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# **534 Struck Avenue**

## **NOISE IMPACT ANALYSIS**

### **CITY OF ORANGE**

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## **LIST OF ABBREVIATED TERMS**

(1)	Reference
ANSI	American National Standards Institute
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
PPV	Peak Particle Velocity
Project	534 Struck Avenue
RMS	Root-mean-square
VdB	Vibration Decibels

## EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures, if any, for the proposed 534 Struck Avenue development ("Project") located south of Struck Avenue and east of Batavia Street in the City of Orange. It is our understanding that the Project is to consist of a 57,900 square foot building with truck terminal use, which would replace the existing 40,000 square foot manufacturing use. This study has been prepared consistent with applicable City of Orange noise standards, and significance criteria based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

The results of this 534 Struck Avenue Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1). 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 described below.

**TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS**

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Operational Noise	7	<i>Less Than Significant</i>	-
Construction Noise	8	<i>Less Than Significant</i>	-
Construction Vibration		<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 534 Struck Avenue ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, sets out the local regulatory setting, presents the study methods and procedures for noise and vibration analysis, and evaluates the future exterior noise environment.

## **1.1 SITE LOCATION**

The proposed 534 Struck Avenue Project is located south of Struck Avenue and east of Batavia Street in the City of Orange, as shown on Exhibit 1-A. Existing uses that surround the Project site includes mostly manufacturing industrial land uses to the west and east, with public-institutional uses to the north and the nearest multi-family residential land uses located northeast of the Project site.

## **1.2 PROJECT DESCRIPTION**

It is our understanding that the Project is to consist of a 57,900 square foot building with truck terminal use, which would replace the existing 40,000 square foot manufacturing use as shown on Exhibit 1-B. To present the potential worst-case conditions, the Project is assumed to be operational 24 hours per day, seven days per week. It is expected that the Project business operations would primarily be conducted within the enclosed buildings, except for traffic movement, parking, as well as loading and unloading of trucks at designated loading bays. At the time this noise analysis was prepared, the future tenants of the proposed Project were unknown. The on-site Project-related noise sources are expected to include loading dock activity, truck terminal activity, truck movements, and roof-top air conditioning units.

## EXHIBIT 1-A: LOCATION MAP

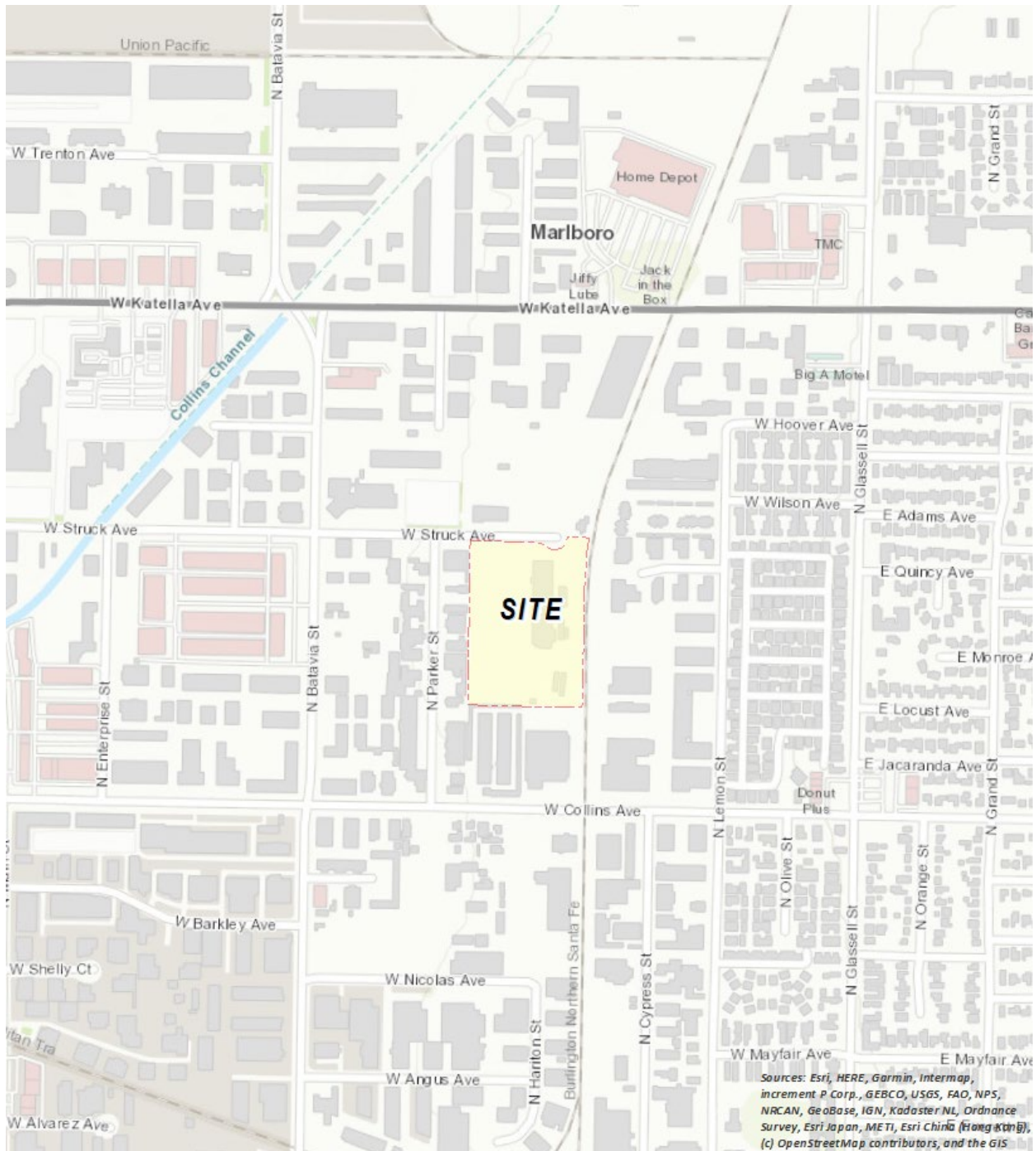
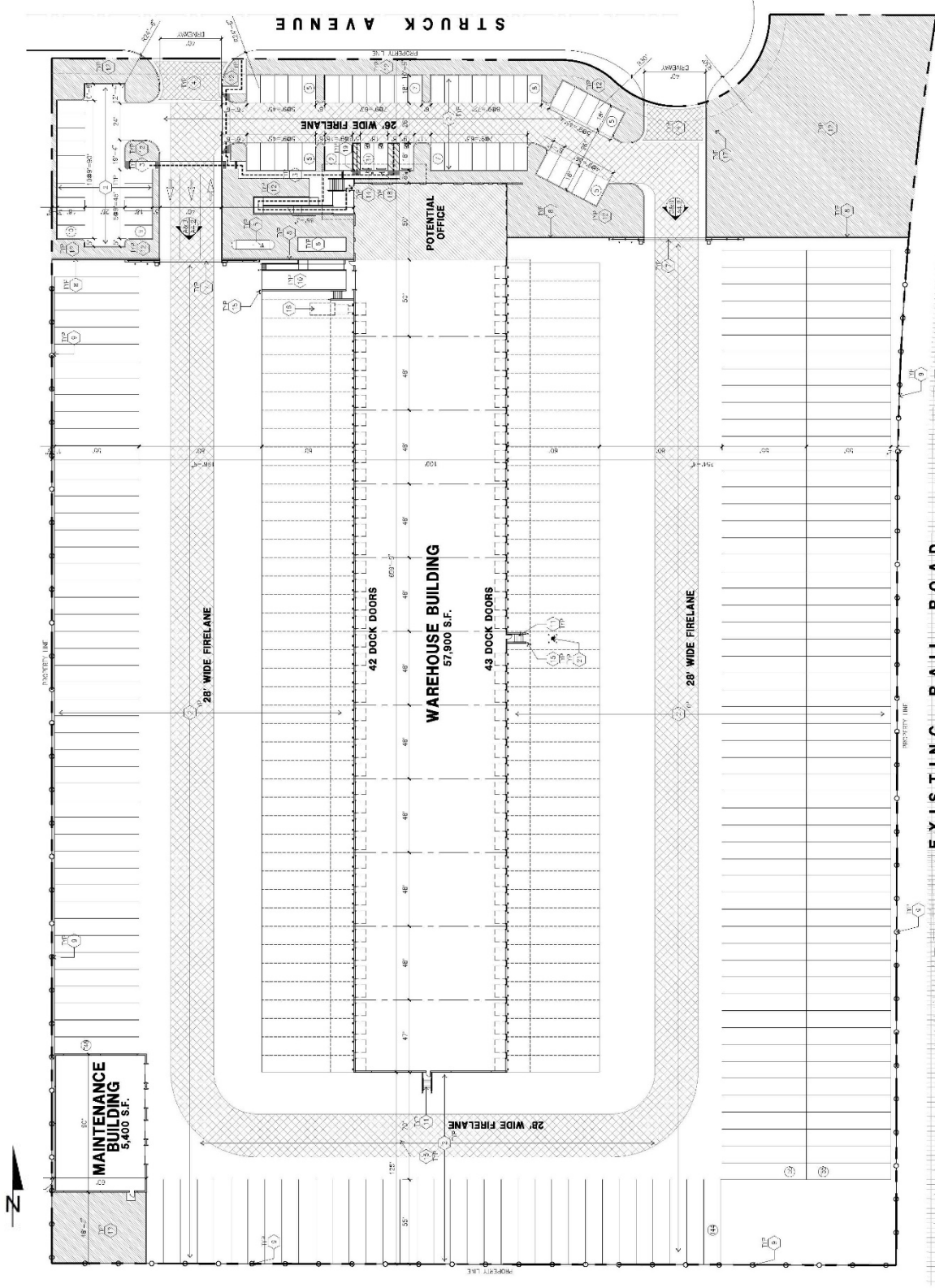


EXHIBIT 1-B: SITE PLAN



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## 2 FUNDAMENTALS

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

**EXHIBIT 2-A: TYPICAL NOISE LEVELS**

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

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

### 2.1 RANGE OF NOISE

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

at approximately 100 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 commonly used figure 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 (typically one hour) 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 sound appears louder. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. The City of Orange 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. (4)

## **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 up to 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 be high enough and long enough to block the path of the noise source. (4)

## 2.6 LAND USE COMPATIBILITY WITH NOISE

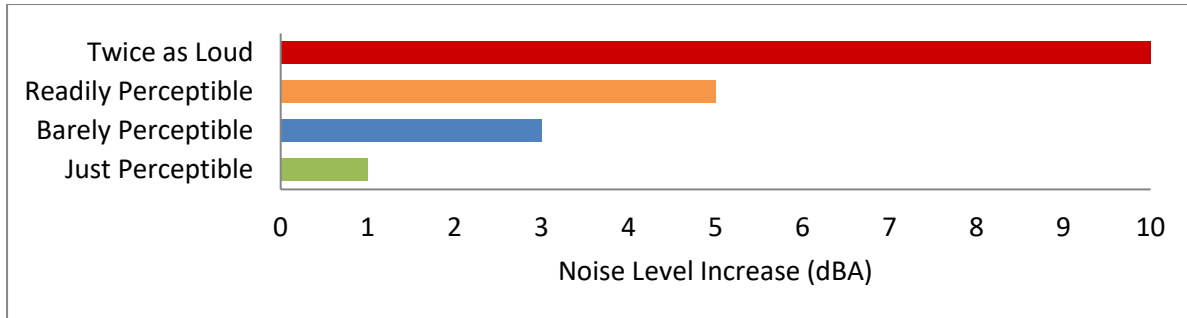
Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, 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. (5)

## 2.7 COMMUNITY RESPONSE TO NOISE

Community responses to noise may range from registering a complaint by telephone or letter, to initiating court action, depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

- Fear associated with noise producing activities;
- Socio-economic status and educational level;
- Perception that those affected are being unfairly treated;
- Attitudes regarding the usefulness of the noise-producing activity;
- Belief that the noise source can be controlled.

Approximately ten 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 will occur. Twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (6) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (6) 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 are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (4)

**EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION**

## 2.8 EXPOSURE TO HIGH NOISE LEVELS

The Occupational Safety and Health Administration (OSHA) sets legal limits on noise exposure in the workplace. The permissible exposure limit (PEL) for a worker over an eight-hour day is 90 dBA. The OSHA standard uses a 5 dBA exchange rate. This means that when the noise level is increased by 5 dBA, the amount of time a person can be exposed to a certain noise level to receive the same dose is cut in half. The National Institute for Occupational Safety and Health (NIOSH) has recommended that all worker exposures to noise should be controlled below a level equivalent to 85 dBA for eight hours to minimize occupational noise induced hearing loss. NIOSH also recommends a 3 dBA exchange rate so that every increase by 3 dBA doubles the amount of the noise and halves the recommended amount of exposure time. (7)

OSHA has implemented requirements to protect all workers in general industry (e.g. the manufacturing and the service sectors) for employers to implement a Hearing Conservation Program where workers are exposed to a time weighted average noise level of 85 dBA or higher over an eight-hour work shift. Hearing Conservation Programs require employers to measure noise levels, provide free annual hearing exams and free hearing protection, provide training, and conduct evaluations of the adequacy of the hearing protectors in use unless changes to tools, equipment and schedules are made so that they are less noisy and worker exposure to noise is less than the 85 dBA. This noise study does not evaluate the noise exposure of workers within a project or construction site based on CEQA requirements, and instead, evaluates Project-related operational and construction noise levels at the nearby sensitive receiver locations in the Project study area.

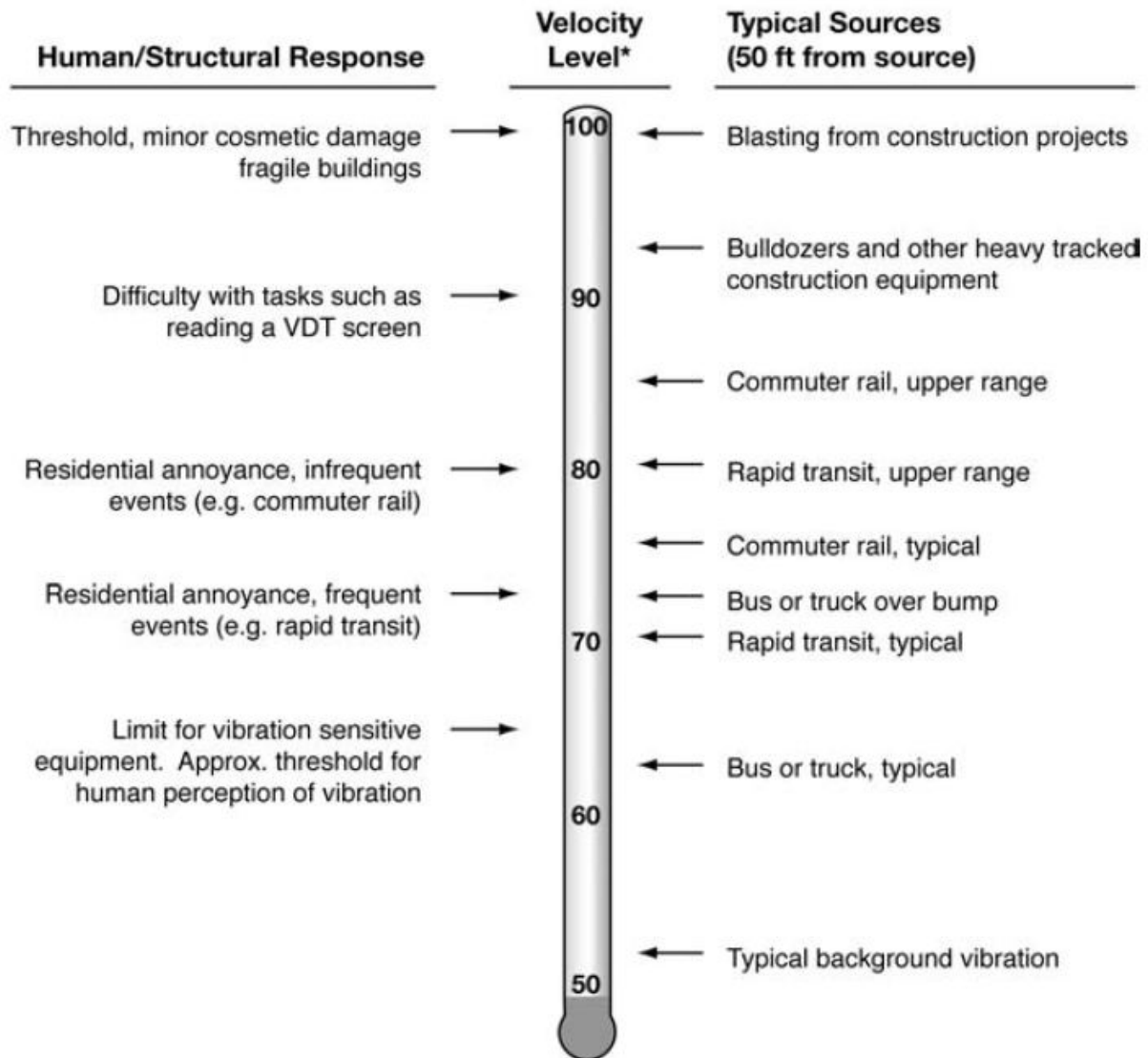
## 2.9 VIBRATION

Per the Federal Transit Administration (FTA) *Transit Noise 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.

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### 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 ORANGE GENERAL PLAN NOISE ELEMENT

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

- Policy 1.1: Consider potential excessive noise levels when making land use planning decisions.*
- Policy 1.2: Encourage new development projects to provide sufficient spatial buffers to separate excessive noise generating land uses and noise-sensitive land uses.*
- Policy 1.4: Ensure that acceptable noise levels are maintained near noise-sensitive uses.*
- Policy 1.5: Reduce impacts of high-noise activity centers located near residential areas.*
- Policy 6.1: Encourage the design and construction of industrial uses to minimize excessive noise through project design features that include noise control.*
- Policy 6.2: Encourage industrial uses to locate vehicular traffic and operations away from abutting residential zones as much as possible.*
- Policy 7.2: Require developers and contractors to employ noise minimizing techniques during construction and maintenance operations.*

*Policy 7.3: Limit the hours of construction and maintenance operations located adjacent to noise-sensitive land uses.*

To ensure noise-sensitive land uses are protected from high levels of noise the City of Orange has developed its own land use compatibility standards, based on recommended parameters from the Governor's Office of Planning and Research (OPR) (9). The City's Land Use Compatibility standards use the CNEL noise descriptor, are intended to be applicable for land use designations exposed to noise levels generated by transportation related sources. Land use compatibility noise exposure limits are generally established as 65 dBA CNEL for most land use designations throughout the City. Higher exterior noise levels are permitted for multiple-family housing and housing in mixed-use contexts than for single-family houses. This is because multiple-family complexes are generally located in transitional areas between single-family and commercial districts or in proximity to major arterials served by transit, and a more integrated mix of residential and commercial activity (accompanied by higher noise levels) is often desired in mixed-use areas close to transit routes. The City of Orange does not identify any transportation related noise exposure standards for industrial land uses.

### **3.3 CITY OF ORANGE MUNICIPAL CODE STANDARDS**

To analyze noise impacts originating from a designated fixed location or private property such as the 534 Struck Avenue Project, stationary-source (operational) noise levels and noise from construction activities are typically evaluated against standards established under the City's Municipal Code.

#### **3.3.1 OPERATIONAL NOISE STANDARDS**

For noise-sensitive residential property, the City of Orange Municipal Code, Section 8.24.040, identifies exterior noise levels standards of 55 dBA  $L_{eq}$  for the daytime hours (7:00 a.m. to 10:00 p.m.) and 50 dBA  $L_{eq}$  during the nighttime (10:00 p.m. to 7:00 a.m.) hours. The City of Orange Municipal Code Noise Standards are included in Appendix 3.1. Per Section 8.24.040(B) for multi-family residential or mixed-use developments located within the City's Urban Mixed Use, Neighborhood Mixed Use, Old Towne Mixed Use or Medium Density Residential General Plan land use districts, exterior noise standards shall apply to common recreation areas only and shall not apply to private exterior space (such as a private yard, patio, or balcony).

#### **3.3.2 CONSTRUCTION NOISE STANDARDS**

The City of Orange has set restrictions to control noise impacts associated with the construction of the proposed Project. Section 8.24.50(E) of the City's Municipal Code states: *Noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities take place between the hours of 7:00 a.m. and 8:00 p.m. on any day except for Sunday or a Federal holiday, or between the hours of 9:00 a.m. and 8:00 p.m. on Sunday or a Federal holiday.* Neither the City's General Plan nor Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what CEQA constitutes a *substantial temporary or periodic noise increase*. 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. (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. (8) 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) Occasionally large bulldozers and loaded trucks can cause perceptible vibration levels at close proximity.

To analyze vibration impacts originating from the operation and construction of the 534 Struck Avenue, vibration-generating activities are appropriately evaluated against standards established under a City's Municipal Code, if such standards exist. However, the City of Orange does not identify specific vibration level limits and instead relies on the Federal Transit Administration (FTA) methodology. (8) The FTA *Transit Noise and Vibration Impact Assessment Manual* methodology provides guidelines for the maximum-acceptable vibration criteria for different types of land uses. These guidelines allow 90 VdB for industrial (workshop) use, 84 VdB for office use and 78 VdB for daytime residential uses and 72 VdB for nighttime uses in buildings where people normally sleep. (8)

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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?

While the City of Orange General Plan Guidelines provide direction on noise compatibility and establish noise standards by land use type that are sufficient to assess the significance of noise impacts, they do not define the levels at which increases are considered substantial for use under Guideline A. CEQA Appendix G Guideline C applies to nearby public and private airports, if any, and the Project's land use compatibility.

### 4.1 CEQA GUIDELINES NOT FURTHER ANALYZED

The Project site is not located within two miles of a public airport or within an airport land use plan; nor is the Project within the vicinity of a private airstrip. 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 Guideline C.

### 4.2 INCREMENTAL NOISE LEVEL INCREASES

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. (11)

There is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an effective 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.

To describe the amount to which a given noise level increase is considered acceptable, the City Orange General Plan has adopted criteria for determining appropriate mitigation under the California Environmental Quality Act (CEQA). An increase in ambient noise levels is assumed to be a significant noise impact if a project causes ambient noise levels to exceed the following:

- Where the existing ambient noise level is less than 65 dBA, a project related permanent increase in ambient noise levels of 5 dBA CNEL or greater.
- Where the existing ambient noise level is greater than 65 dBA, a project related permanent increase in ambient noise levels of 3 dBA CNEL or greater.

### 4.3 SIGNIFICANCE CRITERIA

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.

**TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY**

Analysis	Condition(s)	Significance Criteria	
		Daytime	Nighttime
Operational	Exterior Noise Level Standards <sup>1</sup>	55 dBA L <sub>eq</sub>	50 dBA L <sub>eq</sub>
	If ambient is < 65 dBA L <sub>eq</sub> <sup>2</sup>	≥ 5 dBA L <sub>eq</sub> Project increase	
	If ambient is > 65 dBA L <sub>eq</sub> <sup>2</sup>	≥ 3 dBA L <sub>eq</sub> Project increase	
Construction	Permitted between 7:00 a.m. and 8:00 p.m. on any day except for Sunday or a Federal holiday <sup>3</sup>		
	Noise Level Threshold <sup>4</sup>	80 dBA L <sub>eq</sub>	n/a
	Vibration Level Threshold <sup>5</sup>	78 VdB	n/a

<sup>1</sup> City of Orange Municipal Code Section 8.24.040 (A).

<sup>2</sup> City Orange General Plan Noise Element, Table N-3.

<sup>3</sup> City Orange Municipal Code Section 8.24.50(E).

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

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

<sup>5</sup> FTA, Transit Noise and Vibration Impact Assessment Manual.

## 5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at four locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Wednesday, February 26<sup>th</sup>, 2020. 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 daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. 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. (12)

### 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 average or equivalent sound levels ( $L_{eq}$ ). The equivalent sound level ( $L_{eq}$ ) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 5-1 identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location. Appendix 5.2 provides a summary of the existing hourly ambient noise levels described below:

- Location L1 represents the noise levels east of the Project site north of West Brenna Lane near Citrus Grove Apartments. The noise levels at this location consist primarily of traffic noise from West Brenna Lane. The noise level measurements collected show an overall 24-hour exterior noise level of 61.3 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 52.8 dBA  $L_{eq}$  with an average nighttime noise level of 55.0 dBA  $L_{eq}$ .
- Location L2 represents the noise levels on south of the Project site on Collins Avenue near the Paw in Order pet boarding service building. The ambient noise levels at this location account for traffic on Collins Avenue. The noise level measurements collected show an overall 24-hour exterior noise level of 70.5 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 67.0 dBA  $L_{eq}$  with an average nighttime noise level of 63.0 dBA  $L_{eq}$ .
- Location L3 represents the noise southwest of the Project site on Parker Street near existing industrial buildings. The noise level measurements collected show an overall 24-hour exterior noise level of 65.3 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 60.4 dBA  $L_{eq}$  with an average nighttime noise level of 58.5 dBA  $L_{eq}$ . The noise levels at this location consist primarily of traffic noise from Parker Street.
- Location L4 represents the noise levels northwest of the Project site on Struck Avenue. The 24-hour CNEL indicates that the overall exterior noise level is 66.1 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 59.3 dBA  $L_{eq}$  with an average nighttime noise level of 59.6 dBA  $L_{eq}$ . Traffic on Struck Avenue represents the primary source of noise at this location.

Table 5-1 provides the (energy average) noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Appendix 5.2 provides summary worksheets of the noise levels for each hour as well as the minimum, maximum,  $L_1$ ,  $L_2$ ,  $L_5$ ,  $L_8$ ,  $L_{25}$ ,  $L_{50}$ ,  $L_{90}$ ,  $L_{95}$ , and  $L_{99}$  percentile noise levels observed during the daytime and nighttime periods. The 24-hour existing noise level measurement results are shown on Table 5-1.



The background ambient conditions in the Project study area are dominated by surface street vehicle noise. This includes the auto and heavy truck activities on study area roadway segments near the noise level measurement locations. The 24-hour existing noise level measurement results are shown on Table 5-1.

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

Location <sup>1</sup>	Description	Energy Average Noise Level (dBA L <sub>eq</sub> ) <sup>2</sup>		CNEL
		Daytime	Nighttime	
L1	Located east of the Project site north of West Brenna Lane near Citrus Grove Apartments.	52.8	55.0	61.3
L2	Located south of the Project site on Collins near the Paw in Order pet boarding service building.	67.0	63.0	70.5
L3	Located southwest of the Project site on Parker Street near existing industrial buildings.	60.4	58.5	65.3
L4	Located northwest of the Project site on Struck Avenue near the Department of public works.	59.3	59.6	66.1

<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.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS



## 6 RECEIVER LOCATIONS

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

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

- R1: Location R1 represents the public-institutional City of Orange Department of Public Works use at 637 W Struck Avenue, approximately 86 feet north of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receiver R1 is placed at the building façade. A 24-hour noise measurement was taken near this location, L4, to describe the existing ambient noise environment.
- R2: Location R2 represents the proposed Orange Corporate Yard affordable housing project approximately 217 feet north of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receiver R2 is placed at the proposed residential building façade. A 24-hour noise measurement was taken near this location, L4, to describe the existing ambient noise environment.
- R3: Location R3 represents the existing Citrus Grove Apartment complex at 1120 North Lemon Street, approximately 130 feet east of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receiver R3 is placed at the residential building façade. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.
- R4: Location R4 represents Paw and Order pet boarding service at 618 West Collins Avenue, approximately 566 feet south of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receiver R4 is placed at the building façade. A



24-hour noise measurement near this location, L2, is used to describe the existing ambient noise environment.

### EXHIBIT 6-A: RECEIVER LOCATIONS



#### LEGEND:

● Receiver Locations

—● Distance from receiver to Project site boundary (in feet)

6' Existing Barrier Height (in feet)

— Existing Barrier

## **7 OPERATIONAL NOISE ANALYSIS**

This section analyzes the potential stationary-source operational noise impacts at the nearby receiver locations, identified in Section 6, resulting from the operation of the proposed 534 Struck Avenue Project. Exhibit 7-A identifies the noise source locations used to assess the operational noise levels.

### **7.1 OPERATIONAL NOISE SOURCES**

At the time this noise analysis was prepared the future tenants of the proposed Project were unknown. Therefore, this operational noise analysis is intended to describe noise level impacts associated with the expected typical of warehouse use activities at the Project site. To present the potential worst-case noise conditions, this analysis assumes the Project would be operational 24 hours per day, seven days per week. Consistent with similar warehouse uses, the Project business operations would primarily be conducted within the enclosed buildings, except for traffic movement, parking, as well as loading and unloading of trucks at designated loading bays. The on-site Project-related noise sources are expected to include: loading dock activity, truck terminal activity, truck movements, and roof-top air conditioning units.

### **7.2 REFERENCE NOISE LEVELS**

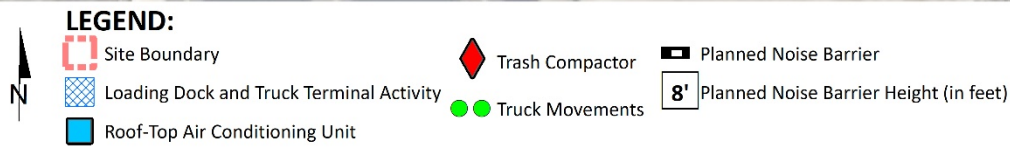
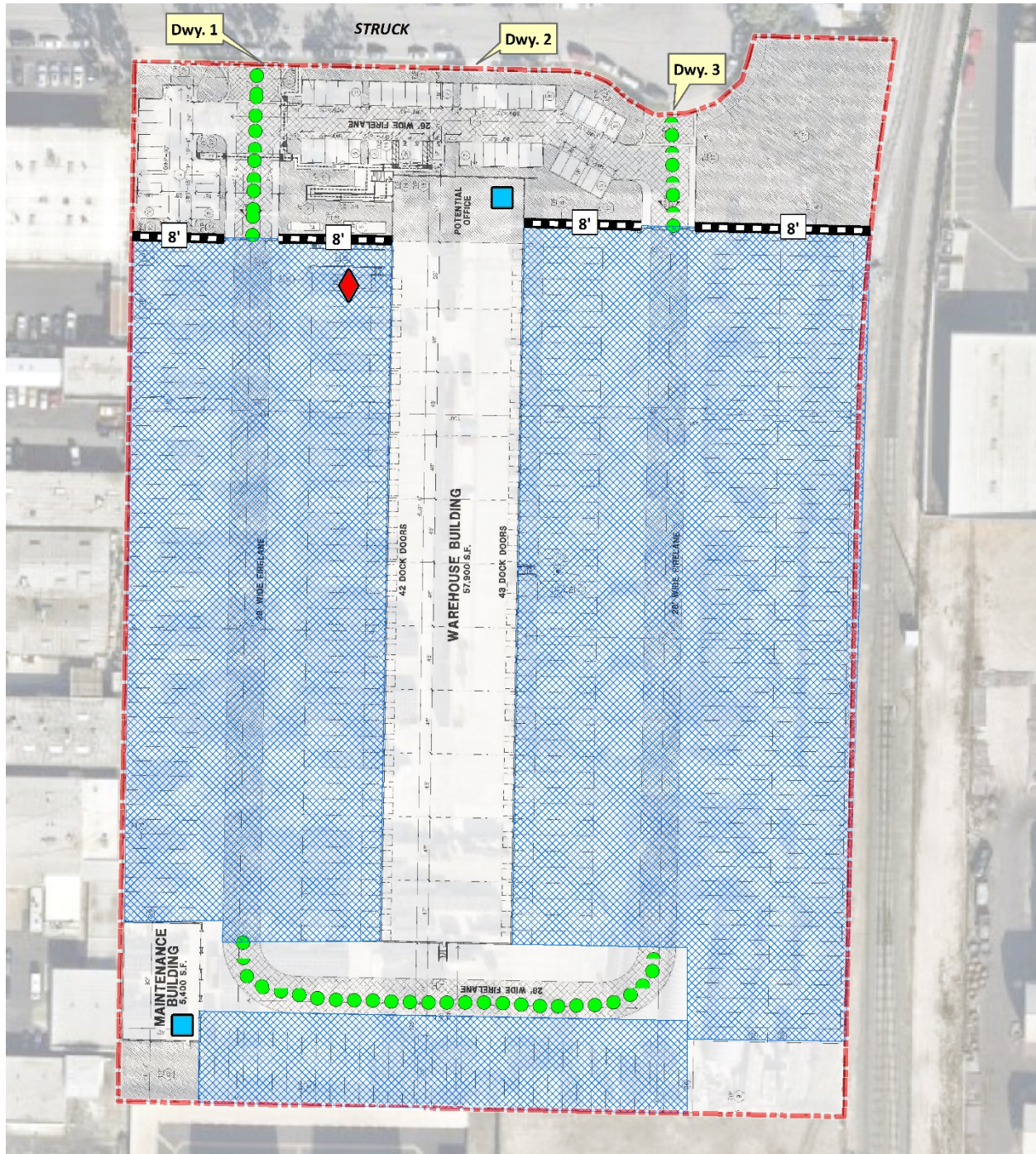
To estimate the Project operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. This section provides a detailed description of the reference noise level measurements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

#### **7.2.1 MEASUREMENT PROCEDURES**

The reference noise level measurements presented in this section were collected using Larson Davis Lxt Type 1 integrating sound level meters and dataloggers. All sound level meters were 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. (12)



# EXHIBIT 7-A: OPERATIONAL NOISE SOURCE LOCATIONS



**TABLE 7-1: REFERENCE NOISE LEVEL MEASUREMENTS**

Noise Source <sup>1</sup>	Noise Source Height (Feet)	Min./Hour <sup>2</sup>		Reference Noise Level @ 50 feet (dBA Leq)	Sound Power Level (dBA) <sup>3</sup>
		Day	Night		
Loading Dock and Truck Terminal Activity	8'	60	60	62.8	103.4
Truck Movements	8'	- <sup>4</sup>	- <sup>4</sup>	58.0	89.7
Roof-Top Air Conditioning Units	5'	39	28	57.2	88.9
Trash Enclosure Activity	5'	10	10	57.3	94.0

<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. "Day" = 7:00 a.m. to 10:00 p.m.; "Night" = 10:00 p.m. to 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. Numbers may vary due to size differences between point and area noise sources.

<sup>4</sup> Entry Gate & Truck Movements are calculate based on the number of events by time of day (See Table 7-2).

## 7.2.2 LOADING DOCK AND TRUCK TERMINAL ACTIVITY

The reference loading dock and truck terminal activities are intended to describe the typical operational noise source levels associated with the Project. This includes truck idling, deliveries, backup alarms, trailer movements, unloading/loading, docking including a combination of tractor trailer semi-trucks, two-axle delivery trucks, and background forklift operations. At a uniform reference distance of 50 feet, Urban Crossroads collected a reference noise level of 62.8 dBA Leq. The loading dock activity noise level measurement was taken over a fifteen-minute period and represents multiple noise sources taken from the center of activity. The reference noise level measurement includes a semi-truck with trailer pass-by event, background switcher cab trailer towing, drop-off, idling, backup alarm events, employees unloading a docked truck container included the squeaking of the truck's shocks when weight was removed from the truck, employees playing music over a radio, as well as a forklift horn. In addition, during the noise level measurement a truck entered the loading dock area and proceeded to reverse and dock in a nearby loading bay, adding truck engine, idling, air brakes noise, in addition to on-going idling of an already docked truck. Noise associated with loading dock and truck trailer activity is expected to operate for the entire hour (60 minutes).

## 7.2.3 TRUCK MOVEMENTS

An entry gate and truck movements reference noise level measurement was taken over a 15-minute period and represents multiple noise sources producing a reference noise level of 58.0 dBA Leq at 50 feet. The noise sources included at this measurement location account for the rattling and squeaking during normal opening and closing operations, the gate closure equipment, truck engines idling outside the entry gate, truck movements through the entry gate, and background truck court activities and forklift backup alarm noise. Consistent with the *534 Struck Avenue Traffic Assessment* prepared by Urban Crossroads, Inc. the Project is expected to generate a total of approximately 148 two-way vehicular trips per day (74 inbound and 74 outbound) which includes 114 two-way truck trips per day (57 inbound and 57 outbound) (13).

Using the estimated number of truck trips in combination with time-of-day vehicle splits, the number of entry gate and truck movements were calculated. As shown on Table 7-2, this information is then used to calculate the entry gate and truck movements operational noise source activity based on the number of events by time of day.

**TABLE 7-2: ENTRY GATE & TRUCK MOVEMENTS BY LOCATION**

Entry Gate & Truck Movement Location <sup>1</sup>	Total Project Truck Trips <sup>2</sup>	Trip Dist. <sup>3</sup>	Truck Trips by Location <sup>4</sup>	Time of Day Vehicle Splits <sup>5</sup>			Truck Movements <sup>6</sup>		
				Day	Evening	Night	Day	Evening	Night
Driveway 1	114	70%	80	47.30%	5.41%	47.30%	38	4	38
Driveway 3		30%	34	47.30%	5.41%	47.30%	16	2	16

<sup>1</sup> Driveway locations as shown on the Site Plan Exhibit 7-A.

<sup>2</sup> Total Project truck trips according to Table 5 of the 534 Struck Avenue Traffic Assessment.

<sup>3</sup> Estimated truck trip distribution.

<sup>4</sup> Calculated trip trucks per location represents the product of the total project truck trips by and the trip distribution.

<sup>5</sup> Estimated heavy truck time of day vehicle splits.

<sup>6</sup> Calculated time of day entry gate and truck movements by location.

#### 7.2.4 ROOF-TOP AIR CONDITIONING UNITS

The noise level measurements describe a single mechanical roof-top air conditioning unit. The reference noise level represents a Lennox SCA120 series 10-ton model packaged air conditioning unit. At the uniform reference distance of 50 feet, the reference noise levels are 57.2 dBA  $L_{eq}$ . Based on the typical operating conditions observed over a four-day measurement period, the roof-top air conditioning units are estimated to operate for 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.

#### 7.2.5 TRASH ENCLOSURE ACTIVITY

To describe the noise levels associated with a trash enclosure activity, Urban Crossroads collected a reference noise level measurement at an existing trash enclosure containing two dumpster bins. The trash enclosure noise levels describe metal gates opening and closing, metal scraping against concrete floor sounds, dumpster movement on metal wheels, 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 each of the Project buildings. Typical trash enclosure activities are estimated to occur for 10 minutes per hour.

### 7.3 CADNAA NOISE PREDICTION MODEL

To fully describe the exterior operational noise levels from the Project, Urban Crossroads, Inc. developed a noise prediction model using the CadnaA (Computer Aided Noise Abatement)



computer program. CadnaA can analyze multiple types of noise sources using the spatially accurate Project site plan, georeferenced Nearmap aerial imagery, topography, buildings, and barriers in its calculations to predict outdoor noise levels.

Using the ISO 9613 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 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 as a result 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. Hard site conditions are used in the operational noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source. A default ground attenuation factor of 0.5 was used in the CadnaA noise analysis to account for mixed ground representing a combination of hard and soft surfaces. Appendix 7.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section.

## **7.4 PROJECT OPERATIONAL NOISE LEVELS**

Using the reference noise levels to represent the proposed Project operations that include loading dock activity, truck terminal activity, truck movements, and roof-top air conditioning units, 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. Tables 7-3 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 36.3 to 52.6 dBA  $L_{eq}$ .

**TABLE 7-3: DAYTIME PROJECT OPERATIONAL NOISE LEVELS**

Noise Source <sup>1</sup>	Operational Noise Levels by Receiver Location (dBA Leq)			
	R1	R2	R3	R4
Loading Dock and Truck Terminal Activity	52.4	50.2	41.0	36.1
Truck Movements	36.5	28.9	22.0	13.8
Roof-Top Air Conditioning Units	32.0	34.6	33.2	21.9
Trash Enclosure Activity	23.5	2.4	0.8	3.4
<b>Total (All Noise Sources)</b>	<b>52.6</b>	<b>50.3</b>	<b>41.7</b>	<b>36.3</b>

<sup>1</sup> See Exhibit 7-A for the noise source locations. CadnaA noise model calculations are included in Appendix 7.1.

Tables 7-4 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 35.3 to 51.6 dBA Leq. The differences between the daytime and nighttime noise levels are largely related to the duration of noise activity (Table 7-1). Appendix 7.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section.

**TABLE 7-4: NIGHTTIME PROJECT OPERATIONAL NOISE LEVELS**

Noise Source <sup>1</sup>	Operational Noise Levels by Receiver Location (dBA Leq)			
	R1	R2	R3	R4
Loading Dock and Truck Terminal Activity	51.4	49.2	40.0	35.2
Truck Movements	36.5	28.9	22.0	13.8
Roof-Top Air Conditioning Units	29.6	32.2	30.8	19.5
Trash Enclosure Activity	22.6	1.4	0.0	2.5
<b>Total (All Noise Sources)</b>	<b>51.6</b>	<b>49.3</b>	<b>40.6</b>	<b>35.3</b>

<sup>1</sup> See Exhibit 7-A for the noise source locations. CadnaA noise model calculations are included in Appendix 7.1.

## 7.5 PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level thresholds based on the City of Orange exterior noise level standards at nearby noise-sensitive receiver locations. Table 7-5 shows the operational noise levels associated with 534 Struck Avenue Project will satisfy the City of Orange 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 7-5: 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	Public-Institutional	52.6	51.6	n/a	n/a	No	No
R2	Residential	50.3	49.3	55	50	No	No
R3	Residential	41.7	40.6	55	50	No	No
R4	Residential	36.3	35.3	55	50	No	No

<sup>1</sup> See Exhibit 7-A for the receiver locations.

<sup>2</sup> Proposed Project operational noise levels as shown on Tables 7-3 and 7-4.

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

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

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

## 7.6 PROJECT OPERATIONAL NOISE LEVEL INCREASES

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

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

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describes the Project noise level increases to the existing ambient noise environment. 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 7-6 and 7-7, respectively. As indicated on Tables 7-6 and 7-7, the Project will generate a daytime and nighttime operational noise level increases ranging from 0.0 to 0.8 dBA Leq at the nearby receiver locations. Project-related operational noise level increases will satisfy the operational noise level increase significance criteria presented in Table 4-1, the increases at the sensitive receiver locations will be *less than significant*.

**TABLE 7-6: DAYTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES**

Receiver Location <sup>1</sup>	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>	Noise Sensitive Land Use?	Increase Criteria <sup>7</sup>	Increase Criteria Exceeded? <sup>7</sup>
R1	52.6	L4	59.3	60.1	0.8	No	5	No
R2	50.3	L4	59.3	59.8	0.5	Yes	5	No
R3	41.7	L1	52.8	53.1	0.3	Yes	5	No
R4	36.3	L2	67.0	67.0	0.0	Yes	3	No

<sup>1</sup> See Exhibit 7-A for the noise source and sensitive receiver locations.

<sup>2</sup> Total Project daytime operational noise levels as shown on Table 7-3.

<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 Criteria as shown on Table 4-1.

**TABLE 7-7: NIGHTTIME OPERATIONAL NOISE LEVEL INCREASES**

Receiver Location <sup>1</sup>	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>	Noise Sensitive Land Use?	Increase Criteria <sup>7</sup>	Increase Criteria Exceeded? <sup>7</sup>
R1	51.6	L4	59.6	60.2	0.6	No	5	No
R2	49.3	L4	59.6	60.0	0.4	Yes	5	No
R3	40.6	L1	55.0	55.2	0.2	Yes	5	No
R4	35.3	L2	63.0	63.0	0.0	Yes	3	No

<sup>1</sup> See Exhibit 7-A for the noise source and sensitive receiver locations.

<sup>2</sup> Total Project nighttime operational noise levels as shown on Table 7-4.

<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 Criteria as shown on Table 4-1.

## 8 CONSTRUCTION ANALYSIS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 8-A shows the construction activity boundaries in relation to the nearby sensitive receiver locations.

### 8.1 CONSTRUCTION NOISE LEVELS

Noise generated by the Project construction equipment will include a combination of trucks, power tools, concrete mixers, and portable generators that when combined can reach high levels. The number and mix of construction equipment is expected to occur in the following stages:

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

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to in excess of 80 dBA when measured at 50 feet. Hard site conditions are used in the construction noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source (i.e., construction equipment). For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver and would be further reduced to 68 dBA at 200 feet from the source to the receiver.

### 8.2 CONSTRUCTION REFERENCE NOISE LEVELS

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. To assess the worst-case construction noise levels, the Project construction noise analysis relies on the highest noise level impacts when the equipment with the highest reference noise level is operating at the closest point from the edge of primary construction activity (Project site boundary) to each receiver location. Appendix 8.1 includes the detailed CadnaA construction noise model inputs.

**EXHIBIT 8-A: CONSTRUCTION NOISE SOURCE AND RECEIVER LOCATIONS**



- LEGEND:**
- Construction Activity
  - Receiver Locations
  - Distance from receiver to Project site boundary (in feet)
  - 6' Existing Barrier Height (in feet)
  - Existing Barrier

**TABLE 8-1: CONSTRUCTION REFERENCE NOISE LEVELS**

Construction Stage	Reference Construction Activity <sup>1</sup>	Reference Noise Level @ 50 Feet (dBA L <sub>eq</sub> )	Highest Reference Noise Level (dBA L <sub>eq</sub> )
Demolition	Demolition Activity	67.9	71.9
	Backhoe	64.2	
	Water Truck Pass-By & Backup Alarm	71.9	
Site Preparation	Scraper, Water Truck, & Dozer Activity	75.3	75.3
	Backhoe	64.2	
	Water Truck Pass-By & Backup Alarm	71.9	
Grading	Rough Grading Activities	73.5	73.5
	Water Truck Pass-By & Backup Alarm	71.9	
	Construction Vehicle Maintenance Activities	67.5	
Building Construction	Foundation Trenching	68.2	71.6
	Framing	62.3	
	Concrete Mixer Backup Alarms & Air Brakes	71.6	
Paving	Concrete Mixer Truck Movements	71.2	71.2
	Concrete Paver Activities	65.6	
	Concrete Mixer Pour & Paving Activities	65.9	
Architectural Coating	Air Compressors	65.2	65.2
	Generator	64.9	
	Crane	62.3	

<sup>1</sup> Reference construction noise level measurements taken by Urban Crossroads, Inc.

### 8.3 CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearby sensitive receiver locations were completed. To assess the worst-case construction noise levels, the Project construction noise analysis relies on the highest noise level impacts when the equipment with the highest reference noise level is operating at the closest point from the edge of primary construction activity (Project site boundary) to each receiver location. As shown on Table 8-2, the construction noise levels are expected to range from 51.2 to 71.8 dBA L<sub>eq</sub> at the nearby receiver locations.



**TABLE 8-2: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY**

Receiver Location <sup>1</sup>	Construction Noise Levels (dBA L <sub>eq</sub> )						
	Demolition	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Highest Levels <sup>2</sup>
R1	68.4	71.8	70.0	68.1	67.7	61.7	71.8
R2	65.6	69.0	67.2	65.3	64.9	58.9	69.0
R3	64.1	67.5	65.7	63.8	63.4	57.4	67.5
R4	47.8	51.2	49.4	47.5	47.1	41.1	51.2

<sup>1</sup> Noise receiver locations are shown on Exhibit 8-A.

<sup>2</sup> Construction noise level calculations based on distance from the project site boundaries (construction activity area) to nearby receiver locations. CadnaA construction noise model inputs are included in Appendix 8.1.

## 8.4 CONSTRUCTION NOISE LEVEL COMPLIANCE

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

**TABLE 8-3: CONSTRUCTION NOISE LEVEL COMPLIANCE**

Receiver Location <sup>1</sup>	Construction Noise Levels (dBA L <sub>eq</sub> )		
	Highest Activity <sup>2</sup>	Threshold <sup>3</sup>	Threshold Exceeded? <sup>4</sup>
R1	71.8	80	No
R2	69.0	80	No
R3	67.5	80	No
R4	51.2	80	No

<sup>1</sup> Noise receiver locations are shown on Exhibit 8-A.

<sup>2</sup> Highest construction noise level calculations based on distance from the construction noise source activity to nearby receiver locations as shown on Table 8-2.

<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?

## 8.4 CONSTRUCTION VIBRATION ASSESSMENT

This analysis focuses on the potential ground-borne vibration associated with construction activities. Ground-borne vibration levels from automobile traffic are generally overshadowed by vibration generated by heavy trucks that roll over the same uneven roadway surfaces. However, due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the



roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity. However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used.

Ground vibration levels associated with various types of construction equipment are summarized on Table 8-4. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential Project construction vibration levels using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation:

$$L_{vdB}(D) = L_{vdB}(25 \text{ ft}) - 30\log(D/25)$$

**TABLE 8-4: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT**

Equipment	Vibration Decibels (VdB) at 25 feet <sup>1</sup>
Small bulldozer	58
Jackhammer	79
Loaded Trucks	86
Large bulldozer	87

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

## 8.5 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. The proposed Project's construction activities most likely to cause vibration impacts are:

- **Heavy Construction Equipment:** Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration while operating close to buildings, the vibration is usually short-term and is not of sufficient magnitude to cause building damage.
- **Trucks:** Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration (FTA). Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site include grading. Using the vibration source level of construction equipment provided on Table 8-4 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts.

Table 8-5 presents the expected Project related vibration levels at the nearby receiver locations. At distances ranging from 86 feet to 566 feet from Project construction activities (at the Project

site boundary), construction vibration levels are estimated to range from 46.4 to 70.9 VdB and will remain below the FTA Transit Noise and Vibration Impact Assessment Manual maximum acceptable daytime vibration criteria of 78 VdB at all receiver locations. Therefore, the Project-related vibration impacts are considered *less than significant* during the construction activities at the Project site. Moreover, the vibration levels reported at the sensitive receiver locations are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating adjacent to the Project site perimeter.

TABLE 8-5: CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver Location <sup>1</sup>	Land Use	Distance to Construction Activity (Feet)	Receiver Vibration Levels (VdB) <sup>2</sup>					Threshold VdB <sup>3</sup>	Threshold Exceeded? <sup>4</sup>
			Small Bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer	Highest Vibration Levels		
R1	Public-Institutional	86'	41.9	62.9	69.9	70.9	70.9	78	No
R2	Residential	217'	29.8	50.8	57.8	58.8	58.8	78	No
R3	Residential	130'	36.5	57.5	64.5	65.5	65.5	78	No
R4	Residential	566'	17.4	38.4	45.4	46.4	46.4	78	No

<sup>1</sup> Noise receiver locations are shown on Exhibit 8-A.

<sup>2</sup> Based on the Vibration Source Levels of Construction Equipment included on Table 8-4.

<sup>3</sup> FTA Transit Noise and Vibration Impact Assessment Manual maximum acceptable vibration criteria (see Section 3.5)

<sup>4</sup> Does the vibration level exceed the maximum acceptable vibration threshold?

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## 9 REFERENCES

1. **State of California.** *California Environmental Quality Act, Environmental Checklist Form Appendix G.* 2019.
2. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
3. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March 1974. EPA/ONAC 550/9/74-004.
4. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* December 2011.
5. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
6. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.
7. **Occupational Safety and Health Administration.** *Standard 29 CFR, Part 1910.*
8. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment Manual.* September 2018.
9. **Office of Planning and Research.** *State of California General Plan Guidelines.* 2018.
10. **City of Orange.** *General Plan Noise Element.* March 2010.
11. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
12. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
13. **Urban Crossroads, Inc.** *534 Struck Avenue Traffic Assessment.* March 2021.

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## 10 CERTIFICATIONS

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed 534 Struck Avenue Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5979.

Bill Lawson, P.E., INCE  
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URBAN CROSSROADS, INC.  
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Costa Mesa, CA 92626  
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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 ORANGE MUNICIPAL CODE**

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## Chapter 8.24 - NOISE CONTROL<sup>[2]</sup>

### Sections:

### Footnotes:

--- (2) ---

**Editor's note**— Ord. No. 1-14, § I, adopted August 12, 2014, repealed the former Ch. 8.24, §§ 8.24.010—8.24.110 and enacted a new Ch. 8.24 as set out herein. The former Ch. 8.24 pertained to similar subject matter and derived from Prior Code 9500.1—9500.16; Ord. Nos. 49-74, 17-74, 1-80, and 26-96.

#### 8.24.010 - Policy.

- A. In order to control unnecessary, excessive and annoying sounds emanating from the City, it is the policy of the City to regulate such sounds generated from all sources as specified in this chapter. The intent of this chapter is to protect residential land uses from unnecessary, excessive and annoying sounds.
- B. It is determined that certain sound levels are detrimental to the public health, welfare and safety, and contrary to public interest.

(Ord. No. 1-14, § I, 8-12-14)

#### 8.24.020 - Definitions.

The following words, phrases and terms as used in this chapter shall have the meaning as indicated below:

- A. "Ambient noise level" means the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.
- B. "Adjusted ambient noise level" means the measured ambient noise level plus 3 dB (A). Three (3) dB (A) is the industry-accepted threshold of human perceptibility for a change in the noise environment.
- C. "Decibel (dB)" means a unit which denotes the ratio between two quantities which are proportional to power: the number of decibels corresponding to the ratio of two amounts of power is ten times the logarithm to the base ten of this ratio.
- D. "Emergency machinery, vehicle or work" means any machinery, vehicle or work used, employed or performed in an effort to protect, provide or restore safe conditions in the community or for the citizenry, or work by private or public utilities when restoring utility service.
- E. "Fixed noise source" means a stationary noise source which creates sounds while fixed or motionless, including but not limited to construction equipment, industrial and commercial machinery and equipment, pumps, fans, compressors, generators, air conditioners and refrigeration equipment.
- F. "Grading" means any excavating or filling of earth material or any combination thereof conducted to prepare a site for construction or other improvements thereon.
- G. "Hourly Average" ( $L_{eq}$ ) means the energy mean or average sound level over a one (1) hour period of time.
- H. "Impact noise" means the noise produced by the collision of one mass in motion with a second mass which may be either in motion or at rest.

- I. "Mobile noise source" means any noise source other than a fixed noise source.
- J. "Noise level" means the "A" weighted sound pressure level in decibels obtained by using a sound level meter at slow response with a reference pressure of twenty (20) microneutons per square meter. The unit of measurement shall be designated as dB(A).
- K. "Person" means a person, firm, association, co-partnership, joint venture, corporation or any entity, public or private in nature.
- L. "Recurring impulsive noise" means a noise of short duration, usually less than one (1) second, with an abrupt onset and rapid decay, which occurs repeatedly or in a cyclical manner. Examples include jack hammering, pile driving, or operational noise from a generator or other mechanical equipment that is cyclical in nature.
- M. "Residential property" means a parcel of real property which is developed and used either in part or in whole for residential purposes, other than transient uses such as hotels and motels.
- N. "Simple tone noise" means a noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished.
- O. "Sound level meter" means an instrument meeting American National Standard Institute's Standard SI.4- 1983 for Type 1 sound level meters or an instrument and the associated recording and analyzing equipment which will provide equivalent data.
- P. "Sound pressure level" of a sound, in decibels, means twenty times the logarithm to the base ten of the ratio of the pressure of the sound to a reference pressure, which reference pressure shall be explicitly stated.

(Ord. No. 1-14, § I, 8-12-14)

#### 8.24.030 - Noise Level Measurement Criteria.

Any noise level measurements made pursuant to the provisions of this chapter shall be performed using a sound level meter as defined in Section 8.24.020P.

(Ord. No. 1-14, § I, 8-12-14)

#### 8.24.040 - Exterior Standards.

- A. The following noise standards for fixed noise sources, unless otherwise specifically indicated, shall apply to all residential property:

**Table 8.24.040 Exterior Noise Standards**

	Noise Level	Time Period
Hourly Average ( $L_{eq}$ )	55 dB (A)	7:00 a.m.—10:00 p.m.
	50 dB (A)	10:00 p.m.—7:00 a.m.
Maximum Level	70 dB (A)	7:00 a.m.—10:00 p.m.
	65 dB (A)	10:00 p.m.—7:00 a.m.

- B. It is unlawful for any person at any location within the City to create any noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level when measured on any other residential property to exceed the noise standards identified in Table 8.24.040. For multi-family residential or mixed use developments located within the City's Urban Mixed Use, Neighborhood Mixed Use, Old Towne Mixed Use or Medium Density Residential General Plan land use districts, exterior noise standards shall apply to common recreation areas only and shall not apply to private exterior space (such as a private yard, patio, or balcony).
- C. In the event the ambient noise level exceeds the noise standards identified in Table 8.24.040 of this section, the "adjusted ambient noise level" shall be applied as the noise standard. In cases where the noise standard is adjusted due to a high ambient noise level, the noise standard shall not exceed the "adjusted ambient noise level", or 70 dB (A), whichever is less. In cases where the ambient noise level is already greater than 70 dB (A), the ambient noise level shall be applied as the noise standard.
- D. Each of the noise limits specified in Table 8.24.040 shall be reduced by 5 dB(A) for impact or simple tone noises, recurring impulsive noises, or for noises consisting of speech or music.

(Ord. No. 1-14, § I, 8-12-14)

#### 8.24.050 - Exemptions from Chapter Provisions.

The following activities shall be exempted from the provisions of this chapter:

- A. School bands, school athletic and school entertainment events;
- B. Outdoor gatherings, public dances, shows, and sporting and entertainment events provided such events are conducted pursuant to any permit requirements established by the City;
- C. Activities conducted on public parks, public playgrounds, and public or private school grounds;
- D. Any mechanical device, apparatus or equipment used, related to or connected with emergency machinery, vehicle or work;
- E. Noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities take place between the hours of 7:00 a.m. and 8:00 p.m. on any day except for Sunday or a Federal holiday, or between the hours of 9:00 a.m. and 8:00 p.m. on Sunday or a Federal holiday. Noise generated outside of the hours specified are subject to the noise standards identified in Table 8.24.040;
- F. All mechanical devices, apparatus or equipment which are utilized for the protection or salvage of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions;
- G. Noise sources associated with agricultural operations provided such operations take place between the hours of 7:00 a.m. and 8:00 p.m. on any day except Sunday or a Federal holiday, or between the hours of 9:00 a.m. and 8:00 p.m. on Sunday or a Federal holiday;
- H. Noise sources associated with agricultural pest control through pesticide application, provided that the application is made in accordance with restricted material permits issued by or regulations enforced by the Agricultural Commissioner;
- I. Noise sources associated with the maintenance of real property, provided such activities take place between the hours of 7:00 a.m. and 8:00 p.m. on any day except Sunday or a Federal holiday, or between the hours of 9:00 a.m. and 8:00 p.m. on Sunday or a Federal holiday. Operation of leaf blowers are regulated under OMC Chapter 8.26;

- J. Industrial or commercial noise affecting residential units, when the residential unit is associated with said industrial or commercial use (e.g. caretaker's dwellings);
- K. Any maintenance or construction activity undertaken by a public agency or utility within street right of way;
- L. Mobile noise sources including but not limited to operational noise from trains, or automobiles or trucks traveling on roadways. **Transportation noise as related to noise/land use compatibility is subject to the City's General Plan Noise Element;**
- M. Any activity to the extent regulation thereof has been preempted by State or Federal Law.

(Ord. No. 1-14, § I, 8-12-14)

#### 8.24.060 - Special Provisions for Schools, Hospitals and Churches.

It is unlawful for any person to create any noise which causes the noise level at any school, hospital or church, while the same is in use, to exceed the noise limits as specified in Section 8.24.040, or which noise level unreasonably interferes with the use of such institutions.

(Ord. No. 1-14, § I, 8-12-14)

#### 8.24.070 - Measurement of Noise Levels.

The location selected for measuring exterior noise levels shall be the point closest to the noise source along the perimeter of the outdoor activity area (such as a private yard, patio, balcony, or common recreation area, as applicable pursuant to Section 8.24.040B. of this chapter) of the affected residential receiving property. If the location of the outdoor activity area is unknown or unclear, the noise standard shall be applied at the point closest to the noise source along the property line of the affected residential receiving property.

(Ord. No. 1-14, § I, 8-12-14)

#### 8.24.080 - Enforcement Authority.

- A. The Chief Building Official or his/her designee are directed to enforce the provisions of this chapter. The Chief Building Official or his/her designee are authorized, pursuant to Penal Code Section 836.5, to arrest any person without a warrant when they have reasonable cause to believe that such person has committed a misdemeanor in their presence.
- B. No person shall interfere with, oppose or resist any authorized person charged with the enforcement of this chapter while such person is engaged in the performance of his duty.

(Ord. No. 1-14, § I, 8-12-14)

#### 8.24.090 - Violation—Public Nuisance.

Any violation of this chapter is a public nuisance and may be abated in accordance with law. The expense of such abatement may, by resolution of the City Council, be declared to be a lien against the property on which such nuisance is maintained, and such lien shall be made a personal obligation of the property owner.

(Ord. No. 1-14, § I, 8-12-14)

#### 8.24.100 - Alternative Noise Prohibition.

Notwithstanding any other provisions of this chapter and in addition thereto, it is unlawful for any person to willfully make, continue, maintain, permit or cause to be made, continued, maintained, or permitted, any loud, unnecessary and unusual noise which disturbs the peace or quiet of any residential property or which causes discomfort or annoyance to any reasonable person of normal sensitivity residing in the area. It shall be a prima facie violation of this section if any power tool, radio, receiving set, television, music amplifier, tape player, record player, compact disc player, musical instrument or similar device is played, used or permitted to be played or used between the hours of 10:00 p.m. and 7:00 a.m. when audible from a distance of one hundred (100) feet from the property line of the noise source or from a distance of one hundred fifty (150) feet from any non-stationary noise source. For the purpose of this chapter, these prohibitions shall also be applied to stationary vehicles parked on the street or on private property. The determination may be made by a peace officer or may be proven by the testimony of any other person. Furthermore, and in addition to the provisions of this chapter, noise prohibitions pursuant to Penal Code Section 415 and Orange Municipal Code Chapter 9.39 may also be applied.

(Ord. No. 1-14, § I, 8-12-14)

#### 8.24.110 - Violation—Misdemeanor.

Any person violating any of the provisions of this chapter shall be deemed guilty of a misdemeanor. Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such. The provisions of this chapter shall not be construed as permitting conduct not prescribed herein and shall not affect the enforceability of any other applicable provisions of law.

(Ord. No. 1-14, § I, 8-12-14)

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## **APPENDIX 5.1:**

### **STUDY AREA PHOTOS**

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# JN:13103 Study Area Photos



L1\_E

33, 48' 21.010000", 117, 51' 24.000000"



L1\_N

33, 48' 21.050000", 117, 51' 23.970000"



L1\_S

33, 48' 21.020000", 117, 51' 23.970000"



L1\_W

33, 48' 20.980000", 117, 51' 23.970000"



L2\_E

33, 48' 7.890000", 117, 51' 30.890000"



L2\_N

33, 48' 7.930000", 117, 51' 30.890000"



# JN:13103 Study Area Photos



L2\_S  
33, 48' 7.930000", 117, 51' 30.890000"



L2\_W  
33, 48' 7.890000", 117, 51' 30.890000"



L3\_E  
33, 48' 13.060000", 117, 51' 35.150000"



L3\_N  
33, 48' 12.110000", 117, 51' 35.670000"



L3\_S  
33, 48' 12.920000", 117, 51' 35.120000"



L3\_W  
33, 48' 13.080000", 117, 51' 35.120000"



# JN:13103 Study Area Photos



L4\_E

33, 48' 22.070000", 117, 51' 34.160000"



L4\_N

33, 48' 22.020000", 117, 51' 34.160000"



L4\_S

33, 48' 22.050000", 117, 51' 34.160000"



L4\_W

33, 48' 22.070000", 117, 51' 34.160000"

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**APPENDIX 5.2:**

**NOISE LEVEL MEASUREMENT WORKSHEETS**

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## 24-Hour Noise Level Measurement Summary

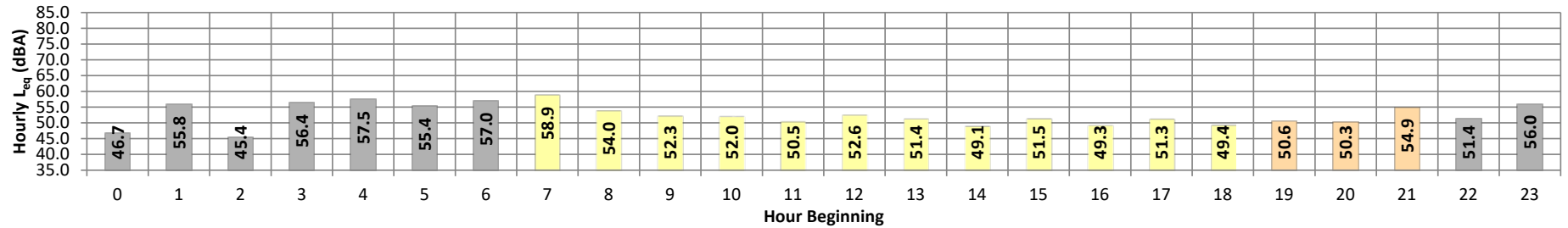
Date: Wednesday, February 26, 2020  
Project: 534 Struck Avenue

Location: L1 - Located east of the Project site north of West Brenna  
Lane near Citrus Grove Apartments.

Meter: Piccolo I

JN: 13103  
Analyst: P. Mara

Hourly  $L_{eq}$  dBA Readings (unadjusted)



Timeframe	Hour	$L_{eq}$	$L_{max}$	$L_{min}$	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	$L_{eq}$	Adj.	Adj. $L_{eq}$
Night	0	46.7	60.5	40.7	60.0	54.0	50.0	47.0	44.0	43.0	41.0	41.0	41.0	46.7	10.0	56.7
	1	55.8	76.7	40.5	65.0	63.0	63.0	63.0	44.0	42.0	41.0	41.0	40.0	55.8	10.0	65.8
	2	45.4	60.0	40.3	55.0	51.0	50.0	47.0	44.0	43.0	41.0	41.0	40.0	45.4	10.0	55.4
	3	56.4	63.4	42.1	62.0	62.0	61.0	61.0	60.0	47.0	43.0	43.0	42.0	56.4	10.0	66.4
	4	57.5	80.7	44.6	69.0	64.0	61.0	57.0	52.0	49.0	46.0	45.0	45.0	57.5	10.0	67.5
	5	55.4	68.1	49.6	65.0	63.0	58.0	56.0	54.0	53.0	51.0	51.0	50.0	55.4	10.0	65.4
Day	6	57.0	73.5	52.4	65.0	65.0	61.0	59.0	55.0	55.0	53.0	53.0	53.0	57.0	10.0	67.0
	7	58.9	85.2	48.0	67.0	63.0	59.0	57.0	53.0	52.0	49.0	49.0	48.0	58.9	0.0	58.9
	8	54.0	72.4	43.1	63.0	62.0	60.0	58.0	52.0	48.0	46.0	45.0	44.0	54.0	0.0	54.0
	9	52.3	78.5	42.5	62.0	60.0	56.0	54.0	48.0	46.0	44.0	43.0	43.0	52.3	0.0	52.3
	10	52.0	70.8	42.5	63.0	60.0	55.0	54.0	50.0	47.0	44.0	44.0	43.0	52.0	0.0	52.0
	11	50.5	67.0	42.3	59.0	58.0	55.0	54.0	50.0	46.0	44.0	44.0	43.0	50.5	0.0	50.5
	12	52.6	65.6	43.9	60.0	59.0	57.0	56.0	53.0	50.0	46.0	45.0	45.0	52.6	0.0	52.6
	13	51.4	72.4	43.0	61.0	58.0	55.0	54.0	49.0	47.0	45.0	44.0	43.0	51.4	0.0	51.4
	14	49.1	65.3	43.4	58.0	56.0	53.0	52.0	48.0	46.0	45.0	44.0	44.0	49.1	0.0	49.1
	15	51.5	73.4	44.2	61.0	60.0	56.0	54.0	49.0	48.0	46.0	45.0	45.0	51.5	0.0	51.5
	16	49.3	65.8	43.0	57.0	56.0	53.0	51.0	48.0	47.0	45.0	44.0	43.0	49.3	0.0	49.3
	17	51.3	67.4	43.6	60.0	58.0	56.0	54.0	50.0	48.0	46.0	46.0	45.0	51.3	0.0	51.3
Evening	18	49.4	70.3	44.1	58.0	56.0	54.0	51.0	47.0	46.0	45.0	45.0	44.0	49.4	0.0	49.4
	19	50.6	72.0	45.4	60.0	58.0	54.0	52.0	49.0	48.0	46.0	46.0	45.0	50.6	5.0	55.6
	20	50.3	63.2	45.9	57.0	56.0	53.0	52.0	50.0	49.0	47.0	47.0	46.0	50.3	5.0	55.3
Night	21	54.9	73.4	46.1	63.0	62.0	62.0	58.0	52.0	51.0	48.0	47.0	47.0	54.9	5.0	59.9
	22	51.4	64.4	45.4	60.0	59.0	56.0	54.0	50.0	48.0	46.0	46.0	46.0	51.4	10.0	61.4
	23	56.0	72.4	45.3	64.0	63.0	62.0	60.0	57.0	50.0	47.0	46.0	45.0	56.0	10.0	66.0
Timeframe	Hour	$L_{eq}$	$L_{max}$	$L_{min}$	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	$L_{eq}$ (dBA)		
Day	Min	49.1	65.3	42.3	57.0	56.0	53.0	51.0	47.0	46.0	44.0	43.0	43.0	24-Hour		
	Max	58.9	85.2	48.0	67.0	63.0	60.0	58.0	53.0	52.0	49.0	49.0	48.0			
Energy Average		52.9	Average:		60.8	58.8	55.8	54.1	49.8	47.6	45.4	44.8	44.2	53.8		
Evening	Min	50.3	63.2	45.4	57.0	56.0	53.0	52.0	49.0	48.0	46.0	46.0	45.0			
	Max	54.9	73.4	46.1	63.0	62.0	62.0	58.0	52.0	51.0	48.0	47.0	47.0	52.8		
Energy Average		52.5	Average:		60.0	58.7	56.3	54.0	50.3	49.3	47.0	46.7	46.0	55.0		
Night	Min	45.4	60.0	40.3	55.0	51.0	50.0	47.0	44.0	42.0	41.0	41.0	40.0	24-Hour CNEL (dBA)		
	Max	57.5	80.7	52.4	69.0	65.0	63.0	63.0	60.0	55.0	53.0	53.0	53.0			
Energy Average		55.0	Average:		62.8	60.4	58.0	56.0	51.1	47.8	45.4	45.2	44.7	61.3		

## 24-Hour Noise Level Measurement Summary

Date: Wednesday, February 26, 2020

Location: L2 - Located south of the Project site on Collins near the Paw  
in Order pet boarding service building.

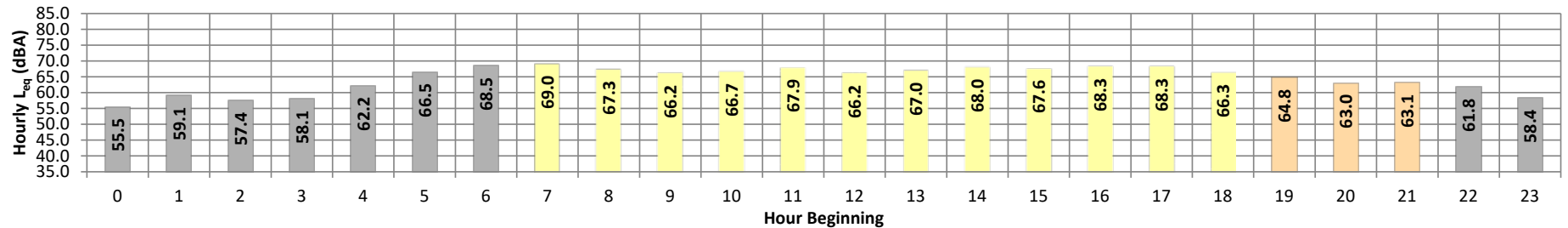
Meter: Piccolo I

JN: 13103

Project: 534 Struck Avenue

Analyst: P. Mara

Hourly  $L_{eq}$  dBA Readings (unadjusted)



Timeframe	Hour	L <sub>eq</sub>	L <sub>max</sub>	L <sub>min</sub>	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L <sub>eq</sub>	Adj.	Adj. L <sub>eq</sub>
Night	0	55.5	76.1	40.6	67.0	66.0	62.0	59.0	48.0	46.0	43.0	43.0	42.0	55.5	10.0	65.5
	1	59.1	82.0	41.8	70.0	68.0	65.0	61.0	46.0	44.0	43.0	42.0	42.0	59.1	10.0	69.1
	2	57.4	77.4	40.7	69.0	67.0	64.0	61.0	51.0	46.0	43.0	42.0	41.0	57.4	10.0	67.4
	3	58.1	77.7	45.1	69.0	68.0	65.0	62.0	53.0	50.0	47.0	46.0	45.0	58.1	10.0	68.1
	4	62.2	76.6	47.3	71.0	70.0	68.0	67.0	62.0	56.0	49.0	49.0	48.0	62.2	10.0	72.2
	5	66.5	84.9	51.9	74.0	72.0	71.0	70.0	67.0	63.0	55.0	54.0	52.0	66.5	10.0	76.5
	6	68.5	79.9	52.8	74.0	74.0	73.0	72.0	70.0	67.0	58.0	57.0	55.0	68.5	10.0	78.5
Day	7	69.0	81.2	51.7	74.0	74.0	73.0	72.0	70.0	68.0	59.0	57.0	53.0	69.0	0.0	69.0
	8	67.3	80.1	46.6	74.0	73.0	71.0	71.0	68.0	66.0	56.0	53.0	49.0	67.3	0.0	67.3
	9	66.2	78.8	46.4	73.0	72.0	71.0	70.0	67.0	64.0	54.0	51.0	49.0	66.2	0.0	66.2
	10	66.7	81.2	45.6	73.0	72.0	71.0	70.0	68.0	64.0	55.0	53.0	49.0	66.7	0.0	66.7
	11	67.9	92.8	45.1	74.0	73.0	71.0	70.0	68.0	65.0	55.0	52.0	47.0	67.9	0.0	67.9
	12	66.2	79.1	46.0	73.0	72.0	70.0	70.0	67.0	64.0	54.0	52.0	49.0	66.2	0.0	66.2
	13	67.0	80.5	47.9	73.0	72.0	71.0	70.0	68.0	65.0	56.0	54.0	50.0	67.0	0.0	67.0
	14	68.0	90.3	48.0	74.0	72.0	71.0	70.0	68.0	66.0	56.0	53.0	50.0	68.0	0.0	68.0
	15	67.6	78.6	48.4	73.0	73.0	72.0	71.0	69.0	66.0	56.0	54.0	51.0	67.6	0.0	67.6
	16	68.3	83.0	45.8	74.0	73.0	72.0	71.0	69.0	67.0	59.0	56.0	50.0	68.3	0.0	68.3
	17	68.3	87.0	48.6	74.0	73.0	72.0	71.0	69.0	67.0	57.0	55.0	51.0	68.3	0.0	68.3
	18	66.3	85.2	48.1	73.0	72.0	71.0	70.0	67.0	64.0	53.0	51.0	49.0	66.3	0.0	66.3
Evening	19	64.8	82.4	48.4	72.0	71.0	70.0	69.0	66.0	61.0	51.0	50.0	49.0	64.8	5.0	69.8
	20	63.0	76.1	48.1	71.0	70.0	68.0	68.0	64.0	57.0	50.0	49.0	48.0	63.0	5.0	68.0
	21	63.1	78.2	48.2	71.0	70.0	69.0	68.0	64.0	57.0	50.0	49.0	49.0	63.1	5.0	68.1
Night	22	61.8	74.8	46.6	70.0	69.0	68.0	67.0	62.0	54.0	48.0	48.0	47.0	61.8	10.0	71.8
	23	58.4	76.1	45.4	69.0	68.0	66.0	64.0	54.0	49.0	47.0	46.0	46.0	58.4	10.0	68.4
Timeframe	Hour	L <sub>eq</sub>	L <sub>max</sub>	L <sub>min</sub>	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L <sub>eq</sub> (dBA)		
Day	Min	66.2	78.6	45.1	73.0	72.0	70.0	70.0	67.0	64.0	53.0	51.0	47.0	24-Hour	Daytime	Nighttime
	Max	69.0	92.8	51.7	74.0	74.0	73.0	72.0	70.0	68.0	59.0	57.0	53.0			
Energy Average		67.5	Average:		73.5	72.6	71.3	70.5	68.2	65.5	55.8	53.4	49.8	65.8		
Evening	Min	63.0	76.1	48.1	71.0	70.0	68.0	68.0	64.0	57.0	50.0	49.0	48.0			
	Max	64.8	82.4	48.4	72.0	71.0	70.0	69.0	66.0	61.0	51.0	50.0	49.0	24-Hour CNEL (dBA)		
Energy Average		63.7	Average:		71.3	70.3	69.0	68.3	64.7	58.3	50.3	49.3	48.7	70.5		
Night	Min	55.5	74.8	40.6	67.0	66.0	62.0	59.0	46.0	44.0	43.0	42.0	41.0			
	Max	68.5	84.9	52.8	74.0	74.0	73.0	72.0	70.0	67.0	58.0	57.0	55.0			
Energy Average		63.0	Average:		70.3	69.1	66.9	64.8	57.0	52.8	48.1	47.4	46.4			

## 24-Hour Noise Level Measurement Summary

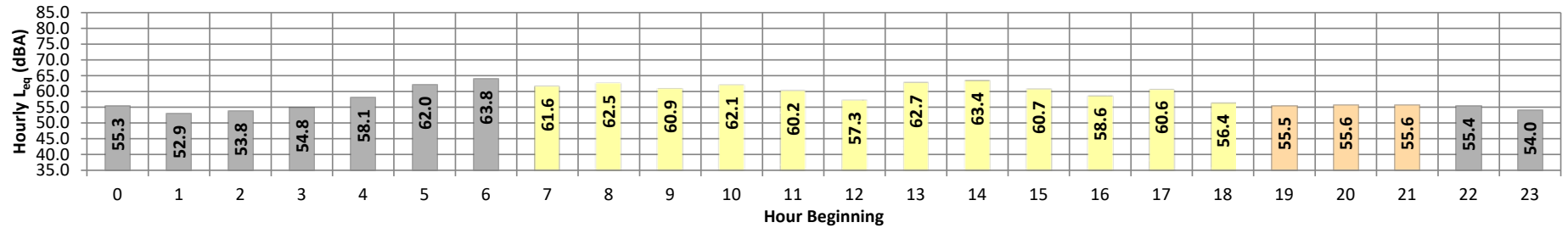
Date: Wednesday, February 26, 2020  
Project: 534 Struck Avenue

Location: L3 - Located southwest of the Project site on Parker Street  
near existing commercial buildings.

Meter: Piccolo I

JN: 13103  
Analyst: P. Mara

Hourly  $L_{eq}$  dBA Readings (unadjusted)



Timeframe	Hour	L <sub>eq</sub>	L <sub>max</sub>	L <sub>min</sub>	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L <sub>eq</sub>	Adj.	Adj. L <sub>eq</sub>
Night	0	55.3	73.4	50.6	66.0	63.0	59.0	56.0	53.0	52.0	51.0	51.0	51.0	55.3	10.0	65.3
	1	52.9	70.9	49.9	61.0	59.0	55.0	53.0	52.0	51.0	50.0	50.0	50.0	52.9	10.0	62.9
	2	53.8	72.1	51.6	60.0	56.0	54.0	53.0	53.0	52.0	52.0	52.0	52.0	53.8	10.0	63.8
	3	54.8	71.1	51.6	61.0	59.0	56.0	55.0	54.0	54.0	52.0	52.0	52.0	54.8	10.0	64.8
	4	58.1	69.3	52.9	64.0	63.0	61.0	60.0	59.0	57.0	54.0	54.0	53.0	58.1	10.0	68.1
	5	62.0	79.6	57.4	69.0	67.0	64.0	63.0	61.0	60.0	59.0	58.0	58.0	62.0	10.0	72.0
	6	63.8	78.3	58.6	69.0	67.0	66.0	66.0	64.0	62.0	60.0	59.0	59.0	63.8	10.0	73.8
Day	7	61.6	72.7	54.0	67.0	66.0	65.0	64.0	62.0	60.0	56.0	56.0	55.0	61.6	0.0	61.6
	8	62.5	81.5	54.7	69.0	67.0	65.0	64.0	63.0	61.0	56.0	56.0	55.0	62.5	0.0	62.5
	9	60.9	87.3	53.6	69.0	67.0	64.0	63.0	59.0	57.0	55.0	54.0	54.0	60.9	0.0	60.9
	10	62.1	80.8	53.4	72.0	69.0	66.0	64.0	60.0	58.0	55.0	55.0	54.0	62.1	0.0	62.1
	11	60.2	76.5	50.2	70.0	67.0	64.0	63.0	60.0	56.0	52.0	52.0	51.0	60.2	0.0	60.2
	12	57.3	74.6	50.5	65.0	64.0	61.0	60.0	57.0	55.0	52.0	51.0	51.0	57.3	0.0	57.3
	13	62.7	88.3	52.6	71.0	67.0	63.0	62.0	58.0	56.0	54.0	54.0	53.0	62.7	0.0	62.7
	14	63.4	86.7	50.8	75.0	71.0	66.0	63.0	58.0	54.0	52.0	51.0	51.0	63.4	0.0	63.4
	15	60.7	83.3	50.6	72.0	68.0	65.0	63.0	56.0	53.0	52.0	51.0	51.0	60.7	0.0	60.7
	16	58.6	79.0	50.0	70.0	67.0	63.0	61.0	55.0	53.0	51.0	51.0	51.0	58.6	0.0	58.6
Evening	17	60.6	84.6	52.7	70.0	67.0	63.0	61.0	56.0	55.0	54.0	53.0	53.0	60.6	0.0	60.6
	18	56.4	73.6	52.6	65.0	63.0	59.0	57.0	55.0	54.0	53.0	53.0	53.0	56.4	0.0	56.4
	19	55.5	74.0	52.5	63.0	61.0	58.0	56.0	54.0	54.0	53.0	53.0	53.0	55.5	5.0	60.5
Night	20	55.6	72.9	52.1	64.0	62.0	58.0	56.0	54.0	54.0	53.0	53.0	52.0	55.6	5.0	60.6
	21	55.6	68.6	52.9	62.0	60.0	57.0	57.0	55.0	54.0	53.0	53.0	53.0	55.6	5.0	60.6
	22	55.4	71.6	52.2	64.0	61.0	57.0	56.0	54.0	54.0	53.0	53.0	53.0	55.4	10.0	65.4
	23	54.0	68.5	52.3	57.0	55.0	54.0	54.0	54.0	53.0	53.0	53.0	52.0	54.0	10.0	64.0
Timeframe	Hour	L <sub>eq</sub>	L <sub>max</sub>	L <sub>min</sub>	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L <sub>eq</sub> (dBA)		
Day	Min	56.4	72.7	50.0	65.0	63.0	59.0	57.0	55.0	53.0	51.0	51.0	51.0	24-Hour	Daytime	Nighttime
	Max	63.4	88.3	54.7	75.0	71.0	66.0	64.0	63.0	61.0	56.0	56.0	55.0			
Energy Average		61.0	Average:		69.6	66.9	63.7	62.1	58.3	56.0	53.5	53.1	52.7	59.7	60.4	58.5
Evening	Min	55.5	68.6	52.1	62.0	60.0	57.0	56.0	54.0	54.0	53.0	53.0	52.0			
	Max	55.6	74.0	52.9	64.0	62.0	58.0	57.0	55.0	54.0	53.0	53.0	53.0	24-Hour CNEL (dBA)		
Energy Average		55.6	Average:		63.0	61.0	57.7	56.3	54.3	54.0	53.0	53.0	52.7	65.3		
Night	Min	52.9	68.5	49.9	57.0	55.0	54.0	53.0	52.0	51.0	50.0	50.0	50.0			
	Max	63.8	79.6	58.6	69.0	67.0	66.0	66.0	64.0	62.0	60.0	59.0	59.0			
Energy Average		58.5	Average:		63.4	61.1	58.4	57.3	56.0	55.0	53.8	53.6	53.3			

## 24-Hour Noise Level Measurement Summary

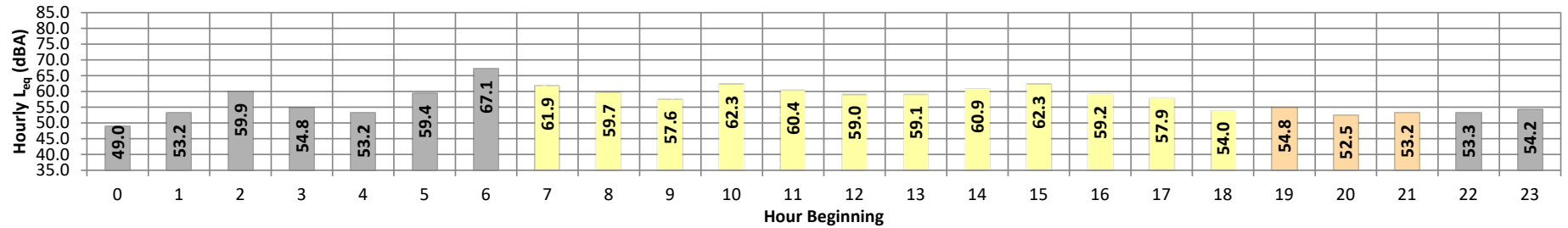
Date: Wednesday, February 26, 2020  
Project: 534 Struck Avenue

Location: L4 - Located northwest of the Project site on Struck Avenue  
near the Department of public works.

Meter: Piccolo I

JN: 13103  
Analyst: P. Mara

Hourly  $L_{eq}$  dBA Readings (unadjusted)



Timeframe	Hour	L <sub>eq</sub>	L <sub>max</sub>	L <sub>min</sub>	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L <sub>eq</sub>	Adj.	Adj. L <sub>eq</sub>
Night	0	49.0	68.9	41.9	59.0	56.0	52.0	50.0	47.0	45.0	43.0	42.0	42.0	49.0	10.0	59.0
	1	53.2	74.1	42.6	63.0	61.0	59.0	57.0	48.0	46.0	44.0	43.0	43.0	53.2	10.0	63.2
	2	59.9	85.3	43.5	72.0	67.0	58.0	55.0	48.0	47.0	45.0	44.0	44.0	59.9	10.0	69.9
	3	54.8	68.7	45.5	62.0	61.0	60.0	59.0	55.0	50.0	47.0	47.0	46.0	54.8	10.0	64.8
	4	53.2	70.9	43.6	63.0	61.0	57.0	56.0	52.0	50.0	46.0	45.0	45.0	53.2	10.0	63.2
	5	59.4	78.6	50.0	70.0	67.0	63.0	61.0	57.0	55.0	52.0	52.0	51.0	59.4	10.0	69.4
	6	67.1	98.1	53.4	73.0	70.0	67.0	65.0	60.0	58.0	55.0	55.0	54.0	67.1	10.0	77.1
Day	7	61.9	92.1	47.2	69.0	67.0	64.0	62.0	57.0	54.0	50.0	49.0	48.0	61.9	0.0	61.9
	8	59.7	84.6	41.6	70.0	67.0	63.0	61.0	56.0	51.0	46.0	45.0	43.0	59.7	0.0	59.7
	9	57.6	74.9	41.8	68.0	66.0	63.0	61.0	56.0	51.0	45.0	44.0	42.0	57.6	0.0	57.6
	10	62.3	87.3	43.5	72.0	68.0	64.0	62.0	56.0	52.0	47.0	46.0	44.0	62.3	0.0	62.3
	11	60.4	82.3	45.2	72.0	68.0	65.0	63.0	57.0	53.0	48.0	48.0	46.0	60.4	0.0	60.4
	12	59.0	82.2	45.6	67.0	65.0	62.0	61.0	58.0	54.0	49.0	48.0	47.0	59.0	0.0	59.0
	13	59.1	84.5	45.6	70.0	66.0	63.0	61.0	56.0	53.0	49.0	48.0	47.0	59.1	0.0	59.1
	14	60.9	83.5	46.2	73.0	69.0	65.0	62.0	57.0	53.0	49.0	48.0	48.0	60.9	0.0	60.9
	15	62.3	85.5	45.8	73.0	69.0	65.0	63.0	58.0	53.0	48.0	47.0	46.0	62.3	0.0	62.3
	16	59.2	81.9	43.8	69.0	67.0	62.0	60.0	55.0	51.0	47.0	46.0	45.0	59.2	0.0	59.2
Evening	17	57.9	81.7	44.1	68.0	64.0	61.0	59.0	55.0	52.0	49.0	47.0	45.0	57.9	0.0	57.9
	18	54.0	74.6	46.8	63.0	60.0	58.0	57.0	53.0	49.0	48.0	47.0	47.0	54.0	0.0	54.0
	19	54.8	77.4	46.5	64.0	62.0	59.0	57.0	51.0	49.0	47.0	47.0	47.0	54.8	5.0	59.8
Night	20	52.5	72.4	46.6	61.0	59.0	56.0	55.0	51.0	49.0	47.0	47.0	47.0	52.5	5.0	57.5
	21	53.2	68.8	47.7	61.0	59.0	56.0	55.0	52.0	51.0	49.0	48.0	48.0	53.2	5.0	58.2
	22	53.3	70.0	47.2	63.0	60.0	58.0	57.0	52.0	50.0	48.0	48.0	47.0	53.3	10.0	63.3
	23	54.2	81.5	47.1	62.0	58.0	55.0	54.0	51.0	49.0	48.0	48.0	47.0	54.2	10.0	64.2
Timeframe	Hour	L <sub>eq</sub>	L <sub>max</sub>	L <sub>min</sub>	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L <sub>eq</sub> (dBA)		
Day	Min	54.0	74.6	41.6	63.0	60.0	58.0	57.0	53.0	49.0	45.0	44.0	42.0	24-Hour	Daytime	Nighttime
	Max	62.3	92.1	47.2	73.0	69.0	65.0	63.0	58.0	54.0	50.0	49.0	48.0			
Energy Average		60.0	Average:		69.5	66.3	62.9	61.0	56.2	52.2	47.9	46.9	45.7	59.4	59.3	59.6
Evening	Min	52.5	68.8	46.5	61.0	59.0	56.0	55.0	51.0	49.0	47.0	47.0	47.0			
	Max	54.8	77.4	47.7	64.0	62.0	59.0	57.0	52.0	51.0	49.0	48.0	48.0	24-Hour CNEL (dBA)		
Energy Average		53.6	Average:		62.0	60.0	57.0	55.7	51.3	49.7	47.7	47.3	47.3	66.1		
Night	Min	49.0	68.7	41.9	59.0	56.0	52.0	50.0	47.0	45.0	43.0	42.0	42.0			
	Max	67.1	98.1	53.4	73.0	70.0	67.0	65.0	60.0	58.0	55.0	55.0	54.0			
Energy Average		59.6	Average:		65.2	62.3	58.8	57.1	52.2	50.0	47.6	47.1	46.6			

## **APPENDIX 7.1:**

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

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# 13103 - 534 Struck Avenue

CadnaA Noise Prediction Model: 13103-05.cna

Date: 24.03.21

Analyst: S. Shami

## Calculation Configuration

Configuration	
Parameter	Value
General	
Country	(user defined)
Max. Error (dB)	0.00
Max. Search Radius (#(Unit,LEN))	2000.01
Min. Dist Src to Rcvr	0.00
Partition	
Raster Factor	0.50
Max. Length of Section (#(Unit,LEN))	999.99
Min. Length of Section (#(Unit,LEN))	1.01
Min. Length of Section (%)	0.00
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960.00
Reference Time Night (min)	480.00
Daytime Penalty (dB)	0.00
Recr. Time Penalty (dB)	5.00
Night-time Penalty (dB)	10.00
DTM	
Standard Height (m)	0.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	2
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rcvr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.10
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	Incl. Ground Att. over Barrier
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (#(Unit,TEMP))	10
rel. Humidity (%)	70
Ground Absorption G	0.50
Wind Speed for Dir. (#(Unit,SPEED))	3.0
Roads (RLS-90)	
Strictly acc. to RLS-90	
Railways (FTA/FRA)	
Aircraft (???)	
Strictly acc. to AzB	

## Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height	Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type		X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)	(ft)	(ft)	(ft)
RECEIVERS	R1	52.5	51.6	58.0	55.0	50.0	0.0	0.0				5.00 a	6072850.09	2240745.91	5.00
RECEIVERS	R2	50.3	49.3	55.8	55.0	50.0	0.0	0.0				5.00 a	6073277.18	2240897.02	5.00
RECEIVERS	R3	41.7	40.6	47.0	55.0	50.0	0.0	0.0				5.00 a	6073515.24	2240703.59	5.00
RECEIVERS	R4	36.3	35.3	41.7	55.0	50.0	0.0	0.0				5.00 a	6072878.26	2239306.80	5.00

## Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			K0	Height	Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)		dB(A)		(min)	(min)	(min)	(dB)	(ft)	(ft)	(ft)	(ft)
POINTSOURCE		AC02	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	0.0	5.00 g	6073090.39	2240557.57	50.00
POINTSOURCE		AC01	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	0.0	5.00 g	6072848.54	2239931.73	25.00
POINTSOURCE		TRASH01	89.0	89.0	89.0	Lw	89.0		150.00	0.00	90.00	0.0	5.00 a	6072974.42	2240491.09	5.00

## Line Source(s)

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Operating Time			Moving Pt. Src			Height	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	Number		Speed		
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	Day	Evening	Night	(mph)	(ft)
LINESOURCE		DWY01	75.9	66.8	75.9	61.7	52.7	61.7	PWL-Pt	89.7					16.0	2.0	16.0	6.2	8
LINESOURCE		DWY02	87.5	78.0	87.5	67.0	57.5	67.0	PWL-Pt	89.7					54.0	6.0	54.0	6.2	8
LINESOURCE		DWY03	81.6	71.8	81.6	65.5	55.7	65.5	PWL-Pt	89.7					38.0	4.0	38.0	6.2	8

Name	Height			Coordinates			
	Begin	End		x	y	z	Ground
	(ft)	(ft)		(ft)	(ft)	(ft)	(ft)
LINESOURCE	8.00	a		6073219.82	2240536.01	8.00	0.00
				6073218.21	2240620.90	8.00	0.00
LINESOURCE	8.00	a		6072894.48	2239994.77	8.00	0.00
				6072895.21	2239976.99	8.00	0.00
				6072898.04	2239967.09	8.00	0.00
				6072911.48	2239959.31	8.00	0.00
				6072929.86	2239955.78	8.00	0.00
				6072957.44	2239950.83	8.00	0.00
				6072993.51	2239950.12	8.00	0.00
				6073035.23	2239948.70	8.00	0.00
				6073085.44	2239948.70	8.00	0.00
				6073120.80	2239945.88	8.00	0.00
				6073170.30	2239947.29	8.00	0.00
				6073190.81	2239956.48	8.00	0.00
				6073203.53	2239967.80	8.00	0.00
				6073205.74	2239990.89	8.00	0.00
LINESOURCE	8.00	a		6072900.80	2240525.97	8.00	0.00
				6072905.20	2240658.54	8.00	0.00

## Area Source(s)

ID	Result. PWL			Result. PWL"			Lw / Li		Operating Time			Moving Pt. Src			Height
	Day	Evening	Night	Day	Evening	Night	Type	Value	Day	Special	Night	Number			
	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			(min)	(min)	(min)	Day	Evening	Night	(ft)
DOCK01	103.4	103.4	103.4	65.2	65.2	65.2	Lw	103.4	900.00	0.00	540.00				8
DOCK02	103.4	103.4	103.4	65.7	65.7	65.7	Lw	103.4	900.00	0.00	540.00				8
DOCK03	103.4	103.4	103.4	64.9	64.9	64.9	Lw	103.4	900.00	0.00	540.00				8
DOCK04	103.4	103.4	103.4	69.6	69.6	69.6	Lw	103.4	900.00	0.00	540.00				8
DOCK05	103.4	103.4	103.4	67.8	67.8	67.8	Lw	103.4	900.00	0.00	540.00				8

Name	Height			Coordinates			
	Begin	End		x	y	z	Ground
	(ft)	(ft)		(ft)	(ft)	(ft)	(ft)
AREASOURCE	8.00	a		6073107.05	2240538.51	8.00	0.00
				6073236.06	2240535.65	8.00	0.00
				6073230.41	2239990.43	8.00	0.00
				6073097.89	2239992.89	8.00	0.00
AREASOURCE	8.00	a		6073007.46	2240525.01	8.00	0.00
				6072998.03	2239995.44	8.00	0.00
				6072878.95	2239994.67	8.00	0.00
				6072887.12	2240525.98	8.00	0.00
AREASOURCE	8.00	a		6073236.06	2240535.65	8.00	0.00
				6073369.06	2240532.74	8.00	0.00
				6073366.55	2240508.83	8.00	0.00
				6073365.04	2240488.09	8.00	0.00
				6073363.15	2240462.06	8.00	0.00
				6073350.23	2239919.62	8.00	0.00
				6073230.41	2239921.13	8.00	0.00
AREASOURCE	8.00	a		6072861.59	2239942.36	8.00	0.00
				6073230.54	2239935.24	8.00	0.00
				6073230.46	2239865.07	8.00	0.00
				6072860.49	2239872.89	8.00	0.00
AREASOURCE	8.00	a		6072810.55	2240528.59	8.00	0.00
				6072887.44	2240526.45	8.00	0.00
				6072879.22	2240010.95	8.00	0.00
				6072804.88	2240009.80	8.00	0.00

## Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height		Coordinates			
			left	right		horz.	vert.	Begin	End	x	y	z	Ground
						(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
BARRIERS		BARRIERS00001						6.00	a	6073478.09	2240837.64	6.00	0.00
										6073468.32	2240797.49	6.00	0.00
										6073448.79	2240723.71	6.00	0.00
										6073435.77	2240656.43	6.00	0.00
										6073431.43	2240622.79	6.00	0.00
BARRIERS		BARRIERS00002						8.00	a	6073369.06	2240532.74	8.00	0.00
										6073236.06	2240535.65	8.00	0.00
BARRIERS		BARRIERS00003						8.00	a	6073107.05	2240538.51	8.00	0.00
										6073195.39	2240536.55	8.00	0.00
BARRIERS		BARRIERS00004						8.00	a	6073007.14	2240525.48	8.00	0.00
										6072921.17	2240526.87	8.00	0.00
BARRIERS		BARRIERS00005						8.00	a	6072810.55	2240528.59	8.00	0.00
										6072880.19	2240526.65	8.00	0.00



## Building(s)

Name	M.	ID	RB	Residents	Absorption	Height	Coordinates			
						Begin	x	y	z	Ground
						(ft)	(ft)	(ft)	(ft)	(ft)
BUILDING		BUILDING00001	x	0		30.00	a 6072858.08	2239829.66	30.00	0.00
							6072923.03	2239828.95	30.00	0.00
							6072917.32	2239491.33	30.00	0.00
							6072853.08	2239492.76	30.00	0.00
BUILDING		BUILDING00002	x	0		30.00	a 6072950.16	2239828.23	30.00	0.00
							6073017.97	2239827.52	30.00	0.00
							6073010.83	2239489.90	30.00	0.00
							6072943.73	2239490.61	30.00	0.00
BUILDING		BUILDING00003	x	0		15.00	a 6072794.55	2239598.40	15.00	0.00
							6072800.26	2239779.70	15.00	0.00
							6072807.40	2239778.98	15.00	0.00
							6072808.83	2239871.06	15.00	0.00
							6073065.79	2239868.21	15.00	0.00
							6073065.08	2239855.36	15.00	0.00
							6072828.81	2239856.79	15.00	0.00
							6072825.25	2239599.11	15.00	0.00
BUILDING		BUILDING00004	x	0		15.00	a 6072915.90	2239457.07	15.00	0.00
							6073037.24	2239455.64	15.00	0.00
							6073044.38	2239822.52	15.00	0.00
							6073061.51	2239823.24	15.00	0.00
							6073056.51	2239426.37	15.00	0.00
							6072914.47	2239427.09	15.00	0.00
BUILDING		BUILDING00005	x	0		15.00	a 6072704.62	2239785.41	15.00	0.00
							6072793.84	2239783.98	15.00	0.00
							6072793.12	2239729.02	15.00	0.00
							6072704.62	2239731.16	15.00	0.00
BUILDING		BUILDING00006	x	0		45.00	a 6073007.99	2240574.93	45.00	0.00
							6073107.62	2240572.85	45.00	0.00
							6073097.89	2239992.89	45.00	0.00
							6072998.03	2239995.44	45.00	0.00
BUILDING		BUILDING00007	x	0		20.00	a 6072804.88	2240009.80	20.00	0.00
							6072862.79	2240008.34	20.00	0.00
							6072861.18	2239919.86	20.00	0.00
							6072803.27	2239921.46	20.00	0.00
BUILDING		BUILDING00008	x	0		30.00	a 6073476.70	2240675.17	30.00	0.00
							6073599.26	2240674.19	30.00	0.00
							6073597.88	2240556.95	30.00	0.00
							6073584.70	2240557.14	30.00	0.00
							6073584.90	2240547.70	30.00	0.00
							6073475.91	2240547.70	30.00	0.00

## Ground Absorption(s)

Name	M.	ID	G	Coordinates	
				x	y
				(ft)	(ft)
GROUND		0	1.0	6072825.21	2240746.38
				6072840.06	2240746.38
				6072861.98	2240745.67
				6072860.56	2240738.60
				6072869.05	2240738.60
				6072873.29	2240747.09
				6073011.19	2240746.38
				6073014.02	2240713.14
				6072823.79	2240718.09

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## **APPENDIX 8.1:**

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

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# 13103

CadnaA Noise Prediction Model: 13103-03\_Construction.cna

Date: 09.06.20

Analyst: B. Lawson

## Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height	Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type		X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)	(ft)	(ft)	(ft)
RECEIVERS		R1	71.8	71.8	78.5	55.0	50.0	0.0				5.00	a 6072850.09	2240745.91	5.00
RECEIVERS		R2	69.0	69.0	75.7	55.0	50.0	0.0				5.00	a 6073277.18	2240897.02	5.00
RECEIVERS		R3	67.5	67.5	74.2	55.0	50.0	0.0				5.00	a 6073515.24	2240703.59	5.00
RECEIVERS		R4	51.2	51.2	57.9	55.0	50.0	0.0				5.00	a 6072878.26	2239306.80	5.00

## Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			K0	Height	Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(dB)	(ft)	(ft)	(ft)	(ft)

## Line Source(s)

Name	M.	ID	Result. PWL			Result. PWL¹			Lw / Li			Operating Time			Moving Pt. Src			Height	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	Number		Speed		
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	Day	Evening	Night	(mph)	(ft)

Name	Height		Coordinates			
	Begin	End	x	y	z	Ground
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)

## Area Source(s)

ID	Result. PWL			Result. PWL''			Lw / Li			Operating Time			Moving Pt. Src			Height
	Day	Evening	Night	Day	Evening	Night	Type	Value		Day	Special	Night	Number			
	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(min)	(min)	(min)	Day	Evening	Night	(ft)
SitePreparation	121.4	121.4	121.4	75.3	75.3	75.3	Lw''	75.3								8

Name	Height		Coordinates			
	Begin	End	x	y	z	Ground
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
SITEBOUNDARY	8.00	a	6073387.70	2240677.15	8.00	0.00
			6073375.58	2240594.94	8.00	0.00
			6073366.55	2240508.83	8.00	0.00
			6073361.00	2240432.44	8.00	0.00
			6073358.91	2240358.14	8.00	0.00
			6073349.10	2239862.56	8.00	0.00
			6072799.88	2239874.17	8.00	0.00
			6072812.70	2240660.49	8.00	0.00
			6073143.26	2240653.54	8.00	0.00
			6073157.15	2240650.76	8.00	0.00
			6073170.34	2240645.21	8.00	0.00
			6073186.31	2240631.32	8.00	0.00
			6073205.76	2240620.21	8.00	0.00
			6073230.76	2240621.60	8.00	0.00
			6073252.29	2240629.24	8.00	0.00
			6073271.73	2240646.60	8.00	0.00
			6073277.29	2240665.35	8.00	0.00
			6073281.45	2240679.93	8.00	0.00

## Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height		Coordinates			
			left	right		horz.	vert.	Begin	End	x	y	z	Ground
					(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
BARRIERS		BARRIERS00001						6.00	a	6073478.09	2240837.64	6.00	0.00
										6073468.32	2240797.49	6.00	0.00
										6073448.79	2240723.71	6.00	0.00
										6073435.77	2240656.43	6.00	0.00
										6073431.43	2240622.79	6.00	0.00

## Building(s)

Name	M.	ID	RB	Residents	Absorption	Height	Coordinates			
						Begin	x	y	z	Ground
						(ft)	(ft)	(ft)	(ft)	(ft)
BUILDING		BUILDING00002	x	0		30.00	a 6072858.08	2239829.66	30.00	0.00
							6072923.03	2239828.95	30.00	0.00
							6072917.32	2239491.33	30.00	0.00
							6072853.08	2239492.76	30.00	0.00

Name	M.	ID	RB	Residents	Absorption	Height	Coordinates			
						Begin	x	y	z	Ground
						(ft)	(ft)	(ft)	(ft)	(ft)
BUILDING		BUILDING00003	x	0		30.00	a 6072950.16	2239828.23	30.00	0.00
							6073017.97	2239827.52	30.00	0.00
							6073010.83	2239489.90	30.00	0.00
							6072943.73	2239490.61	30.00	0.00
BUILDING		BUILDING00004	x	0		15.00	a 6072794.55	2239598.40	15.00	0.00
							6072800.26	2239779.70	15.00	0.00
							6072807.40	2239778.98	15.00	0.00
							6072808.83	2239871.06	15.00	0.00
							6073065.79	2239868.21	15.00	0.00
							6073065.08	2239855.36	15.00	0.00
							6072828.81	2239856.79	15.00	0.00
							6072825.25	2239599.11	15.00	0.00
BUILDING		BUILDING00005	x	0		15.00	a 6072915.90	2239457.07	15.00	0.00
							6073037.24	2239455.64	15.00	0.00
							6073044.38	2239822.52	15.00	0.00
							6073061.51	2239823.24	15.00	0.00
							6073056.51	2239426.37	15.00	0.00
							6072914.47	2239427.09	15.00	0.00
BUILDING		BUILDING00006	x	0		15.00	a 6072704.62	2239785.41	15.00	0.00
							6072793.84	2239783.98	15.00	0.00
							6072793.12	2239729.02	15.00	0.00
							6072704.62	2239731.16	15.00	0.00