 27334 San Bernardino Avenue in the City of Redlands. The reference noise levels describe the expected concrete pour noise sources that may include concrete mixer truck movements and pouring activities, concrete paving equipment, rear mounted concrete mixer truck backup alarms, engine idling, air brakes, generators, and workers communicating/whistling. To describe the nighttime concrete pour noise levels associated with the construction of the Oleander & Santa Ana Warehouses, this analysis relies on reference sound pressure level of 67.7 dBA  $L_{eq}$  at 50 feet representing a sound power level of 100.3 dBA  $L_w$ . While the Project noise levels will depend on the actual duration of activities and specific equipment fleet in use at the time of construction, the reference sound power level of 100.3 dBA  $L_w$  is used to describe the expected Project nighttime concrete pour noise activities.

### 10.6.2 NIGHTTIME CONCRETE POUR NOISE LEVEL COMPLIANCE

As shown on Table 10-4, the noise levels associated with the nighttime concrete pour activities (paving) are estimated to range from 42.3 to 61.2 dBA  $L_{eq}$  and will satisfy the City of Fontana 65 dBA  $L_{eq}$  nighttime stationary-source exterior hourly average  $L_{eq}$  residential noise level threshold at all the receiver locations. Based on the results of this analysis, all nearest noise receiver locations will experience *less than significant* impacts due to the Project related nighttime concrete pour activities. Appendix 10.2 includes the CadnaA nighttime concrete pour noise model inputs.

**TABLE 10-4: NIGHTTIME CONCRETE POUR NOISE LEVEL COMPLIANCE**

Receiver Location <sup>1</sup>	Concrete Pour Construction Noise Levels (dBA Leq)		
	Exterior Noise Levels <sup>2</sup>	Nighttime Threshold <sup>3</sup>	Threshold Exceeded? <sup>4</sup>
R1	51.9	70	No
R2	49.0	70	No
R3	52.3	70	No
R4	61.2	70	No
R5	50.5	70	No
R6	42.3	70	No

<sup>1</sup> Construction noise source and receiver locations are shown on Exhibit 10-A.

<sup>2</sup> Nighttime Concrete Pour noise model inputs are included in Appendix 10.2.

<sup>3</sup> Construction noise level thresholds as shown on Table 4-1.

<sup>4</sup> Do the estimated Project construction noise levels exceed the nighttime construction noise level threshold?

## 10.7 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. Construction vibration is generally associated with pile driving and rock blasting. However, no pile driving, or rock blasting activities are planned for the Project. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. Ground vibration levels associated with various types of construction equipment are summarized on Table 10-7. 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 vibration impacts the FTA provides the following equation:  $PPV_{\text{equip}} = PPV_{\text{ref}} \times (25/D)^{1.5}$

**TABLE 10-5: 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
Vibratory Roller	0.210

Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual

Table 10-6 presents the expected Project related vibration levels at the nearby receiver locations. At distances ranging from 13 to 425 feet from Project construction activities, construction vibration velocity levels are estimated to range from 0.003 to 0.560 PPV (in/sec). Based on maximum acceptable continuous vibration threshold of 0.3 PPV (in/sec), the typical Project

construction vibration levels will fall exceed the building damage thresholds at the building façade of the Fontana Adult School relocatable classrooms (receiver location R4). The Project-related construction vibration impacts will be *potentially significant* during the construction activities at the Project site and mitigation is required.

**TABLE 10-6: PROJECT CONSTRUCTION VIBRATION LEVELS**

Receiver <sup>1</sup>	Distance to Const. Activity (Feet) <sup>2</sup>	Typical Construction Vibration Levels PPV (in/sec) <sup>3</sup>						Thresholds PPV (in/sec) <sup>4</sup>	Thresholds Exceeded? <sup>5</sup>
		Small bulldozer	Jackhammer	Loaded Trucks	Large bulldozer	Vibratory Roller	Highest Vibration Level		
R1	239'	0.000	0.001	0.003	0.003	0.007	0.007	0.3	No
R2	425'	0.000	0.000	0.001	0.001	0.003	0.003	0.3	No
R3	332'	0.000	0.001	0.002	0.002	0.004	0.004	0.3	No
R4	13'	0.008	0.093	0.203	0.237	0.560	0.560	0.3	<b>Yes</b>
R5	330'	0.000	0.001	0.002	0.002	0.004	0.004	0.3	No
R6	732'	0.000	0.000	0.000	0.001	0.001	0.001	0.3	No

<sup>1</sup> Receiver locations are shown on Exhibit 10-A.

<sup>2</sup> Distance from receiver location to Project construction boundary (Project site boundary).

<sup>3</sup> Based on the Vibration Source Levels of Construction Equipment (Table 10-4).

<sup>4</sup> Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, Table 19, p. 38.

<sup>5</sup> Does the peak vibration exceed the acceptable vibration thresholds?

"PPV" = Peak Particle Velocity

Therefore, a 20-foot buffer setback mitigation measure is required which would restrict the use of large, loaded trucks, heavy mobile equipment greater than 80,000 pounds, jack hammers and vibratory roller within 20-feet of occupied sensitive receiver locations represented by receiver location R4. Instead, small rubber-tired or alternative equipment, as well as soil compaction equipment shall be used during Project construction to reduce vibration effects on nearby structures and their occupants. Table 10-7 shows that with the 20-foot setback buffer, Project construction vibration levels will not exceed the 0.3 PPV (in/sec) construction vibration threshold.

**TABLE 10-7: MITIGATED PROJECT CONSTRUCTION VIBRATION LEVELS**

Receiver <sup>1</sup>	Distance to Const. Activity (Feet) <sup>2</sup>	Typical Construction Vibration Levels PPV (in/sec) <sup>3</sup>						Thresholds PPV (in/sec) <sup>4</sup>	Thresholds Exceeded? <sup>5</sup>
		Small bulldozer	Jackhammer	Loaded Trucks	Large bulldozer	Vibratory Roller	Highest Vibration Level		
R4	13'	0.008	0.093	0.203	0.237	0.560	0.560	0.3	<b>Yes</b>

<sup>1</sup> Receiver locations are shown on Exhibit 10-A.

<sup>2</sup> Distance from receiver location to Project construction boundary (Project site boundary).

<sup>3</sup> Based on the Vibration Source Levels of Construction Equipment (Table 10-4).

<sup>4</sup> Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, Table 19, p. 38.

<sup>5</sup> Does the peak vibration exceed the acceptable vibration thresholds?

"PPV" = Peak Particle Velocity



## 11 REFERENCES

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## 12 CERTIFICATIONS

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Oleander & Santa Ana Warehouses 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) 584-3148.

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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 FONTANA DEVELOPMENT CODE**

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**APPENDIX 5.1:**  
**STUDY AREA PHOTOS**

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**APPENDIX 5.2:**

**NOISE LEVEL MEASUREMENT WORKSHEETS**

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**APPENDIX 7.1:**  
**OFF-SITE TRAFFIC NOISE CONTOURS**

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## **APPENDIX 9.1:**

### **CADNAA OPERATIONAL NOISE MODEL INPUTS**

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## **APPENDIX 10.1:**

### **CADNAA CONSTRUCTION NOISE MODEL INPUTS**

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## **APPENDIX 10.2:**

### **CADNAA CONCRETE POUR NOISE MODEL INPUTS**

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