Florence and Norwalk

NOISE AND VIBRATION IMPACT ANALYSIS

CITY OF SANTA FE SPRINGS

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LIST OF ABBREVIATED TERMS

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

EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the potential noise impacts and the necessary noise mitigation measures, if any, for the proposed Florence and Norwalk development ("Project"). The proposed Project is to consist of two warehouse buildings totaling 146,563 square feet. This study has been prepared to satisfy applicable City of Santa Fe Springs standards and thresholds of significance based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

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

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

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

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1 INTRODUCTION

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

1.1 SITE LOCATION

The proposed project is located at the southwest corner of Florence Avenue and Norwalk Boulevard the City of Santa Fe Springs as shown on Exhibit 1-A.

1.2 PROJECT DESCRIPTION

The proposed Project is to consist of two warehouse buildings totaling 146,563 square feet as shown on Exhibit 1-B. The on-site Project-related noise sources are expected to include: loading dock activity, roof-top air conditioning units, trash enclosure activity, parking lot vehicle movements, and truck movements. This noise analysis is intended to describe noise level impacts associated with the expected typical operational activities at the Project site.

EXHIBIT 1-A: LOCATION MAP

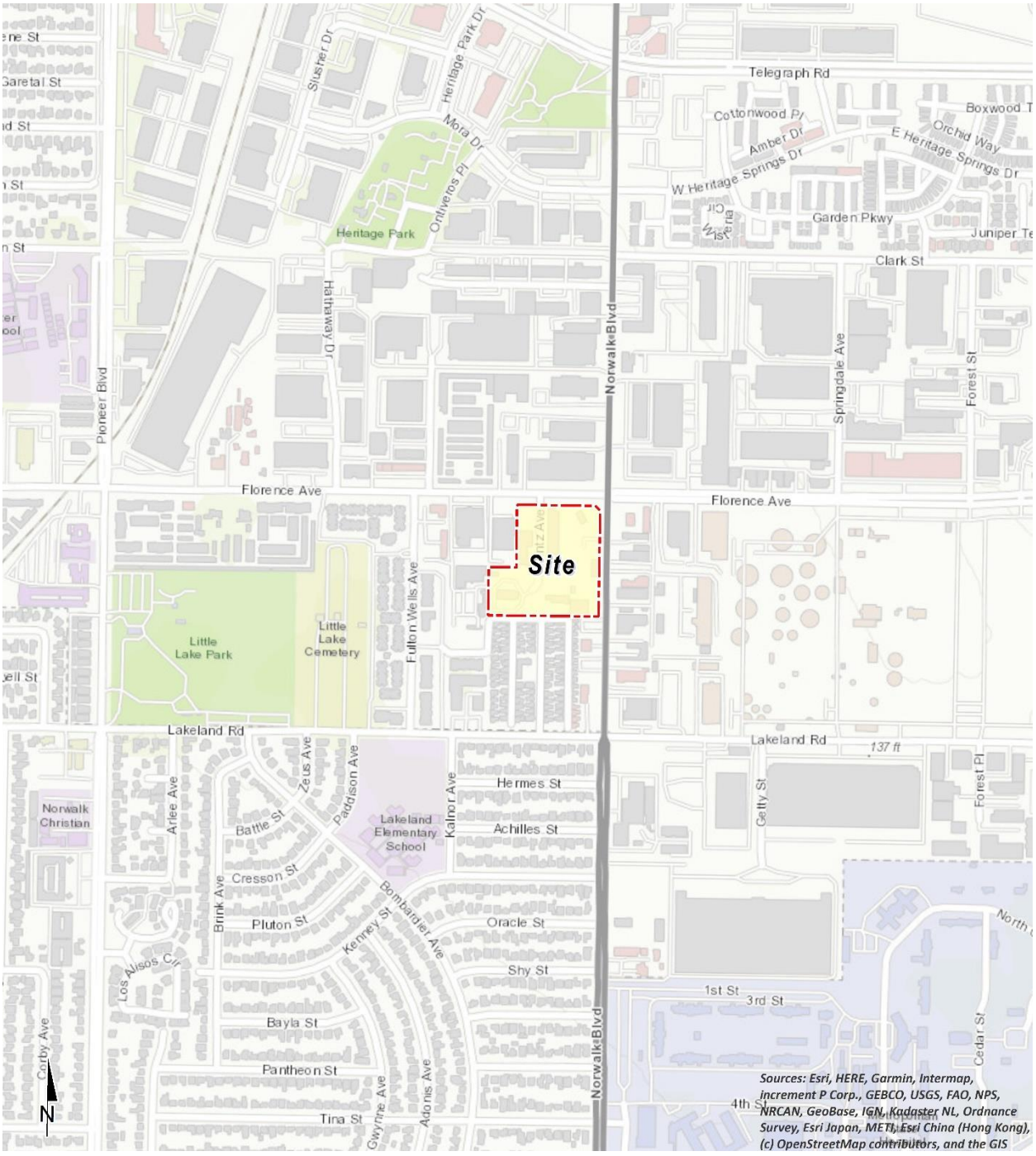
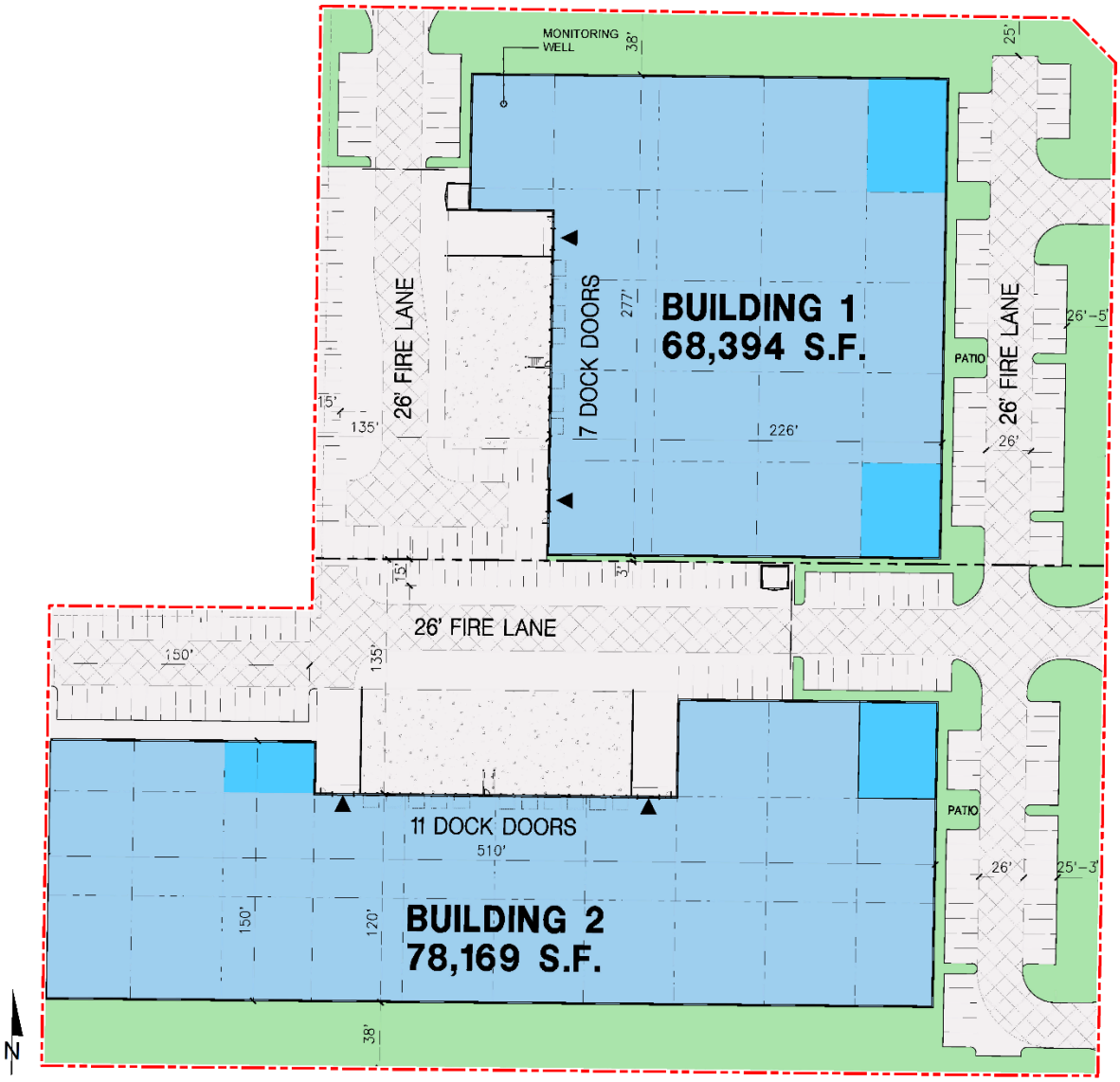


EXHIBIT 1-B: SITE PLAN



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2 FUNDAMENTALS

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

EXHIBIT 2-A: TYPICAL NOISE LEVELS

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

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

2.1 RANGE OF NOISE

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

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

2.2 NOISE DESCRIPTORS

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

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

2.3 SOUND PROPAGATION

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

2.3.1 GEOMETRIC SPREADING

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

2.3.2 GROUND ABSORPTION

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

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

2.3.3 ATMOSPHERIC EFFECTS

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

2.3.4 SHIELDING

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

2.4 NOISE CONTROL

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

2.5 NOISE BARRIER ATTENUATION

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

2.6 LAND USE COMPATIBILITY WITH NOISE

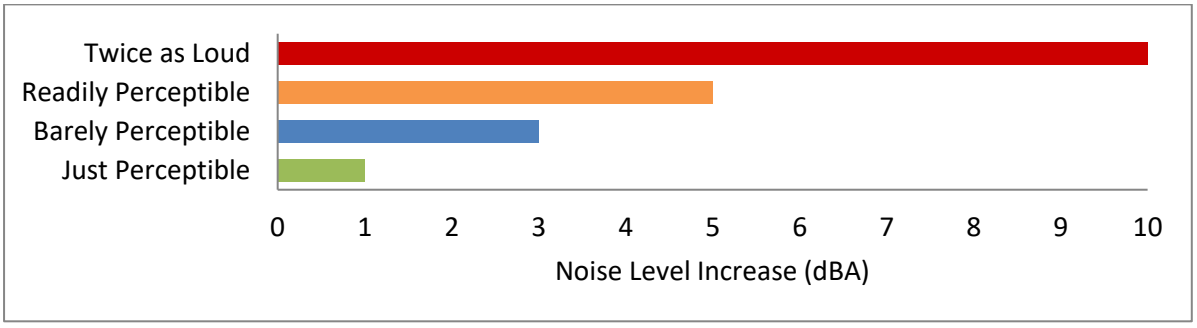
Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development,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

2.7 COMMUNITY RESPONSE TO NOISE

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

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

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



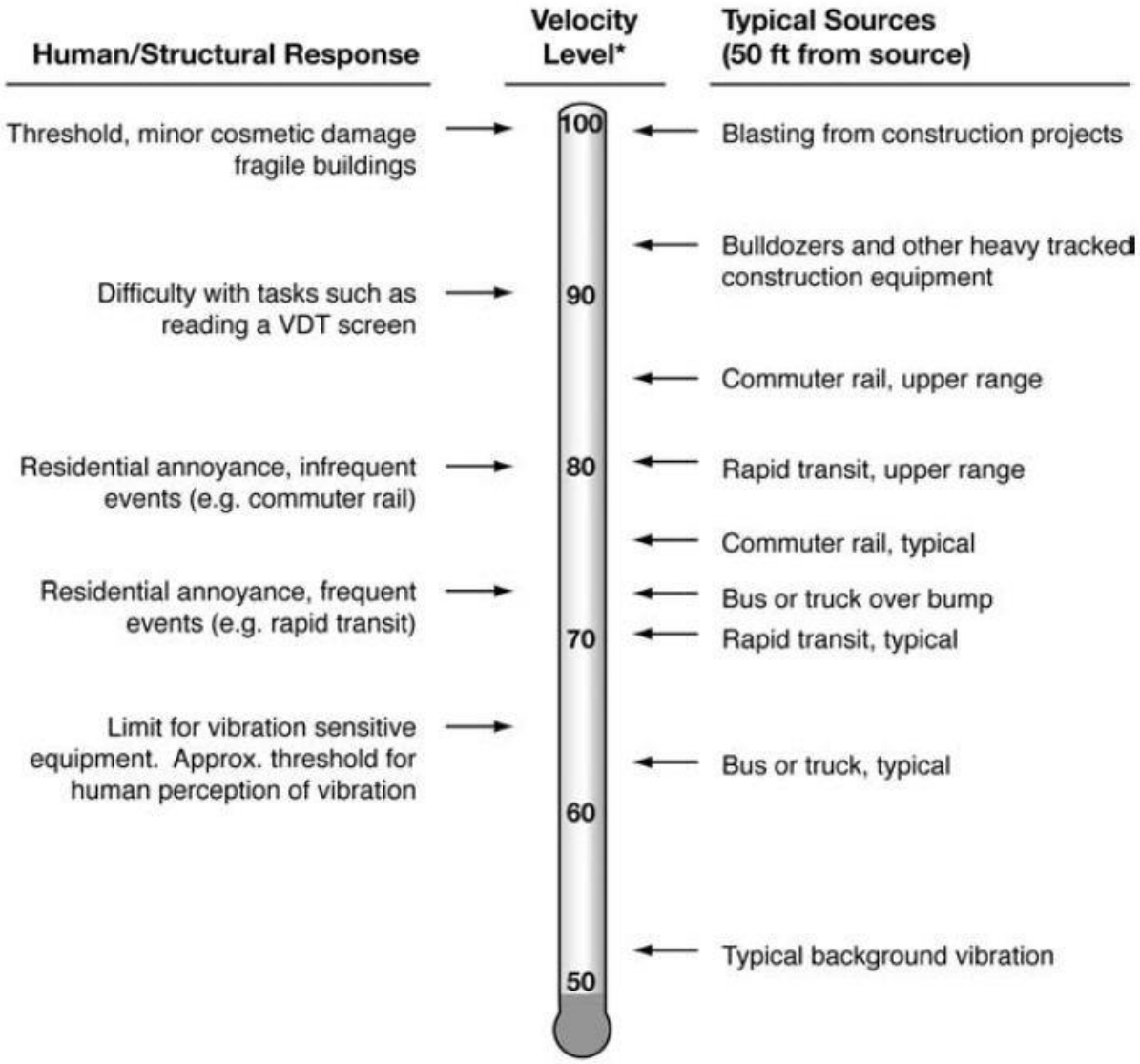
2.8 VIBRATION

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

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

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

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



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

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

3 REGULATORY SETTING

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

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

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

3.2 CITY OF SANTA FE SPRINGS GENERAL PLAN NOISE ELEMENT

The City of Santa Fe Springs *General Plan Noise Element* establishes a *comprehensive program for including noise control in the planning process*. (14) The *Noise Element* provides land use compatibility guidelines and transportation noise standards for future development and the future noise contour boundaries for major roadways in the City of Santa Fe Springs. The noise criteria identified in the City of Santa Fe Springs Noise Element (Table 1) are guidelines to evaluate the land use compatibility of transportation-related noise. The compatibility criteria provide the City with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels.

The *Noise/Land Use Compatibility Matrix* indicates that industrial land uses, such as the Project site, are considered *normally acceptable* with exterior noise levels below 70 dBA CNEL, and *conditionally acceptable* with noise levels below 75 dBA CNEL. Noise-sensitive residential land uses are considered *normally acceptable* with exterior noise levels below 60 dBA CNEL, and *conditionally acceptable* with noise levels below 65 dBA CNEL. For *conditionally acceptable* land uses, *new development should be undertaken only after detailed analysis of noise reduction requirements is made and needed noise insulation features included in the design. Convention construction, but with closed windows and fresh air supply systems or air conditions, will normally suffice.* (14)

3.3 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Florence and Norwalk Project, stationary-source (operational) noise such as the expected loading dock activity, roof-top air conditioning units, trash enclosure activity, parking lot vehicle movements, and truck movements are typically evaluated against standards established under a jurisdiction's Municipal Code. The City of Santa Fe Springs Municipal Code base exterior noise level standards are shown on Table 3-1.

TABLE 3-1: OPERATIONAL NOISE LEVEL STANDARDS

Jurisdiction	Receiving Land Use	Exterior Noise Level Standard (dBA L_{eq})[2]	
		Daytime	Nighttime
City of Santa Fe Springs[1]	Any school, church, or hospital	45	45
	A-1, R-1 or R-3 Zone	50	45
	C-1 or C-4 Zone	60	55
	ML, PF or BP Zone	60	60
	M-1 or M-2 Zone	70	70

[1] Source: City of Santa Fe Springs, Section 155.424 (Appendix 3.1).
L_{eq} represents a steady state sound level containing the same total energy as a time varying signal over a given sample period.
"Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 7:00 a.m.

The City of Santa Fe Springs Municipal Code, Section 155.424, establishes exterior noise level limits by receiving land uses. For noise-sensitive residential properties, the Municipal Code identifies operational noise level limits for the daytime (7:00 a.m. to 10:00 p.m.) hours of 50 dBA L_{50} and 45 dBA L_{50} during the nighttime (10:00 p.m. to 7:00 a.m.) hours. (1) In addition, Section 155.424[B] indicates that if the existing ambient noise levels already exceed any of the exterior noise level limit categories, then the standard can be adjusted to reflect the ambient conditions. Appendix 3.1 includes the City of Santa Fe Springs Municipal Code noise standards.

3.4 CONSTRUCTION NOISE STANDARDS

The City of Santa Fe Springs has set restrictions to control noise impacts associated with construction. Section 155.425[B] of the Municipal Code states that *it shall be unlawful for any person within a residential zone, or within a radius of 500 feet therefrom, to operate equipment or perform any outside construction or repair work on buildings, structures, or projects or to operate any pile driver, power shovel, pneumatic hammer, derrick, power hoist, or any other construction type device between the hours of 7:00 p.m. of one day and 7:00 a.m. of the next day.* (13) While the City establishes limits to the hours during which construction activity may take place, it does not identify specific noise level limits for construction noise levels at potentially affected receiver locations for CEQA analysis purposes. Therefore, a numerical construction threshold based on Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* is used for analysis of daytime construction impacts, as discussed below.

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

3.5 VIBRATION STANDARDS

Construction activity can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. (8) To analyze vibration impacts originating from the operation and construction of Florence and Norwalk, vibration-generating activities are appropriately evaluated against standards established under a City's Municipal Code, if such standards exist. However, the City of Santa Fe Springs does not identify specific vibration level limits. Therefore, for analysis purposes, the Caltrans *Transportation and Construction Vibration Guidance Manual*, (13 p. 38) Table 19, vibration damage are used in this noise study to assess potential temporary construction-related impacts at adjacent building locations. The nearest noise sensitive buildings adjacent to the Project site can best be described as "older residential structures" with a maximum acceptable continuous vibration threshold of 0.3 PPV (in/sec).

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4 SIGNIFICANCE CRITERIA

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

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

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

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

4.1 NOISE LEVEL INCREASES (THRESHOLD A)

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines. Under CEQA, consideration must be given to the magnitude of the increase, the existing baseline ambient noise levels, and the location of receivers to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (15) This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged.

The Federal Interagency Committee on Noise (FICON) (16) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (CNEL) and equivalent continuous noise level (L_{eq}).

As previously stated, the approach used in this noise study recognizes *that there is no single noise increase that renders the noise impact significant*, based on a 2008 California Court of Appeal ruling on Gray v. County of Madera. (15) For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria may be exceeded. Therefore, for this analysis, a *readily perceptible* 5 dBA or greater project-related noise level increase is considered a significant impact when the without project noise levels are below 60 dBA. Per the FICON, in areas where the without project noise levels range from 60 to 65 dBA, a 3 dBA *barely perceptible* noise level increase appears to be appropriate for most people. When the without project noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if

the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance. The FICON guidance provides an established source of criteria to assess the impacts of substantial temporary or permanent increase in baseline ambient noise levels. Based on the FICON criteria, the amount to which a given noise level increase is considered acceptable is reduced when the without Project (baseline) noise levels are already shown to exceed certain land-use specific exterior noise level criteria. The specific levels are based on typical responses to noise level increases of 5 dBA or *readily perceptible*, 3 dBA or *barely perceptible*, and 1.5 dBA depending on the underlying without Project noise levels for noise-sensitive uses. These levels of increases and their perceived acceptance are consistent with guidance provided by both the Federal Highway Administration (4 p. 9) and Caltrans (17 p. 2_48).

4.2 VIBRATION (THRESHOLD B)

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

4.3 CEQA GUIDELINES NOT FURTHER ANALYZED (THRESHOLD C)

CEQA Noise Threshold C applies when there are nearby public and private airports and/or air strips and focuses on land use compatibility of the Project to nearby airports and airstrips. The Project site is not located within two miles of an airport or airstrip. The closest airport is the Long Beach Airport (LGB) located roughly 8.5 miles southwest of the Project site. As such, the Project site would not be exposed to excessive noise levels from airport operations, and therefore, impacts are considered *less than significant,* and no further noise analysis is conducted in relation to Appendix G to the CEQA Guidelines, Noise Threshold C.

4.4 SIGNIFICANCE CRITERIA SUMMARY

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

TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Receiving Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Operational	Noise-Sensitive	Exterior Noise Level Standards[1]	50 dBA L_{eq}	45 dBA L_{eq}
		If ambient is < 60 dBA Leq[2]	≥ 5 dBA L_{eq} Project increase	
		If ambient is 60 - 65 dBA Leq[2]	≥ 3 dBA L_{eq} Project increase	
		If ambient is > 65 dBA Leq[2]	≥ 1.5 dBA L_{eq} Project increase	
Construction		Unlawful between the hours of 7:00 p.m. to 7:00 a.m.[3]		
		Noise Level Threshold[4]	80 dBA L_{eq}	
		Vibration Level Threshold[5]	0.03 PPV (in/sec)	

[1] City of Santa Fe Springs Municipal Code, Section 155.424. If the existing ambient noise levels already exceed any of the exterior noise level limit categories, then the standard can be adjusted to reflect the ambient conditions (Section 155.424[B]).
[2] FICON, 1992.
[3] City of Santa Fe Springs Municipal Code Section 155.425[B].
[4] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual.
[5] Caltrans Transportation and Construction Vibration Manual, April 2020 Table 19.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at two 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, June 22, 2022. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the equivalent daytime and nighttime hourly noise levels. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (18)

5.2 NOISE MEASUREMENT LOCATIONS

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

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

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

5.3 NOISE MEASUREMENT RESULTS

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

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

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]	
		Daytime	Nighttime
L1	Located west of the Project site near the Costa Azul Senior Apartments.	60.2	53.2
L2	Located southwest of the Project site near the Little Lake Village grass area.	57.8	47.7

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

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

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

LEGEND:

N

Site Boundary

Existing Barrier

Measurement Locations

8' Existing Barrier Height (in feet)

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6 RECEIVER LOCATIONS

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

To describe the potential off-site Project noise levels, 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 existing noise sensitive Lakeland Villas Mobile Home Park at 12147 Lakeland Road, approximately 36 feet south 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 the nearest mobile home behind the existing 8-foot-high wall. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R2: Location R2 represents the existing noise sensitive Little Lake Village residential community at 10902 Fulton Wells Avenue, approximately 123 feet southwest of the Project site. Location R2 is placed at the community grass area. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents the existing noise sensitive Little Lake Village residential community at 10902 Fulton Wells Avenue, approximately 281 feet west of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receiver R2 is placed at the building facade. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R4: Location R4 represents the existing noise sensitive Costa Azul Senior Apartment Community at 10829 Fulton Wells Avenue, approximately 486 feet west of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site,

receiver R4 is placed at the building façade. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

EXHIBIT 6-A: RECEIVER LOCATIONS

7 OPERATIONAL NOISE ANALYSIS

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

7.1 OPERATIONAL NOISE SOURCES

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

7.2 REFERENCE NOISE LEVELS

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

7.2.1 MEASUREMENT PROCEDURES

The reference noise level measurements presented in this section were collected using a Larson Davis LxT Type 1 precisions sound level meter (serial number 01146). The LxT sound level meter was calibrated using a Larson-Davis calibrator, Model CAL 200, was programmed in "slow" mode to record noise levels in "A" weighted form and was located at approximately five feet above the ground elevation for each measurement. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (18)

EXHIBIT 7-A: OPERATIONAL NOISE SOURCE LOCATIONS

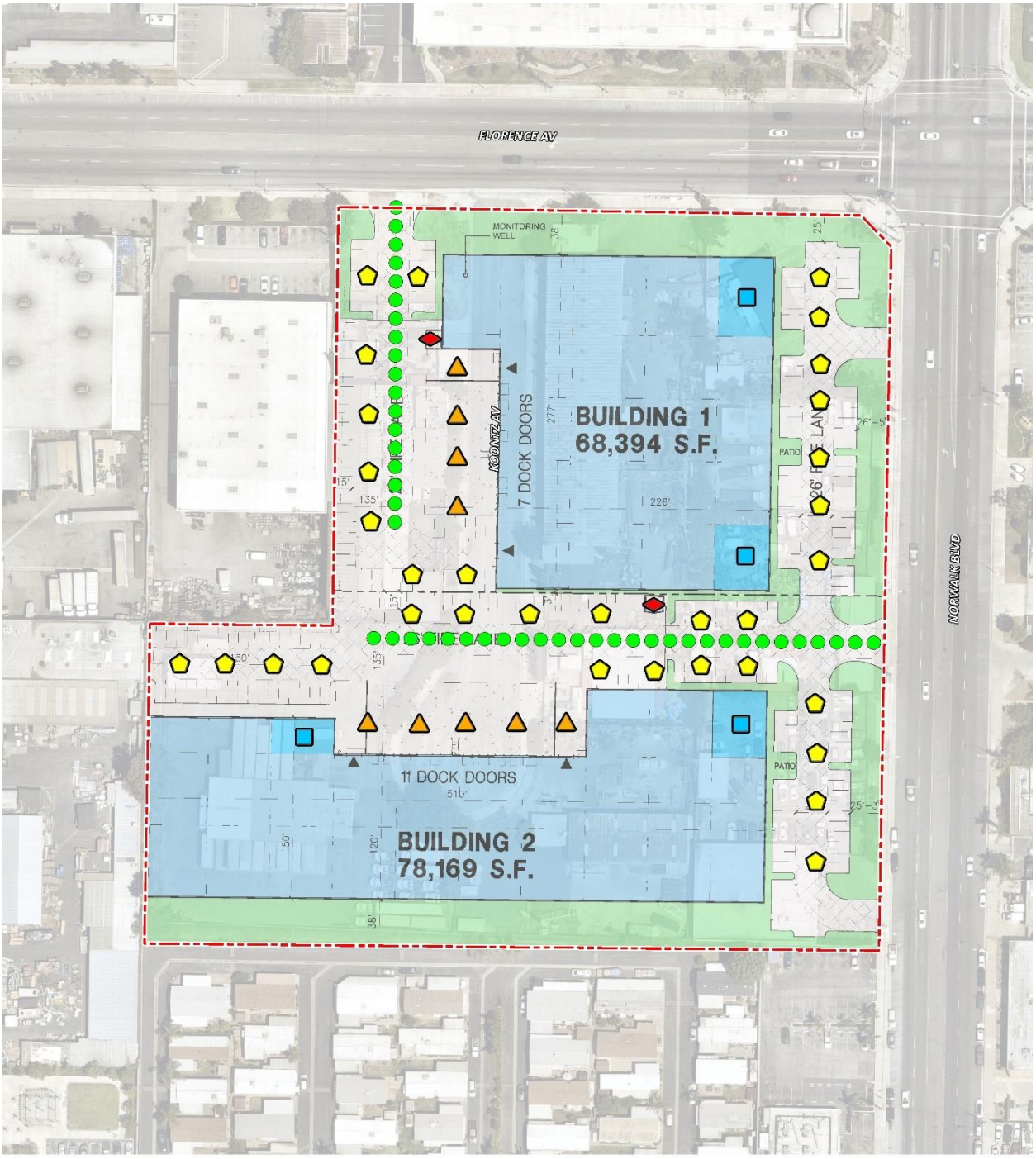

TABLE 7-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source[1]	Noise Source Height (Feet)	Min./ Hour[2]		Reference Noise Level (dBA L_{eq}) @ 50 Feet	Sound Power Level (dBA)[3]
		Day	Night		
Loading Dock Activity	8'	60	60	62.8	103.4
Roof-Top Air Conditioning Units	5'	39	28	57.2	88.9
Trash Enclosure Activity	5'	10	10	57.3	89.0
Parking Lot Vehicle Movements	5'	60	60	56.1	87.8
Truck Movements	8'	60	60	59.8	93.2

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

7.2.2 LOADING DOCK ACTIVITY

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

7.2.3 ROOF-TOP AIR CONDITIONING UNITS

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

7.2.5 TRASH ENCLOSURE ACTIVITY

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

7.2.6 PARKING LOT VEHICLE MOVEMENTS

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

7.2.6 TRUCK MOVEMENTS

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

7.3 CADNAA NOISE PREDICTION MODEL

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

Using the ISO 9613-2 protocol, CadnaA will calculate the distance from each noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation inputs to provide a summary of noise level at each receiver and the partial noise level contributions by noise source. Consistent with the ISO 9613-2 protocol, the CadnaA noise prediction model relies on the reference sound power level (L_w) to describe individual noise sources. While sound pressure levels (e.g., L_{eq}) quantify in decibels the intensity of given sound sources at a reference distance, sound power levels (L_w) are connected to the sound source and are independent of distance. Sound pressure levels vary substantially with distance from the source and diminish because of intervening obstacles and barriers, air absorption, wind, and

other factors. Sound power is the acoustical energy emitted by the sound source and is an absolute value that is not affected by the environment.

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

7.4 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed Project operations that include loading dock activity, roof-top air conditioning units, trash enclosure activity, parking lot vehicle movements, and truck movements, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the Project site and the Project-related noise level increases that would be experienced at each of the sensitive receiver locations. Table 7-2 shows the Project operational noise levels during the daytime hours of 7:00 a.m. to 10:00 p.m. The daytime hourly noise levels at the off-site receiver locations are expected to range from 35.2 to 39.6 dBA L_{eq}.

TABLE 7-2: DAYTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA Leq)			
	R1	R2	R3	R4
Loading Dock Activity	39.2	34.1	37.7	37.5
Roof-Top Air Conditioning Units	26.4	26.2	25.2	28.8
Trash Enclosure Activity	6.8	3.5	10.0	6.8
Parking Lot Vehicle Movements	25.6	24.8	26.8	27.0
Truck Movements	19.6	16.5	22.7	23.6
Total (All Noise Sources)	**39.6**	**35.2**	**38.4**	**38.5**

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

Table 7-3 shows the Project operational noise levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. The nighttime hourly noise levels at the off-site receiver locations are expected to range from 35.0 to 39.6 dBA L_{eq}. The differences between the daytime and nighttime noise levels are largely related to the estimated duration of noise activity as outlined in Table 7-1 and Appendix 7.1.

TABLE 7-3: NIGHTTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA Leq)			
	R1	R2	R3	R4
Loading Dock Activity	39.2	34.1	37.7	37.5
Roof-Top Air Conditioning Units	24.0	23.8	22.8	26.4
Trash Enclosure Activity	5.8	2.5	9.0	5.8
Parking Lot Vehicle Movements	25.6	24.8	26.8	27.0
Truck Movements	19.6	16.5	22.7	23.6
Total (All Noise Sources)	**39.6**	**35.0**	**38.3**	**38.3**

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

7.5 PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level thresholds based on the City of Santa Fe Springs exterior noise level standards at nearby noise-sensitive receiver locations. Table 7-4 shows the operational noise levels associated with the Project will satisfy the City of Santa Fe Springs exterior noise level standards.

TABLE 7-4: OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Project Operational Noise Levels (dBA Leq)[2]		Noise Level Standards (dBA Leq)[3]		Noise Level Standards Exceeded?[4]	
	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
R1	39.6	39.6	55.0	45.0	No	No
R2	35.2	35.0	55.0	45.0	No	No
R3	38.4	38.3	55.0	45.0	No	No
R4	38.5	38.3	55.0	45.0	No	No

[1] See Exhibit 6-A for the receiver locations.
[2] Proposed Project operational noise levels as shown on Tables 7-2 and 7-3.
[3] City of Santa Fe Springs Municipal Code, Section 155.424.
"Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 7:00 a.m.

7.6 PROJECT OPERATIONAL NOISE LEVEL INCREASES

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

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

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describes the Project noise level increases to the existing ambient noise environment. As indicated on Tables 7-5, the Project will generate a daytime operational noise level increases ranging from 0.0 to 0.1 dBA L_{eq} at the nearest receiver locations. Table 9-6 shows that the Project will generate a nighttime operational noise level increases ranging from 0.1 to 0.6 dBA L_{eq} at the nearest receiver locations. Project-related operational noise level increases will satisfy the operational noise level increase significance criteria presented on Table 4-1. Therefore, the incremental Project operational noise level increase is considered *less than significant* at all receiver locations.

TABLE 7-5: DAYTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria[7]	Increase Criteria Exceeded?
R1	39.6	L2	57.8	57.9	0.1	5.0	No
R2	35.2	L2	57.8	57.8	0.0	5.0	No
R3	38.4	L1	60.2	60.2	0.0	5.0	No
R4	38.5	L1	60.2	60.2	0.0	5.0	No

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

TABLE 7-6: NIGHTTIME OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria[7]	Increase Criteria Exceeded?
R1	39.6	L2	47.7	48.3	0.6	5.0	No
R2	35.0	L2	47.7	47.9	0.2	5.0	No
R3	38.3	L1	53.2	53.3	0.1	5.0	No
R4	38.3	L1	53.2	53.3	0.1	5.0	No

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

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8 CONSTRUCTION ANALYSIS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 8-A shows the construction activity boundaries in relation to the nearest sensitive receiver locations previously described in Section 6. Section 155.425[B] of the Municipal Code states that *it shall be unlawful for any person within a residential zone, or within a radius of 500 feet therefrom, to operate equipment or perform any outside construction or repair work on buildings, structures, or projects or to operate any pile driver, power shovel, pneumatic hammer, derrick, power hoist, or any other construction type device between the hours of 7:00 p.m. of one day and 7:00 a.m. of the next day.* (13)

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

8.1 CONSTRUCTION NOISE LEVELS

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

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

8.2 CONSTRUCTION REFERENCE NOISE LEVELS

To describe construction noise activities, this construction noise analysis was prepared using reference construction equipment noise levels from the Federal Highway Administration (FHWA) published the Roadway Construction Noise Model (RCNM), which includes a national database of construction equipment reference noise emission levels. (19) The RCNM equipment database, provides a comprehensive list of the noise generating characteristics for specific types of construction equipment. In addition, the database provides an acoustical usage factor to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

EXHIBIT 8-A: CONSTRUCTION NOISE SOURCE LOCATIONS

8.3 CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearby sensitive receiver locations were completed. Consistent with FTA guidance for general construction noise assessment, Table 8-1 presents the combined noise levels for the loudest construction equipment, assuming they operate at the same time. As shown on Table 8-2, the construction noise levels are expected to range from 36.3 to 61.4 dBA L_{eq} at the nearby receiver locations. Appendix 8.1 includes the detailed CadnaA construction noise model inputs.

TABLE 8-1: CONSTRUCTION REFERENCE NOISE LEVELS

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

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

TABLE 8-2: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})						
	Demolition	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Highest Levels[2]
R1	61.4	58.4	61.4	59.4	61.4	55.4	61.4
R2	55.1	52.1	55.1	53.1	55.1	49.1	55.1
R3	42.3	39.3	42.3	40.3	42.3	36.3	42.3
R4	42.6	39.6	42.6	40.6	42.6	36.6	42.6

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

8.4 CONSTRUCTION NOISE LEVEL COMPLIANCE

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

TABLE 8-3: CONSTRUCTION NOISE LEVEL COMPLIANCE

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})		
	Highest Construction Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	61.4	80	No
R2	55.1	80	No
R3	42.3	80	No
R4	42.6	80	No

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

8.5 CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. 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 for human response (annoyance) and

building damage using the following vibration assessment methods defined by the FTA. To describe the vibration impacts the FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 8-4: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

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

Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual

Table 8-5 presents the expected Project related vibration levels at the nearby receiver locations. At distances ranging from 36 to 486 feet from Project construction activities, construction vibration velocity levels are estimated to range from 0.001 to 0.052 in/sec PPV. Based on maximum acceptable continuous vibration threshold of 0.3 PPV (in/sec), the typical Project construction vibration levels will fall below the building damage thresholds at all the noise sensitive receiver locations. Therefore, the Project-related vibration impacts are considered *less than significant* during typical 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: PROJECT CONSTRUCTION VIBRATION LEVELS

Receiver[1]	Distance to Const. Activity (Feet)[2]	Typical Construction Vibration Levels PPV (in/sec)[3]					Thresholds PPV (in/sec)[4]	Thresholds Exceeded?[5]
		Small bulldozer	Jackhammer	Loaded Trucks	Large bulldozer	Highest Vibration Level		
R1	36'	0.002	0.020	0.044	0.052	0.052	0.3	No
R2	123'	0.000	0.003	0.007	0.008	0.008	0.3	No
R3	281'	0.000	0.001	0.002	0.002	0.002	0.3	No
R4	486'	0.000	0.000	0.001	0.001	0.001	0.3	No

[1] Receiver locations are shown on Exhibit 8-A.
[2] Distance from receiver location to Project construction boundary (Project site boundary).
[3] Based on the Vibration Source Levels of Construction Equipment (Table 8-4).
[4] Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, Table 19, p. 38.
[5] Does the peak vibration exceed the acceptable vibration thresholds?
"PPV" = Peak Particle Velocity

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

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9 REFERENCES

1. **State of California.** *California Environmental Quality Act, Environmental Checklist Form Appendix G.* 2021.
2. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
3. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March 1974. EPA/ONAC 550/9/74-004.
4. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* December 2011.
5. **U.S. Department of Transportation Federal Highway Administration.** *Highway Noise Barrier Design Handbook.* 2001.
6. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
7. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.
8. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment Manual.* September 2018.
9. **Office of Planning and Research.** *State of California General Plan Guidlines.* October 2019.
10. **City of Santa Fe Springs.** *General Plan Noise Element.* 1994.
11. —. *Municipal Code, Section 155.424.*
12. **City of Norwalk.** *Municipal Code, Chapter 9.04.*
13. **City of Santa Fe Springs.** *Municipal Code Section 155.425[B].*
14. **California Department of Transportation.** *Transportation and Construction Vibration Guidance Manual.* April 2020.
15. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
16. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.
17. **California Department of Transportation.** *Technical Noise Supplement.* November 2009.
18. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
19. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning.** *FHWA Roadway Construction Noise Model.* January, 2006.

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10 CERTIFICATIONS

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Florence and Norwalk Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 584-3148.

Bill Lawson, P.E., INCE
Principal
URBAN CROSSROADS, INC.
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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 San Diego • March, 2018
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 SANTA FE SPRINGS MUNICIPAL CODE

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§ 155.421 DECLARATION OF POLICY PERTAINING TO NOISE.

It is hereby declared to be the policy of the city to prohibit unnecessary, excessive, and annoying noises from all sources subject to its police power. At certain levels noises are detrimental to the health and welfare of the citizenry and in the public interest shall be systematically proscribed.

('64 Code, § 52.30) (Am. Ord. 712, passed 6-11-87)

§ 155.422 EXEMPTIONS FROM NOISE CONTROL PROVISIONS.

The following activities shall be exempt from noise control provisions of this subchapter:

(A) Activities conducted on public parks, public playgrounds and public or private school grounds including but not limited to school athletics and school entertainment events.

(B) Occasional outdoor gatherings, public dancing shows and sporting and entertainment events provided said events are conducted pursuant to any required permit or City Council authorization.

(C) Any mechanical device, apparatus or equipment when used, related to or connected with emergency work.

(D) Any activity to the extent regulation thereof has been preempted by state or federal law.

('64 Code, § 52.31) (Am. Ord. 712, passed 6-11-87)

§ 155.423 NOISE LEVEL MEASUREMENT PROCEDURES.

Any noise level measurement made pursuant to the provisions of this subchapter shall be measured with a sound level meter in accordance with the following:

(A) Measurements shall be made in decibels (dB) using the A-weighted scale with slow response, following the manufacturer's instructions, except the fast response shall be used for impulsive sounds.

(B) Outdoor noise shall be measured at the lot line and/or at any point with the land parcel receiving the noise, where possible, the microphone shall be positioned at least 10 feet from the nearest reflective surface. For the purpose of this measurement the boundaries of any lease agreement, or operating unit or group of contiguous fee properties operated as a unit, shall be considered as the lot line.

(C) Measurements shall be made with the microphone at a height not less than five feet above the ground or floor level for outdoor measurements and for measurements within a building or on a balcony or deck, respectively.

(D) Measurements within a building for determining the noise level from exterior noises shall be made with the microphone five feet from the window (closed) and/or wall of the structure.

(E) The ambient noise level shall be measured while the alleged intruding noise source is inoperative. If for any reason the alleged intruding noise source cannot be turned off, the ambient noise level shall be estimated, if possible, by performing a measurement in the same general area of the alleged intruding noise source but a sufficient distance such that the noise from the alleged intruding noise source is at least 10 dB below the ambient noise level in order that only the actual ambient noise level be measured. If a difference of 10 dB as specified in the preceding sentence cannot be obtained within the same general area, but the alleged intruding noise source is five to 10 dB below the ambient, then the level of the ambient noise level itself may be reasonably determined by subtracting a one decibel correction to account for the contribution of the alleged intruding noise source.

('64 Code, § 52.32) (Am. Ord. 712, passed 6-11-87)

§ 155.424 PERMITTED NOISE LEVELS.

(A) The noise level caused by any device, instrument, vehicle, machinery, operation, use or activity shall not exceed the levels set forth in the table set out in division (E) of this section except as further provided in this chapter.

(B) In the event the ambient noise level exceeds a permitted noise level set forth in division (E) of this section, the permissible noise level for the corresponding duration and receiving area shall be the ambient level.

(C) Noise of impulsive character (hammering, and the like) or that contains a pure tone (such as a whine, screech, or hum), shall only be permitted at levels five dB(A) less than the permitted levels determined under this section.

(D) At a lot line separating properties with different permitted noise levels, the applicable permitted outdoor noise level shall be the arithmetic mean of the permitted outdoor noise levels set forth in division (E) of this section for the receiving areas on opposite sides of said lot line.

(E) Noise level table.

A-Weighted Sound Level in Decibels (dB(A))		
	Daytime ***(7:00 a.m. to 10:00 p.m.)***	***Nighttime*** ***(10:00 p.m. to 7:00 a.m.)***

	Maximum Cumulative Minutes Duration in Any 1-Hour Period				Absolute Maximum	Maximum Cumulative Minutes Duration in Any 1-Hour Period				Absolute Maximum
A-Weighted Sound Level in Decibels (dB(A))										
	Daytime (7:00 a.m. to 10:00 p.m.)					Nighttime (10:00 p.m. to 7:00 a.m.)				
	Maximum Cumulative Minutes Duration in Any 1-Hour Period				Absolute Maximum	Maximum Cumulative Minutes Duration in Any 1-Hour Period				Absolute Maximum
Receiving Area	30	15	5	1		30	15	5	1	
Outdoor Noise at Lot Line Of:										
Any school, church or hospital	45	50	55	60	65	45	50	55	60	65
Any other use										
In the A-1, R-1 or R-3 Zone	50	55	60	65	70	45	50	55	60	65
In the C-1 or C-4 Zone	60	65	70	75	80	55	60	65	70	75
1 In the ML, PF or BP Zone	60	65	70	75	80	60	65	70	75	80
In the M-1 or M-2 Zone	70	75	80	85	90	70	75	80	85	90
Residential Building Interior:										
In the A-1 or R-1 Zone	45	50	55	60	65	45	50	55	60	65
In the R-3 Zone	45	50	55	60	65	45	50	55	60	65
Sound levels at or above each decibel level given in the table shall not occur for a duration longer than that given in the corresponding column heading .										

('64 Code, § 52.34) (Am. Ord. 712, passed 6-11-87) Penalty, see §10.97

§ 155.425 SPECIAL NOISE SOURCES.

The following additional provisions shall apply to certain special noise sources:

(A) *Radios, television sets, and similar devices.* It shall be unlawful for any person within the city to use or operate any radio receiving set, musical instrument, phonograph, television set, or other similar device for the producing or reproducing of sound in any manner or to use bells, whistles, or any device conveying speech content or music as may be generated by sound amplifying equipment so as to create any noise which would cause the noise level to exceed the ambient noise level a maximum of five dB(A) at the boundary of any property within a residential zone or at the boundary of any private residential open space, or within the common outdoor area of any multiple residential development.

(B) *Construction of buildings and projects.* It shall be unlawful for any person within a residential zone, or within a radius of 500 feet therefrom, to operate equipment or perform any outside construction or repair work on buildings, structures, or projects or to operate any pile driver, power shovel, pneumatic hammer, derrick, power hoist, or any other construction type device between the hours of 7:00 p.m. of one day and 7:00 a.m. of the next day.

(C) *Maintenance.* It shall be unlawful for any person, including city and utility crews, to perform maintenance of real property, other than emergency work, between 7:00 p.m. on one day and 7:00 a.m. of the following day, if such maintenance activity produces noise above the ambient level at any lot line of property within a residential zone.

('64 Code, § 52.35) (Am. Ord. 712, passed 6-11-87) Penalty, see §10.97

§ 155.426 PROPOSED DEVELOPMENT PROJECT.

If at any time the Director of Planning and Development has reason to believe that a new development project, addition, modification, or any other changes thereto may not conform with the permitted noise level standards of this chapter, the Director of Planning and Development may require as a "condition of approval" an acoustical analysis (noise study) as part of the building permit process or other approval procedures.

('64 Code, § 52.37) (Am. Ord. 712, passed 6-11-87)

§ 155.427 WAIVERS FROM NOISE REQUIREMENTS.

(A) Waivers from the noise control requirements of this chapter may be authorized by a conditional use permit granted in

accordance with the provisions of §§ 155.710 through 155.724 for a period not to exceed two years subject to reasonable terms, conditions, and requirements. A waiver may be granted only if the Planning Commission makes the findings that:

(1) Additional time is necessary for the applicant to alter or modify his activity, operation or noise source to comply with this chapter; or

(2) The activity, operation or noise source cannot feasibly be carried on in a manner that would comply with the provisions of this chapter and no other reasonable alternative is available to the applicant.

(B) In granting a waiver, the Planning Commission may prescribe any conditions or requirements it deems necessary to minimize adverse effects upon the community or the surrounding neighborhood.

(C) In granting waivers, the Planning Commission shall consider the magnitude of adverse effect caused by the offensive noise, the uses of property within the area affected by the noise, operations carried on under existing regulations and codes, the time factors related to study, design, financing and construction of remedial work, the economic factors related to age and useful life of the equipment, the general public interest, health and welfare, the feasibility of plans submitted for corrections, and the effect on the community if the waiver is denied.

('64 Code, § 52.38) (Am. Ord. 712, passed 6-11-87)

§ 155.428 VIBRATIONS.

Every use shall be so operated that the ground vibration generated by said use is not harmful or injurious to the use or development of surrounding properties. No vibration shall be permitted which is perceptible without instruments at any use alone the property line on which said use is located. For the purpose of this determination, the boundary of any lease agreement or operating unit or properties operating as a unit shall be considered the same as the property line.

('64 Code, § 52.40) (Am. Ord. 712, passed 6-11-87) Penalty, see §10.97

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APPENDIX 5.1:

STUDY AREA PHOTOS

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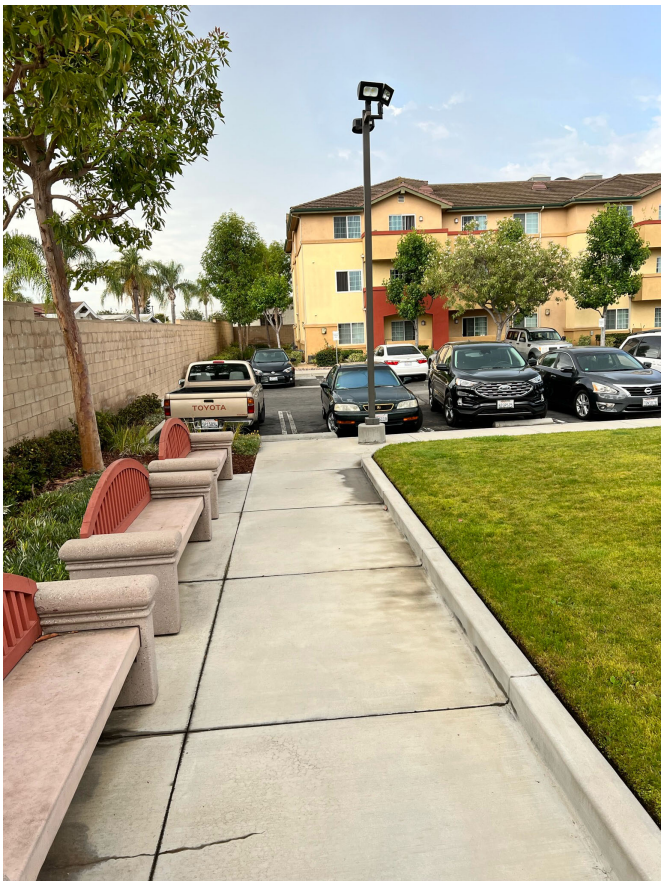
14851_L2_N_E
33, 55' 59.520000"118, 4' 29.770000"

14851_L2_N_N
33, 55' 59.540000"118, 4' 29.770000"



14851_L2_N_S
33, 55' 59.520000"118, 4' 29.710000"

14851_L2_N_W
33, 55' 59.470000"118, 4' 29.710000"

14851_L4_Q_E
33, 56' 4.520000"118, 4' 34.690000"

14851_L4_Q_N
33, 56' 4.520000"118, 4' 34.690000"

14851_L4_Q_S
33, 56' 4.520000"118, 4' 34.690000"

14851_L4_Q_W
33, 56' 4.520000"118, 4' 34.690000"

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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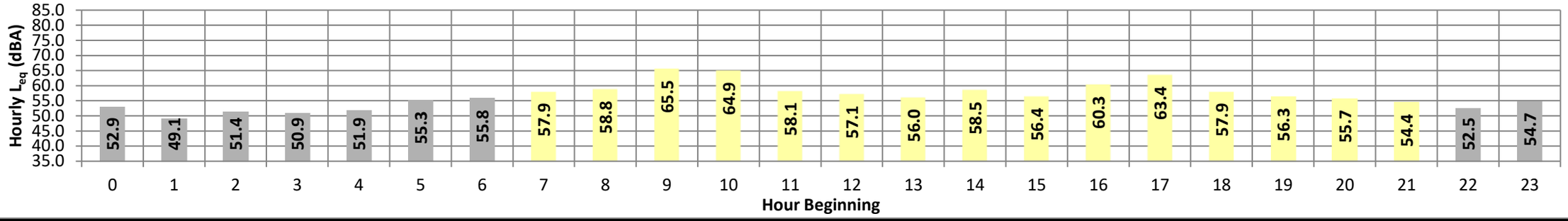
24-Hour Noise Level Measurement Summary

Date: Wednesday, June 22, 2022 *Location:* L1 - Located west of the Project site near the Costa Azul Senior *Meter:* Piccolo II *JN:* 14851

Project: Florence and Norwalk *Source:* Apartments. *Analyst:* B. Lawson

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	52.9	62.9	41.9	62.7	62.4	61.0	59.0	50.1	45.9	42.4	42.2	42.0	52.9	10.0	62.9
	1	49.1	59.0	41.3	58.7	58.3	56.4	54.7	47.2	43.7	41.8	41.6	41.4	49.1	10.0	59.1
	2	51.4	63.6	41.1	63.3	62.7	59.2	56.1	47.1	44.1	41.7	41.5	41.2	51.4	10.0	61.4
	3	50.9	59.3	42.4	59.0	58.7	57.3	55.8	51.2	47.7	43.3	43.0	42.6	50.9	10.0	60.9
	4	51.9	61.4	44.1	61.1	60.6	58.9	56.8	51.1	48.2	44.9	44.5	44.2	51.9	10.0	61.9
	5	55.3	65.9	46.7	65.5	64.9	62.8	60.3	53.1	50.6	47.6	47.2	46.8	55.3	10.0	65.3
	6	55.8	65.9	47.1	65.5	65.0	62.7	61.0	54.5	50.9	48.1	47.7	47.2	55.8	10.0	65.8
Day	7	57.9	67.5	46.6	67.2	66.8	65.4	64.0	56.6	51.7	47.8	47.3	46.8	57.9	0.0	57.9
	8	58.8	67.4	50.7	67.0	66.5	65.0	63.5	58.8	55.8	52.4	51.7	50.9	58.8	0.0	58.8
	9	65.5	71.0	61.5	70.5	70.0	68.5	67.7	66.0	64.9	63.1	62.6	61.9	65.5	0.0	65.5
	10	64.9	76.2	59.5	74.6	73.1	69.7	67.3	64.4	62.9	60.8	60.4	59.9	64.9	0.0	64.9
	11	58.1	69.1	48.7	68.7	68.2	65.6	63.0	56.2	51.9	49.5	49.2	48.9	58.1	0.0	58.1
	12	57.1	66.4	47.3	66.2	65.8	64.1	62.5	56.5	52.7	48.5	47.9	47.4	57.1	0.0	57.1
	13	56.0	65.7	47.1	65.2	64.7	63.0	61.3	55.5	51.0	48.2	47.8	47.3	56.0	0.0	56.0
	14	58.5	71.8	45.1	71.3	70.2	65.9	62.0	53.9	49.5	46.1	45.7	45.3	58.5	0.0	58.5
	15	56.4	66.8	45.1	66.6	66.2	64.2	62.3	54.1	49.6	46.1	45.7	45.2	56.4	0.0	56.4
	16	60.3	69.7	49.3	68.9	68.2	66.4	65.2	61.4	56.5	50.7	50.0	49.4	60.3	0.0	60.3
	17	63.4	69.9	54.5	69.6	69.2	68.1	67.2	64.7	61.9	56.9	56.1	54.8	63.4	0.0	63.4
	18	57.9	65.9	49.9	65.7	65.4	64.2	62.8	57.9	55.0	51.1	50.6	50.0	57.9	0.0	57.9
	19	56.3	66.9	45.2	66.5	65.9	63.9	61.9	54.5	49.9	46.3	45.8	45.4	56.3	5.0	61.3
	20	55.7	66.3	45.4	66.1	65.7	63.7	61.2	53.1	50.6	46.4	46.0	45.5	55.7	5.0	60.7
	21	54.4	64.1	45.2	63.7	63.3	61.9	59.9	53.2	49.7	46.5	45.8	45.3	54.4	5.0	59.4
Night	22	52.5	62.4	43.7	62.1	61.7	60.1	58.0	50.8	48.2	44.4	44.1	43.8	52.5	10.0	62.5
	23	54.7	64.2	43.7	63.8	63.4	61.7	59.7	54.9	50.3	44.9	44.5	44.0	54.7	10.0	64.7

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	54.4	64.1	45.1	63.7	63.3	61.9	59.9	53.1	49.5	46.1	45.7	45.2
	Max	65.5	76.2	61.5	74.6	73.1	69.7	67.7	66.0	64.9	63.1	62.6	61.9
Energy Average		60.2	Average:		67.9	67.3	65.3	63.4	57.8	54.2	50.7	50.2	49.6
Night	Min	49.1	59.0	41.1	58.7	58.3	56.4	54.7	47.1	43.7	41.7	41.5	41.2
	Max	55.8	65.9	47.1	65.5	65.0	62.8	61.0	54.9	50.9	48.1	47.7	47.2
Energy Average		53.2	Average:		62.4	62.0	60.0	57.9	51.1	47.7	44.4	44.0	43.7

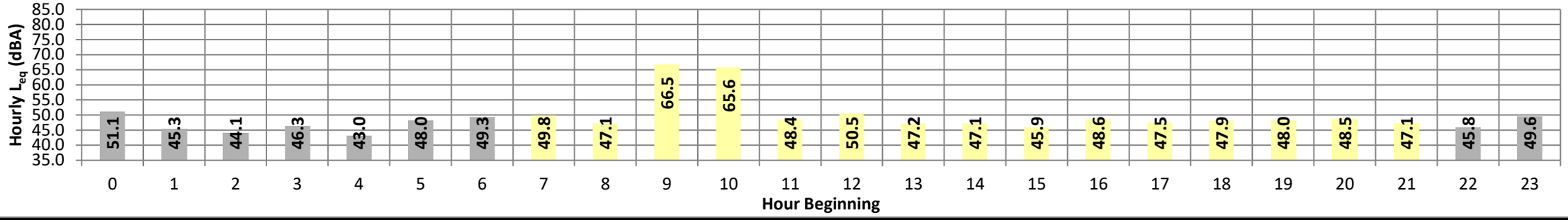
24-Hour	L_{eq} (dBA) Daytime (7am-10pm)	Nighttime (10pm-7am)
58.7	60.2	53.2

24-Hour Noise Level Measurement Summary

Date: Wednesday, June 22, 2022 *Location:* L2 - Located southwest of the Project site near the Little Lake *Meter:* Piccolo II *JN:* 14851

Project: Florence and Norwalk *Source:* Village grass area. *Analyst:* B. Lawson

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	51.1	60.6	44.1	60.4	60.1	59.2	57.5	47.6	45.3	44.3	44.3	44.1	51.1	10.0	61.1
	1	45.3	53.2	43.1	52.7	52.4	49.1	47.5	44.5	44.0	43.5	43.3	43.2	45.3	10.0	55.3
	2	44.1	50.0	42.6	49.6	48.9	46.7	45.7	44.0	43.4	42.9	42.8	42.7	44.1	10.0	54.1
	3	46.3	52.4	41.5	52.2	51.8	51.2	50.7	47.5	43.6	41.9	41.8	41.6	46.3	10.0	56.3
	4	43.0	45.1	42.0	44.8	44.6	44.1	43.9	43.3	42.9	42.3	42.2	42.1	43.0	10.0	53.0
	5	48.0	52.5	45.6	52.1	51.7	50.5	50.0	48.7	47.4	46.1	46.0	45.7	48.0	10.0	58.0
	6	49.3	54.9	46.6	54.4	53.8	52.2	51.4	49.7	48.5	47.2	47.0	46.7	49.3	10.0	59.3
Day	7	49.8	58.6	44.8	58.1	57.5	55.8	53.7	49.1	47.4	45.6	45.4	45.0	49.8	0.0	49.8
	8	47.1	52.1	44.0	51.5	50.8	49.6	49.0	47.8	46.7	45.0	44.6	44.2	47.1	0.0	47.1
	9	66.5	72.7	62.7	71.5	70.6	69.1	68.4	67.0	66.1	64.2	63.8	63.1	66.5	0.0	66.5
	10	65.6	76.6	60.4	75.0	73.3	70.0	67.9	65.3	63.8	61.7	61.4	60.8	65.6	0.0	65.6
	11	48.4	54.2	45.0	53.6	52.9	51.7	51.0	49.2	47.5	45.8	45.6	45.2	48.4	0.0	48.4
	12	50.5	57.8	43.9	57.1	56.5	55.2	54.4	51.6	48.4	45.2	44.7	44.1	50.5	0.0	50.5
	13	47.2	52.0	43.9	51.4	51.1	50.3	49.8	47.9	46.5	44.7	44.4	44.1	47.2	0.0	47.2
	14	47.1	52.6	43.3	52.1	51.5	50.6	50.1	48.1	46.0	44.1	43.8	43.5	47.1	0.0	47.1
	15	45.9	49.4	43.6	49.0	48.6	48.0	47.6	46.4	45.5	44.3	44.1	43.8	45.9	0.0	45.9
	16	48.6	54.5	45.4	53.8	53.0	51.9	51.1	49.2	47.7	46.2	45.9	45.6	48.6	0.0	48.6
	17	47.5	51.9	44.8	51.4	51.0	50.3	49.8	48.4	46.8	45.3	45.1	44.9	47.5	0.0	47.5
	18	47.9	52.3	45.1	51.9	51.4	50.7	50.3	48.7	47.3	45.8	45.6	45.2	47.9	0.0	47.9
	19	48.0	53.5	44.3	52.9	52.4	51.9	51.3	49.5	46.2	44.7	44.6	44.4	48.0	5.0	53.0
	20	48.5	54.5	44.7	54.1	53.5	52.2	51.7	49.4	47.0	45.2	45.1	44.8	48.5	5.0	53.5
	21	47.1	51.5	44.5	51.2	50.9	50.2	49.7	47.8	46.2	44.9	44.7	44.5	47.1	5.0	52.1
Night	22	45.8	50.1	43.6	49.6	49.2	48.5	48.0	46.3	45.1	44.0	43.9	43.7	45.8	10.0	55.8
	23	49.6	55.4	43.7	54.9	54.5	54.1	53.7	51.5	47.0	44.3	44.1	43.8	49.6	10.0	59.6

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	45.9	49.4	43.3	49.0	48.6	48.0	47.6	46.4	45.5	44.1	43.8	43.5
	Max	66.5	76.6	62.7	75.0	73.3	70.0	68.4	67.0	66.1	64.2	63.8	63.1
Energy Average		57.8	Average:		55.6	55.0	53.8	53.1	51.0	49.3	47.5	47.2	46.9
Night	Min	43.0	45.1	41.5	44.8	44.6	44.1	43.9	43.3	42.9	41.9	41.8	41.6
	Max	51.1	60.6	46.6	60.4	60.1	59.2	57.5	51.5	48.5	47.2	47.0	46.7
Energy Average		47.7	Average:		52.3	51.9	50.6	49.8	47.0	45.2	44.1	43.9	43.7

24-Hour	L_{eq} (dBA) Daytime (7am-10pm)	Nighttime (10pm-7am)
56.0	57.8	47.7

APPENDIX 7.1:

CADNAA OPERATIONAL NOISE MODEL INPUTS

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14851 - Florence & Norwalk

CadnaA Noise Prediction Model: 14851-02.cna
Date: 15.07.22
Analyst: B. Lawson

Calculation Configuration

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

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	39.6	39.5	46.2	50.0	45.0	0.0				5.00	a	6008409.00	2288110.43	5.00
RECEIVERS		R2	35.2	35.0	41.6	50.0	45.0	0.0				5.00	a	6008123.55	2288027.20	5.00
RECEIVERS		R3	38.4	38.3	45.0	50.0	45.0	0.0				5.00	a	6007868.78	2288369.00	5.00
RECEIVERS		R4	38.5	38.3	45.0	50.0	45.0	0.0				5.00	a	6007683.13	2288547.59	5.00

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)		(ft)	(ft)	(ft)
POINTSOURCE		PARK33	87.8	87.8	87.8	Lw	87.8					5.00	a	6008328.85	2288634.93	5.00
POINTSOURCE		PARK32	87.8	87.8	87.8	Lw	87.8					5.00	a	6008330.80	2288586.16	5.00
POINTSOURCE		PARK31	87.8	87.8	87.8	Lw	87.8					5.00	a	6008330.80	2288538.37	5.00
POINTSOURCE		PARK30	87.8	87.8	87.8	Lw	87.8					5.00	a	6008332.75	2288497.40	5.00
POINTSOURCE		PARK29	87.8	87.8	87.8	Lw	87.8					5.00	a	6008175.12	2288380.06	5.00
POINTSOURCE		PARK28	87.8	87.8	87.8	Lw	87.8					5.00	a	6008212.45	2288380.06	5.00
POINTSOURCE		PARK27	87.8	87.8	87.8	Lw	87.8					5.00	a	6008252.30	2288379.56	5.00
POINTSOURCE		PARK26	87.8	87.8	87.8	Lw	87.8					5.00	a	6008292.14	2288379.05	5.00
POINTSOURCE		PARK25	87.8	87.8	87.8	Lw	87.8					5.00	a	6008366.29	2288420.92	5.00
POINTSOURCE		PARK24	87.8	87.8	87.8	Lw	87.8					5.00	a	6008410.18	2288420.92	5.00
POINTSOURCE		PARK23	87.8	87.8	87.8	Lw	87.8					5.00	a	6008463.64	2288420.92	5.00
POINTSOURCE		PARK22	87.8	87.8	87.8	Lw	87.8					5.00	a	6008522.66	2288421.42	5.00
POINTSOURCE		PARK21	87.8	87.8	87.8	Lw	87.8					5.00	a	6008521.65	2288375.02	5.00
POINTSOURCE		PARK20	87.8	87.8	87.8	Lw	87.8					5.00	a	6008566.54	2288374.01	5.00

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)		(ft)	(ft)	(ft)
POINTSOURCE		PARK19	87.8	87.8	87.8	Lw	87.8					5.00	a	6008699.20	2288347.28	5.00
POINTSOURCE		PARK18	87.8	87.8	87.8	Lw	87.8					5.00	a	6008700.72	2288305.91	5.00
POINTSOURCE		PARK17	87.8	87.8	87.8	Lw	87.8					5.00	a	6008700.21	2288266.57	5.00
POINTSOURCE		PARK16	87.8	87.8	87.8	Lw	87.8					5.00	a	6008699.71	2288216.63	5.00
POINTSOURCE		PARK15	87.8	87.8	87.8	Lw	87.8					5.00	a	6008702.74	2288465.31	5.00
POINTSOURCE		PARK14	87.8	87.8	87.8	Lw	87.8					5.00	a	6008703.24	2288510.70	5.00
POINTSOURCE		PARK13	87.8	87.8	87.8	Lw	87.8					5.00	a	6008702.74	2288550.05	5.00
POINTSOURCE		PARK12	87.8	87.8	87.8	Lw	87.8					5.00	a	6008703.24	2288597.46	5.00
POINTSOURCE		PARK11	87.8	87.8	87.8	Lw	87.8					5.00	a	6008703.74	2288627.22	5.00
POINTSOURCE		PARK10	87.8	87.8	87.8	Lw	87.8					5.00	a	6008702.74	2288666.06	5.00
POINTSOURCE		PARK09	87.8	87.8	87.8	Lw	87.8					5.00	a	6008703.24	2288698.85	5.00
POINTSOURCE		PARK08	87.8	87.8	87.8	Lw	87.8					5.00	a	6008604.88	2288415.37	5.00
POINTSOURCE		PARK07	87.8	87.8	87.8	Lw	87.8					5.00	a	6008643.21	2288415.88	5.00
POINTSOURCE		PARK06	87.8	87.8	87.8	Lw	87.8					5.00	a	6008605.38	2288378.55	5.00
POINTSOURCE		PARK05	87.8	87.8	87.8	Lw	87.8					5.00	a	6008643.72	2288378.04	5.00
POINTSOURCE		PARK04	87.8	87.8	87.8	Lw	87.8					5.00	a	6008366.80	2288453.71	5.00
POINTSOURCE		PARK03	87.8	87.8	87.8	Lw	87.8					5.00	a	6008411.69	2288453.71	5.00
POINTSOURCE		PARK02	87.8	87.8	87.8	Lw	87.8					5.00	a	6008329.82	2288700.28	5.00
POINTSOURCE		PARK01	87.8	87.8	87.8	Lw	87.8					5.00	a	6008371.76	2288699.30	5.00
POINTSOURCE		TRASH01	89.0	89.0	89.0	Lw	89		150.00	0.00	90.00	5.00	a	6008381.52	2288647.61	5.00
POINTSOURCE		TRASH02	89.0	89.0	89.0	Lw	89		150.00	0.00	90.00	5.00	a	6008565.86	2288428.15	5.00
POINTSOURCE		AC01	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	6008642.91	2288681.75	55.00
POINTSOURCE		AC02	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	6008641.70	2288468.33	55.00
POINTSOURCE		AC03	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	6008277.52	2288319.03	55.00
POINTSOURCE		AC04	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	6008638.17	2288329.62	55.00
POINTSOURCE		DOCK01	103.4	103.4	103.4	Lw	103.4					5.00	a	6008403.95	2288510.08	5.00
POINTSOURCE		DOCK02	103.4	103.4	103.4	Lw	103.4					5.00	a	6008403.95	2288551.05	5.00
POINTSOURCE		DOCK03	103.4	103.4	103.4	Lw	103.4					5.00	a	6008403.95	2288585.18	5.00
POINTSOURCE		DOCK04	103.4	103.4	103.4	Lw	103.4					5.00	a	6008403.95	2288625.17	5.00
POINTSOURCE		DOCK05	103.4	103.4	103.4	Lw	103.4					5.00	a	6008493.68	2288331.59	5.00
POINTSOURCE		DOCK06	103.4	103.4	103.4	Lw	103.4					5.00	a	6008452.72	2288331.59	5.00
POINTSOURCE		DOCK07	103.4	103.4	103.4	Lw	103.4					5.00	a	6008410.78	2288331.59	5.00
POINTSOURCE		DOCK08	103.4	103.4	103.4	Lw	103.4					5.00	a	6008372.74	2288330.62	5.00
POINTSOURCE		DOCK09	103.4	103.4	103.4	Lw	103.4					5.00	a	6008329.82	2288331.59	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		TRUCK01	93.2	93.2	93.2	74.1	74.1	74.1	Lw	93.2									8	a
LINESOURCE		TRUCK02	93.2	93.2	93.2	72.1	72.1	72.1	Lw	93.2									8	a

Name	Height				Coordinates			
	Begin		End		x	y	z	Ground
	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
LINESOURCE	8.00	a			6008353.23	2288756.85	8.00	0.00
					6008352.26	2288488.62	8.00	0.00
LINESOURCE	8.00	a			6008755.08	2288396.94	8.00	0.00
					6008328.85	2288400.84	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)
BARRIEREXISTING		0						8.00	a			6008652.15	2288137.94	8.00	0.00
												6008141.77	2288152.08	8.00	0.00
												6008135.69	2287819.61	8.00	0.00
BARRIEREXISTING		0						8.00	a			6008652.15	2288137.94	8.00	0.00
												6008645.59	2287768.05	8.00	0.00
BARRIEREXISTING		0						6.00	a			6007776.32	2288421.17	6.00	0.00
												6007934.31	2288418.57	6.00	0.00
												6007928.23	2288049.64	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		BUILDING00001	x	0		50.00	a	6008392.24	2288716.86	50.00	0.00
								6008664.37	2288715.88	50.00	0.00
								6008661.44	2288440.83	50.00	0.00
								6008436.14	2288440.83	50.00	0.00
								6008437.11	2288638.83	50.00	0.00
								6008390.29	2288640.78	50.00	0.00
BUILDING		BUILDING00002	x	0		50.00	a	6008512.21	2288357.93	50.00	0.00

Name	M.	ID	RB	Residents	Absorption	Height		Coordinates			
						Begin		x	y	z	Ground
						(ft)		(ft)	(ft)	(ft)	(ft)
								6008659.49	2288356.95	50.00	0.00
								6008655.59	2288183.34	50.00	0.00
								6008147.43	2288188.21	50.00	0.00
								6008151.33	2288335.49	50.00	0.00
								6008303.49	2288334.52	50.00	0.00
								6008301.54	2288304.28	50.00	0.00
								6008511.24	2288303.31	50.00	0.00
BUILDING		BUILDING00003	x	0		25.00	a	6008171.81	2288681.75	25.00	0.00
								6008296.66	2288678.82	25.00	0.00
								6008295.68	2288505.21	25.00	0.00
								6008169.86	2288506.18	25.00	0.00
BUILDING		BUILDING00004	x	0		25.00	a	6007971.87	2288734.41	25.00	0.00
								6008121.10	2288731.49	25.00	0.00
								6008121.10	2288686.62	25.00	0.00
								6008143.53	2288682.72	25.00	0.00
								6008140.60	2288570.55	25.00	0.00
								6008050.87	2288573.48	25.00	0.00
								6008050.87	2288523.74	25.00	0.00
								6007985.52	2288524.71	25.00	0.00
								6007985.52	2288572.51	25.00	0.00
								6007969.91	2288572.51	25.00	0.00
BUILDING		BUILDING00005	x	0		25.00	a	6007972.84	2288416.45	25.00	0.00
								6008143.53	2288416.45	25.00	0.00
								6008144.50	2288367.68	25.00	0.00
								6008122.07	2288365.73	25.00	0.00
								6008122.07	2288324.76	25.00	0.00
								6008023.56	2288328.67	25.00	0.00
								6008023.56	2288303.31	25.00	0.00
								6007970.89	2288305.26	25.00	0.00
BUILDING		BUILDING00006	x	0		25.00	a	6007887.01	2288609.57	25.00	0.00
								6007927.00	2288608.59	25.00	0.00
								6007925.05	2288455.46	25.00	0.00
								6007887.01	2288454.49	25.00	0.00
BUILDING		BUILDING00007	x	0		25.00	a	6008019.66	2288253.56	25.00	0.00
								6008062.57	2288253.56	25.00	0.00
								6008061.60	2288163.83	25.00	0.00
								6008019.66	2288163.83	25.00	0.00

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APPENDIX 8.1:

CADNAA CONSTRUCTION NOISE MODEL INPUTS

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14851 - Florence & Norwalk

CadnaA Noise Prediction Model: 14851-02_Construction.cna
Date: 15.07.22
Analyst: B. Lawson

Calculation Configuration

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

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	61.4	61.4	68.0	50.0	45.0	0.0				5.00	a	6008409.00	2288110.43	5.00
RECEIVERS		R2	55.1	55.1	61.7	50.0	45.0	0.0				5.00	a	6008123.55	2288027.20	5.00
RECEIVERS		R3	42.3	42.3	48.9	50.0	45.0	0.0				5.00	a	6007868.78	2288369.00	5.00
RECEIVERS		R4	42.6	42.6	49.3	50.0	45.0	0.0				5.00	a	6007683.13	2288547.59	5.00

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL"			Lw / Li			Operating Time			Height	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	(ft)	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)		
SITEBOUNDARY		SITEBOUNDARY00001	115.0	115.0	115.0	70.3	70.3	70.3	Lw	115					8	a

Name	Height			Coordinates			
	Begin		End	x	y	z	Ground
	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
SITEBOUNDARY	8.00	a		6008305.82	2288756.52	8.00	0.00
				6008736.78	2288749.63	8.00	0.00
				6008761.77	2288723.88	8.00	0.00
				6008751.63	2288142.70	8.00	0.00
				6008145.61	2288148.60	8.00	0.00
				6008150.25	2288412.54	8.00	0.00
				6008300.90	2288411.04	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)
BARRIEREXISTING		0						8.00	a			6008652.15	2288137.94	8.00	0.00
												6008141.77	2288152.08	8.00	0.00
												6008135.69	2287819.61	8.00	0.00
BARRIEREXISTING		0						8.00	a			6008652.15	2288137.94	8.00	0.00
												6008645.59	2287768.05	8.00	0.00
BARRIEREXISTING		0						6.00	a			6007776.32	2288421.17	6.00	0.00
												6007934.31	2288418.57	6.00	0.00
												6007928.23	2288049.64	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		BUILDING00003	x	0		25.00	a	6008171.81	2288681.75	25.00	0.00
								6008296.66	2288678.82	25.00	0.00
								6008295.68	2288505.21	25.00	0.00
								6008169.86	2288506.18	25.00	0.00
BUILDING		BUILDING00004	x	0		25.00	a	6007971.87	2288734.41	25.00	0.00
								6008121.10	2288731.49	25.00	0.00
								6008121.10	2288686.62	25.00	0.00
								6008143.53	2288682.72	25.00	0.00
								6008140.60	2288570.55	25.00	0.00
								6008050.87	2288573.48	25.00	0.00
								6008050.87	2288523.74	25.00	0.00
								6007985.52	2288524.71	25.00	0.00
								6007985.52	2288572.51	25.00	0.00
								6007969.91	2288572.51	25.00	0.00
BUILDING		BUILDING00005	x	0		25.00	a	6007972.84	2288416.45	25.00	0.00
								6008143.53	2288416.45	25.00	0.00
								6008144.50	2288367.68	25.00	0.00
								6008122.07	2288365.73	25.00	0.00
								6008122.07	2288324.76	25.00	0.00
								6008023.56	2288328.67	25.00	0.00
								6008023.56	2288303.31	25.00	0.00
								6007970.89	2288305.26	25.00	0.00
BUILDING		BUILDING00006	x	0		25.00	a	6007887.01	2288609.57	25.00	0.00
								6007927.00	2288608.59	25.00	0.00
								6007925.05	2288455.46	25.00	0.00
								6007887.01	2288454.49	25.00	0.00
BUILDING		BUILDING00007	x	0		25.00	a	6008019.66	2288253.56	25.00	0.00
								6008062.57	2288253.56	25.00	0.00
								6008061.60	2288163.83	25.00	0.00
								6008019.66	2288163.83	25.00	0.00