APPENDIX I

NOISE IMPACT ANALYSIS

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Katella Avenue High Cube Warehouse

NOISE IMPACT ANALYSIS

CITY OF CYPRESS

PREPARED BY:

Bill Lawson, PE, INCE
blawson@urbanxroads.com
(949) 336-5979

Sama Shami
sshami@urbanxroads.com
(714) 389-6609

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
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
mph	Miles per hour
OPR	Office of Planning and Research
PPV	Peak particle velocity
Project	Katella Avenue High Cube Warehouse
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
VdB	Vibration Decibels

EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the potential noise impacts and the necessary noise mitigation measures, if any, for the proposed Katella Avenue High Cube Warehouse development ("Project"). As shown on Exhibit 1-A, the Project site is located at 6400 Katella Avenue in the City of Cypress and is currently occupied by the former Mitsubishi Motors Corporation. The proposed Project will consist of the demolition of existing buildings and the development of up to 486,088 square feet (sf) of warehousing use within two buildings (northern building is 263,274 sf and southern building is 222,814 sf). This study has been prepared to satisfy applicable City of Cypress standards and thresholds of significance based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

OFF-SITE TRAFFIC NOISE ANALYSIS

Traffic generated by the operation of the Project will influence the traffic noise levels in surrounding off-site areas. To quantify the off-site traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on 5 study-area roadway segments were calculated using the transportation related twenty-four hour community noise equivalent levels (CNEL) based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in the *Katella Avenue High Cube Warehouse Traffic Impact Analysis* prepared by Urban Crossroads, Inc. (2) To assess the off-site noise level impacts associated with the proposed Project, noise contour boundaries were developed for Existing 2020 and Opening Year Cumulative (2021) conditions. The analysis shows that the Project-related traffic noise level increases under all with Project traffic scenarios are considered *less than significant* impacts at receiving land uses adjacent to the study area roadway segments.

OPERATIONAL NOISE ANALYSIS

Using reference noise levels to represent the expected noise source activity from the Katella Avenue High Cube Warehouse site, the operational analysis estimates the Project-related stationary-source noise levels at nearby sensitive receiver locations. The typical activities associated with the proposed Katella Avenue High Cube Warehouse are anticipated to include loading dock activity, truck movements, roof-top air conditioning units, and trash compactor activity. The operational noise analysis shows that the Project will satisfy the City of Cypress stationary-source exterior daytime and nighttime noise level standards at all nearby noise sensitive receiver locations. Therefore, the Project-related operational noise level impacts are considered *less than significant*.

OPERATIONAL VIBRATION ANALYSIS

The Project operational vibration impacts will include heavy trucks moving on site to and from the loading dock areas. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement conditions. According to the FTA *Transit Noise Impact and Vibration Assessment* trucks rarely create vibration that exceed 70 VdB (unless there are bumps due to

frequent potholes in the road). Since the trucks transiting on site will be travelling at very low speeds on smooth surfaces, it is expected that delivery truck vibration impacts at nearby receiver locations will satisfy the vibration perceptibility threshold of 65 VdB and therefore, will be *less than significant*.

CONSTRUCTION NOISE ANALYSIS

Using sample reference noise levels to represent the planned construction activities of the Katella Avenue High Cube Warehouse site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. To prevent high levels of construction noise from impacting noise-sensitive land uses, City of Cypress Municipal Code Section 13-70, states that construction activities are limited to the hours of 7:00 a.m. to 8:00 p.m. on weekdays, 9:00 a.m. to 8:00 p.m. on Saturdays except Sunday or a federal holiday. (3)

While the City establishes limits to the hours during which construction activity may take place, neither the City's General Plan nor the Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers. Therefore, a numerical construction threshold based on Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* is used for analysis of daytime construction impacts. The highest Project-related short-term construction noise levels are expected to range from 52.0 to 65.3 dBA L_{eq} and will satisfy the reasonable daytime 80 dBA L_{eq} exterior noise level threshold identified by the FTA at all receiver locations.

To describe the temporary Project construction noise level increases to the existing ambient noise environment, the Project construction noise levels were combined with the existing ambient noise levels measurements at the off-site receiver locations. The difference between the combined Project-construction and ambient noise levels are used to describe the construction noise level increase. The temporary const noise level increase comparison shows that the Project will contribute, construction noise level increases ranging from 1.4 to 15.4 dBA L_{eq} at the nearest sensitive receiver locations. Since the worst-case temporary noise level increases at receiver locations R3 and R4 exceed the Caltrans *substantial* 12 dBA L_{eq} significance threshold, the construction noise level increases are considered *potentially significant* temporary noise level impacts.

CONSTRUCTION NOISE MITIGATION MEASURES

Therefore, temporary construction noise mitigation measures are required to reduce these short-term construction noise level increase impacts at receiver locations R3 and R4. This includes mitigation in the form of a 150-foot buffer zone for large construction equipment (e.g. dozers, graders, scrapers, etc.) near the southern Project site boundary or provide sound dampening mats for heavy equipment capable of a minimum 5 dBA L_{eq} noise reduction for heavy mobile equipment engine compartments (e.g., cement mixers, dozers. The construction noise analysis presents a conservative approach with the highest noise-level-producing equipment for each stage of Project construction operating at the closest point from primary construction activity to the nearby sensitive receiver locations. This scenario is unlikely to occur during typical construction activities and likely overstates the construction noise levels which will be

experienced at each receiver location. With the construction noise mitigation measures identified in the Executive Summary the worst-case construction noise level increases at the nearest residential receivers would be reduced to a *less than significant* impact with mitigation.

Though construction noise is temporary, intermittent and of short duration, and will not present any long-term impacts, the following mitigation measures are required to reduce noise and vibration levels produced by the construction equipment to the nearby sensitive residential land uses.

- Restrict the use of large construction equipment (e.g., dozers, graders, scrapers) near the southern Project site boundary with sound power level ratings greater than 100 dBA. If the contractor can demonstrate that specific pieces of large construction equipment have sound power level ratings equal to or below 100 dBA, then the equipment shall be allowed to operate within the buffer 150-foot buffer zone near the southern Project site boundary; or
- Install sound dampening mats or blankets to the engine compartments of heavy mobile equipment (e.g., cement mixers, dozers) capable of a minimum 5 dBA noise reduction (FHWA, Construction Noise Special Report). (4) The dampening materials must be capable of the minimum 5 dBA noise reduction and can be made of commercially-available sound dampening materials, including but not limited to polyurethane foam and vinyl sheeting (University of Massachusetts Lowell The Use of Noise Dampening Mats to Reduce Heavy-Equipment Noise, provided in Appendix 11.2). (5)
    - The sound dampening mats or blankets must be installed prior to the use of heavy mobile construction equipment within the Project site;
    - The sound dampening mats or blankets must remain installed for the duration of the use of the equipment during Project construction.
- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site during all Project construction (i.e., to the center).
- The contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. At distances ranging from 56 feet to 1,449 feet from typical Project construction activities (at the Project site boundary), construction vibration levels are estimated to range from 5.1 to 76.5 VdB, and the highest expected construction vibration levels are estimated to range from 34.1 to 76.5 VdB and will remain below the FTA *Transit Noise and*

Vibration Impact Assessment Manual maximum acceptable vibration criteria at all receiver locations. Therefore, the Project-related vibration impacts are considered *less than significant* during typical construction activities at the Project site.

SUMMARY OF CEQA SIGNIFICANCE FINDINGS

The results of this Katella Avenue High Cube Warehouse Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1). Table ES-1 shows the findings of significance for each potential noise and/or vibration impact under CEQA before and after any required mitigation measures.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-Site Traffic Noise	7	*Less Than Significant*	-
Operational Noise	9	*Less Than Significant*	-
Operational Vibration		*Less Than Significant*	-
Construction Noise	10	*Potentially Significant*	*Less Than Significant*
Construction Vibration		*Less Than Significant*	-

1 INTRODUCTION

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

1.1 SITE LOCATION

The proposed project is located at 6400 Katella Avenue in the City of Cypress as shown on Exhibit 1-A. The site is currently occupied by the former Mitsubishi Motors Corporation, which includes 145,004 square feet of warehousing use, 180,000 square feet corporate headquarters office building, and 70,000 square feet of research and development buildings. The nearest noise sensitive residential land use is located south of Project site across the Stanton Storm Channel.

1.2 PROJECT DESCRIPTION

The proposed Project will consist of the demolition of existing buildings and the development of up to 486,088 square feet (sf) of warehousing use within two buildings (northern building is 263,274 sf and southern building is 222,814 sf).

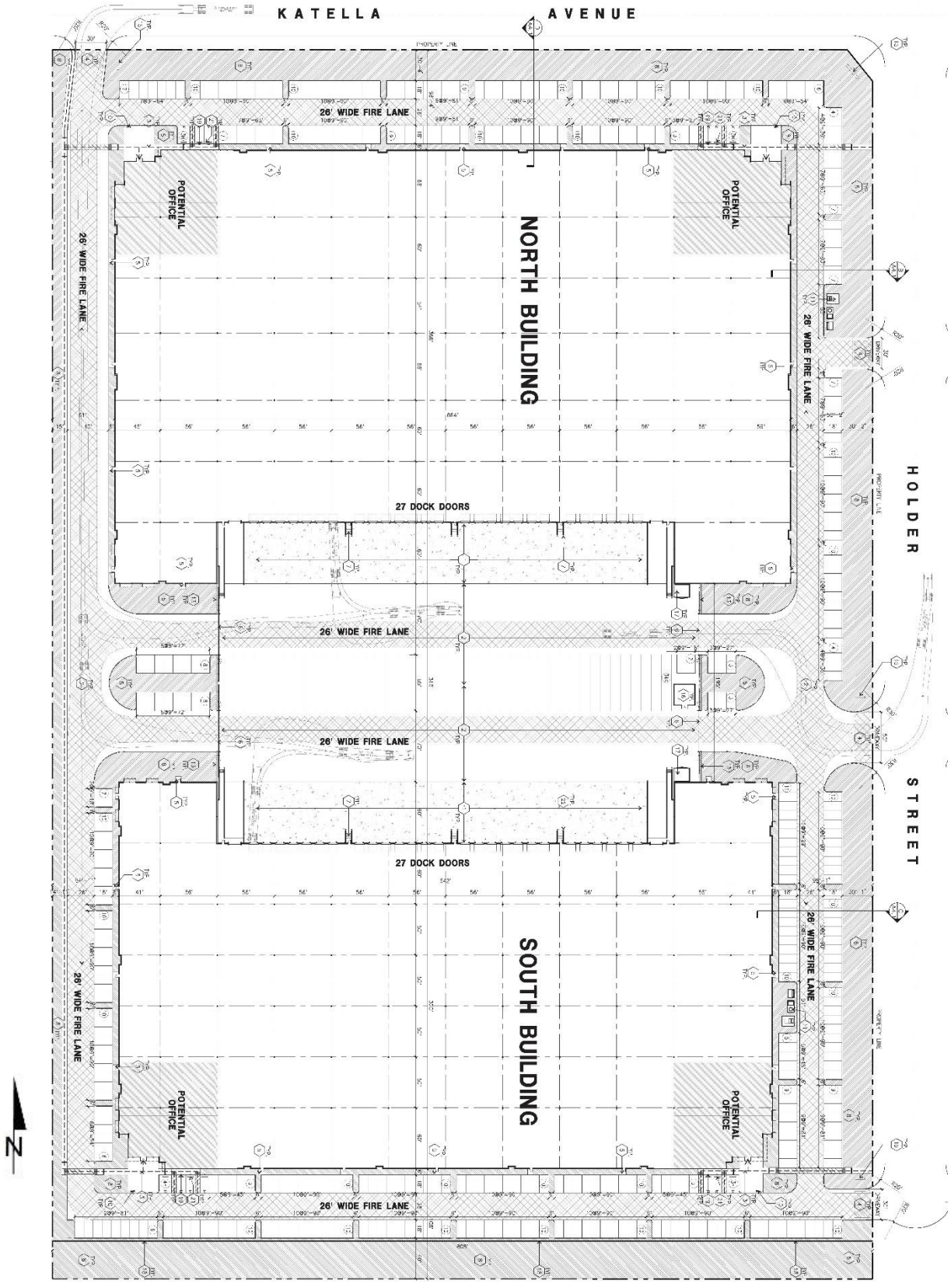
The Project is anticipated to be constructed in one phase by the year 2021. The on-site Project-related noise sources are expected to include: loading dock activity, truck movements, roof-top air conditioning units, and trash compactor activity. This noise analysis is intended to describe noise level impacts associated with the expected typical operational activities at the Project site. To present a conservative approach, this report assumes the Project will operate 24-hours daily for seven days per week.

EXHIBIT 1-A: LOCATION MAP

LEGEND:

Site Boundary

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. (6) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 100 feet, which can cause serious discomfort. (7) 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 figure is the equivalent level (L_{eq}). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period (typically one hour) and is commonly used to describe the "average" noise levels within the environment.

To describe the time-varying character of environmental noise, the statistical or percentile noise descriptors L_{50}, L_{25}, L_8 and L_2, are commonly used. The percentile noise descriptors are the noise levels equaled or exceeded during 50 percent, 25 percent, 8 percent and 2 percent of a stated time. Sound levels associated with the L_2 and L_8 typically describe transient or short-term events, while levels associated with the L_{50} describe the steady state (or median) noise conditions. The relies on the percentile noise levels to describe the stationary source noise level limits. While the L_{50} describes the noise levels occurring 50 percent of the time, the L_{eq} accounts for the total energy (average) observed for the entire hour.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level is utilized. The CNEL is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of 5 decibels to dBA L_{eq} sound levels in the evening from 7:00 p.m. to 10:00 p.m., and the addition of 10 decibels to dBA L_{eq} sound levels at night between 10:00 p.m. and 7:00 a.m. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. The City of Cypress 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. (6)

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. (8)

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. (6)

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 FHWA does not consider the planting of vegetation to be a noise abatement measure. (8)

2.3.5 REFLECTION

Field studies conducted by the FHWA have shown that the reflection from barriers and buildings does not substantially increase noise levels. (8) If all the noise striking a structure was reflected back to a given receiving point, the increase would be theoretically limited to 3 dBA. Further, not all the acoustical energy is reflected back to same point. Some of the energy would go over the structure, some is reflected to points other than the given receiving point, some is scattered by ground coverings (e.g., grass and other plants), and some is blocked by intervening structures

and/or obstacles (e.g., the noise source itself). Additionally, some of the reflected energy is lost due to the longer path that the noise must travel. FHWA measurements made to quantify reflective increases in traffic noise have not shown an increase of greater than 1-2 dBA; an increase that is not perceptible to the average human ear.

2.4 NOISE CONTROL

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

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by up to 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receiver. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (8)

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. (9)

2.7 COMMUNITY RESPONSE TO NOISE

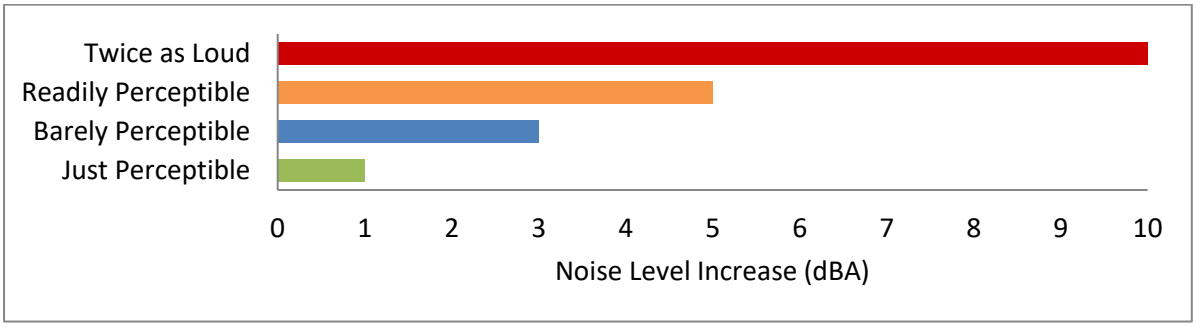
Community responses to noise may range from registering a complaint by telephone or letter, to initiating court action, depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

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

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Twenty-five percent of the population will not complain even in very severe noise

environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (10) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (10) Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. A change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (8)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



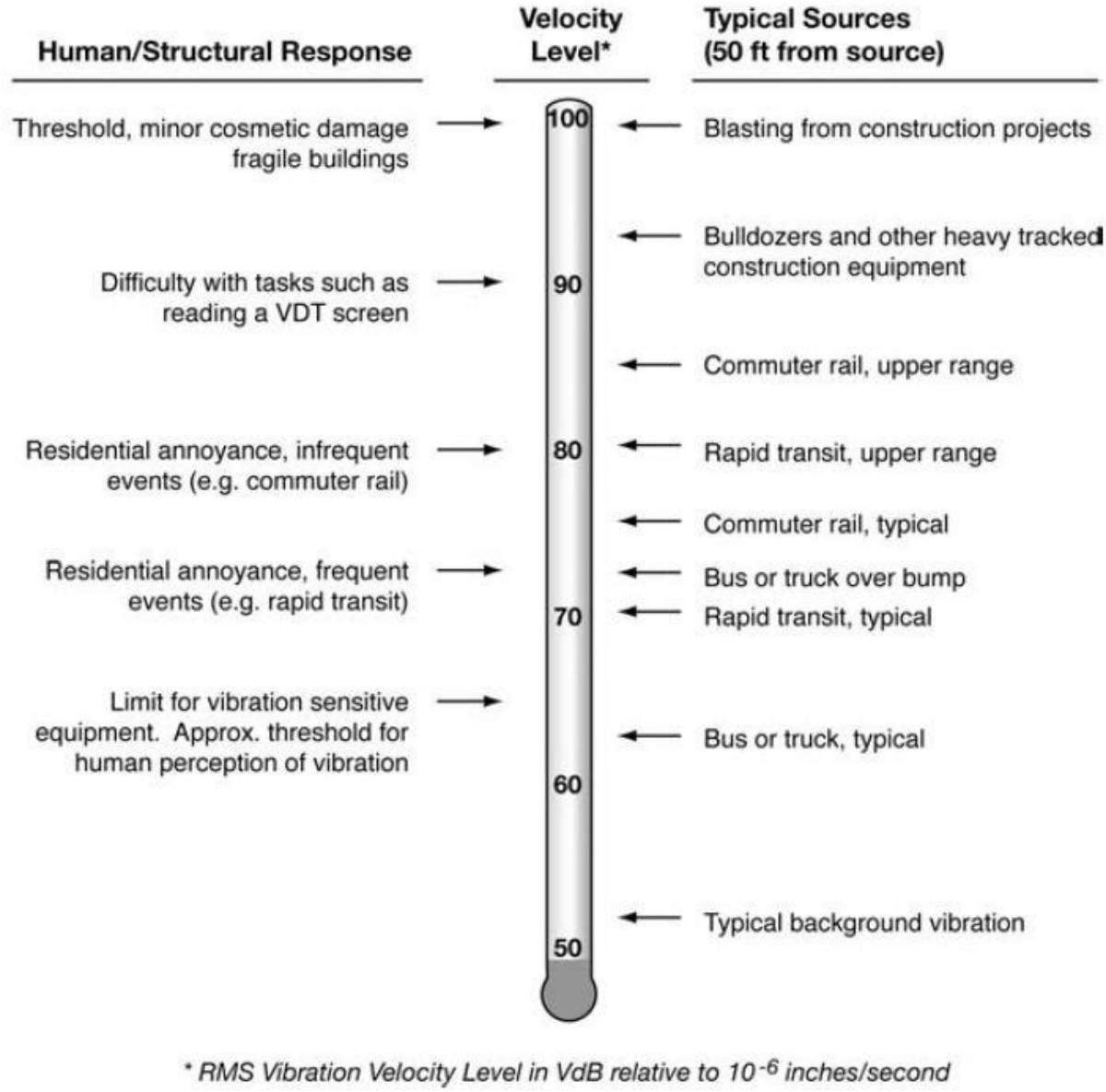
2.8 VIBRATION

Per the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (11), 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



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

3 REGULATORY SETTING

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

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research (OPR). (12) 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 CYPRESS GENERAL PLAN NOISE ELEMENT

The City of Cypress has adopted a Noise Element of the General Plan (13) to control and abate environmental noise, and to protect the citizens of the City of Cypress from excessive exposure to noise. The City of Cypress General Plan Noise Element specifies the maximum allowable unmitigated exterior noise levels for new developments impacted by transportation noise sources such as arterial roads, freeways, airports, and railroads. In addition, the City of Cypress General Plan Noise Element identifies several goals and policies to minimize the impacts of excessive noise levels throughout the community and establishes noise level requirements for all land uses. To limit the exposure of City residents to excessive noise, the City of Cypress General Plan Noise Element contains the following five goals:

N-1	*Reduce noise impacts from transportation noise sources.*
N-2	*Incorporate noise considerations into land use planning decisions.*
N-3	*Minimize noise spillover from commercial uses into nearby residential neighborhoods.*
N-4	*Minimize the noise impacts associated with the development of residential units above ground floor commercial uses in mixed use developments.*
N-5	*Develop measures to control non-transportation noise impacts.*

To satisfy these five overarching goals, the City of Cypress General Plan Noise Element identifies policies to reduce noise levels at sensitive land uses. For transportation noise sources (Goal N-1), the City of Cypress General Plan Noise Element requires the incorporation of mitigation measures, such as noise barriers, in the design of new developments. Further, the City has

established criteria to determine the land use compatibility of new developments based on the noise level criteria defined in Table N-2, and the interior and exterior noise standards in Table N-3 of the City of Cypress General Plan Noise Element (Goal N-2). To minimize the noise spillover from commercial to residential land uses (Goal N-3), the City of Cypress General Plan Noise Element sets noise level limits for commercial properties and landscape buffer distance requirements, in addition to enforcing the City's Noise Ordinance. Additional policies are identified to reduce commercial noise in mixed-use developments where residential units are located above ground floor commercial uses (Goal N-4). Goal N-5 of the City of Cypress General Plan Noise Element requires compliance with the Noise Ordinance for noise-generating activities on land uses such as commercial and industrial.

The *Noise and Land Use Compatibility Matrix* (Table N-2) in the City of Cypress General Plan Noise Element lists land use categories and the acceptable and unacceptable levels of community noise exposure. The compatibility criteria shown on Table N-2 (and Exhibit 3-A of this report) provides the City with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels. The *Noise and Land Use Compatibility Matrix* describes categories of compatibility, but not specific noise standards. According to these categories of transportation-related noise compatibility, the Katella Avenue High Cube Warehouse industrial land uses are considered *normally acceptable* with unmitigated exterior noise levels below 70 dBA CNEL and *conditionally acceptable* with noise levels below 75 dBA CNEL. For *conditionally acceptable* land use, *"new construction or development should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice"* (City of Cypress General Plan Noise Element, Table N-2).

3.3 OPERATIONAL NOISE LEVEL STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Project, stationary-source (operational) noise such as loading dock activity, truck movements, roof-top air conditioning units, and trash compactor activity are typically evaluated against standards established under a City's Municipal Code. The noise regulations included in the City of Cypress Municipal Code, Article VII *Noise Control*, provide standards for determining and mitigating non-transportation or stationary-source noise impacts from operations at private properties. The noise standards identified in the Municipal Code are based on noise zones specified in Section 13-67 *Designated noise zone* which establishes Noise Zone 1 for all residential properties zoned RS-15000 or RS-6000, and Noise Zone 2 for all other residential properties.

All the nearby noise sensitive receiver location near the Project site are located within Noise Zone 1. For noise-sensitive residential land uses in Noise Zone 1, Section 13-68, *Exterior Noise Standards*, identifies a daytime (7:00 a.m. to 10:00 p.m.) noise level standard of 55 dBA L_{50} and a nighttime (10:00 p.m. to 7:00 a.m.) noise level standard of 50 dBA L_{50} (14) The City of Cypress Municipal Code, Section 13-68, identifies operational noise level limits using the percentile noise descriptors. The L_{50} percentile noise descriptor identifies the noise levels occurring 50 percent of the time.

EXHIBIT 3-A: NOISE AND LAND USE COMPATIBILITY MATRIX

Land Use Category	Community Noise Exposure			
	Ldn or CNEL, dB			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential-Low Density	50-60	60-65	65-75	75-85
Residential-Multiple Family	50-60	60-65	65-75	75-85
Transient Lodging-Motel, Hotels	50-65	65-70	70-80	80-85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50-60	60-65	65-80	80-85
Auditoriums, Concert Halls, Amphitheaters	NA	50-65	NA	65-85
Sports Arenas, Outdoor Spectator Sports	NA	50-70	NA	70-85
Playgrounds, Neighborhood Parks	50-70	NA	70-75	75-85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50-70	NA	70-80	80-85
Office Buildings, Business Commercial and Professional	50-67.5	67.5-75	75-85	NA
Industrial, Manufacturing, Utilities, Agriculture	50-70	70-75	75-85	NA

Source: Modified from U.S. Department of Housing and Urban Development Guidelines and State of California Standards.

NOTES:
NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
NORMALLY UNACCEPTABLE
New Construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.
NA: Not Applicable

These standards shall not exceed:

- The noise standard for a cumulative period of more than 30 minutes in any hour (L_{50})
- The noise standard plus 5 dB(A) for a cumulative period of more than 15 minutes in any hour (L_{25})
- The noise standard plus 10 dB(A) for a cumulative period of more than 5 minutes in any hour (L_{8})
- The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour (L_{2})
- The noise standard plus 20 dB(A) for any period of time (L_{max}).

In the event the ambient noise level exceeds any of the four (4) noise limit categories listed above; the cumulative period applicable to said category shall be increased to reflect the ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum

ambient noise level. The City of Cypress Municipal Code noise standards are shown on Table 3-1 and included in Appendix 3.1.

TABLE 3-1: OPERATIONAL EXTERIOR NOISE STANDARDS

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

[1] The percent noise level is the level exceeded "n" percent of the time. L_{50} is the noise level exceeded 50% of the time.
[2] City of Cypress Municipal Code Section 13-68. Exterior Noise Standards (Appendix 3.1).
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

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

3.4 CONSTRUCTION NOISE STANDARDS

To analyze noise impacts originating from the construction of the Katella Avenue High Cube Warehouse Project, noise from construction activities are typically evaluated against standards established under a City's Municipal Code. The City of Cypress Municipal Code, Section 13-70, states that construction activities are limited to the hours of 7:00 a.m. to 8:00 p.m. on weekdays, 9:00 a.m. to 8:00 p.m. on Saturdays and prohibited on Sundays and federal holidays. (3) While the City establishes limits to the hours during which construction activity may take place, neither the City's General Plan or Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers. Therefore, a numerical construction threshold based on Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* is used for analysis of daytime construction impacts, as discussed below.

According to the FTA, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should account for the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. Due to the lack of standardized construction noise thresholds, the FTA provides guidelines that can be considered reasonable criteria for

construction noise assessment. The FTA considers a daytime exterior construction noise level of 80 dBA L_{eq} as a reasonable threshold for noise sensitive residential land use. (11 p. 179)

3.5 OPERATIONAL VIBRATION STANDARDS

Section 3.10.120 of the City of Cypress Municipal Code included in Appendix 3.2 requires that uses shall not generate inherent and recurrent ground vibrations that are perceptible, without the aid of instruments, at the boundary of the parcel on which a use is located. This restriction shall not apply to temporary construction activity. According to the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* the threshold of perception is approximately 65 VdB. Although the perceptibility threshold is approximately 65 VdB, human response to vibration is not usually substantial unless the vibration exceeds 70 VdB. Therefore, to ensure that the Project operational vibration levels are not perceptible consistent with Section 3.10.120 of the City of Cypress Municipal Code (15), a threshold of 65 VdB is used to assess the potential Project operational vibration levels.

3.6 CONSTRUCTION VIBRATION STANDARDS

Construction activity can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. Katella Avenue High Cube Warehouse(11) To analyze vibration impacts originating from the construction of the Katella Avenue High Cube Warehouse, vibration-generating activities are appropriately evaluated against standards established under a City's Municipal Code, if such standards exist. However, the City of Cypress does not identify specific construction vibration level limits. Therefore, to describe the potential Project construction vibration levels, this analysis relies on the FTA *Transit Noise and Vibration Impact Assessment Manual* guidelines for the maximum-acceptable vibration levels for different types of land uses. These acceptable guidelines allow for vibration levels of 90 VdB for industrial (workshop) use, 84 VdB for office use, 78 VdB for daytime residential uses and 72 VdB for nighttime uses in buildings where people normally sleep. (11)

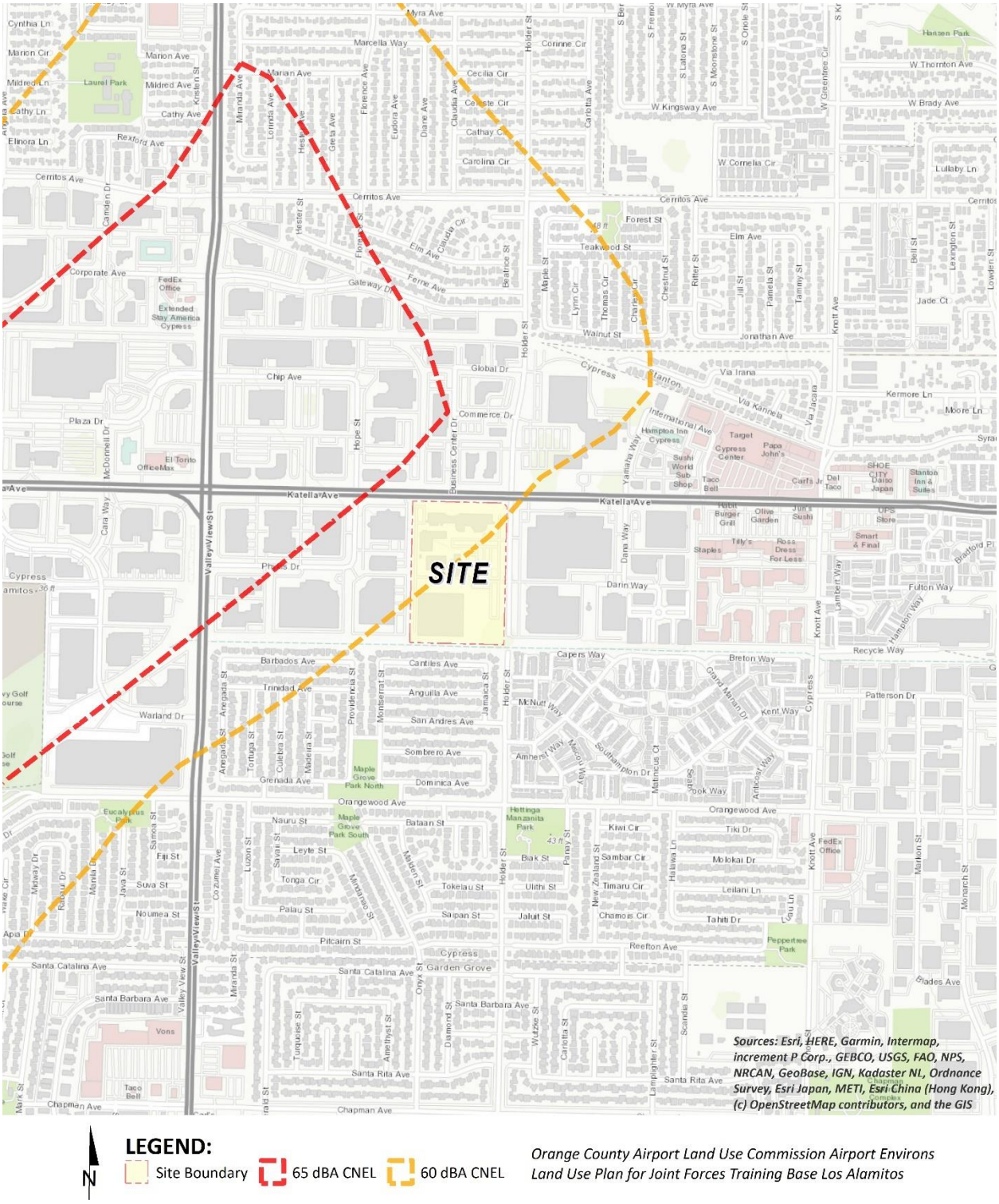
3.6 LOS ALAMITOS JOINT FORCES TRAINING BASE

The Project site is located approximately 0.6 miles northeast of the Los Alamitos Joint Forces Training Base (JFTB), Los Alamitos airfield. The base contains two runways and is the only remaining military airfield in Los Angeles and Orange Counties. The majority of the JFTB operations consist of helicopter training with some light twin engine fixed aircraft and occasional operations by transient military and civil support aircraft.

The Orange County Airport Land Use Commission *Airport Environs Land Use Plan for Joint Forces Training Base Los Alamitos* (16) shows the 65 and 60 dBA CNEL noise contour boundaries for the Los Alamitos airfield in relation to the Katella Avenue High Cube Warehouse site, which is located outside the 65 dBA CNEL noise contour. Based on the City of Cypress *Noise and Land Use*

Compatibility Matrix (see Exhibit 3-A), the community noise exposure levels at the Project site are considered *normally acceptable.*

EXHIBIT 3-B: JFTB AIRFIELD NOISE CONTOUR BOUNDARIES



4 SIGNIFICANCE CRITERIA

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

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

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

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

While the City of Cypress General Plan Guidelines provide direction on noise compatibility and establish noise standards by land use type that are sufficient to assess the significance of noise impacts, they do not define the levels at which increases are considered substantial temporary or permanent for use under CEQA Significance Criteria A.

4.1 CEQA GUIDELINES NOT FURTHER ANALYZED

The closest airport which would require additional noise analysis under CEQA Significance Criteria C is the Los Alamitos Joint Forces Training Base (JFTB), Los Alamitos airfield. The Project site is located approximately 0.6 miles northeast of the JFTB. As previously indicated in Section 3.7, the noise contour boundaries of JFTB are presented on Exhibit 3-B of this report and show that the Project is located outside of the 65 dBA CNEL noise contour boundary. Therefore, since industrial land use is considered *normally acceptable* with exterior noise levels of 50-70 dBA CNEL as shown on Exhibit 3-A, the JFTB noise impacts are considered *less than significant* and no further noise analysis is provided under CEQA Significance Criteria C.

4.2 NOISE-SENSITIVE RECEIVERS

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the nearest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels, and the location of noise-sensitive receivers to determine if a noise level increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (17) Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction. 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.

4.2.1 SUBSTANTIAL PERMANENT NOISE LEVEL INCREASES

Since neither the City of Cypress General Plan Noise Element or Municipal Code identify any noise level increase thresholds, the substantial permanent noise level increase criteria is derived from the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual.* To describe the amount to which a given noise level increase is considered acceptable, the FTA criteria is used to evaluate the incremental noise level increase and establishes a method for comparing future project noise with existing ambient conditions under CEQA Significance Threshold A. In effect, the amount to which a given noise level increase is considered acceptable is reduced based on existing ambient noise conditions. Table 4-1 below provides a summary of the allowable criteria used to identify potentially significant incremental noise level increases.

TABLE 4-1: SIGNIFICANCE OF PERMANENT NOISE LEVEL INCREASES

Without Project Noise Level	Potential Significant Impact (dBA CNEL)
< 50 dBA	7 dBA or more
50 - 55 dBA	5 dBA or more
55 - 60 dBA	3 dBA or more
60 - 65 dBA	2 dBA or more
65 - 75 dBA	1 dBA or more
> 75 dBA	0 dBA

FTA Transit Noise and Vibration Impact Assessment Manual, 2018 (Table 4-6).

4.2.2 SUBSTANTIAL TEMPORARY OF PERIODIC NOISE LEVEL INCREASES

Due to the temporary, short-term nature of noise-generating construction activities, the temporary noise level increases over the existing ambient conditions must be considered under CEQA Significance Threshold A. Therefore, the Caltrans *Traffic Noise Analysis Protocol* 12 dBA L_{eq} *substantial* noise level increase threshold is used in this analysis to assess temporary noise level increases. (18) If the Project-related construction noise levels generate a temporary noise level increase above the existing ambient noise levels of up to 12 dBA L_{eq}, then the Project construction noise level increases will be considered a *potentially significant* impact. Although the Caltrans recommendations were specifically developed to assess traffic noise impacts, the 12 dBA L_{eq} substantial noise level increase threshold is used in California to address noise level increases with the potential to exceed existing conditions.

4.3 NON-NOISE-SENSITIVE RECEIVERS

As previously shown on Exhibit 3-A, the *normally acceptable* exterior noise level for non-noise-sensitive land use, such as office, commercial and professional use is 67.5 dBA CNEL and 70 dBA CNEL for industrial uses. Therefore, noise levels greater than 67.5 for office, commercial and professional use or 70 dBA CNEL for industrial uses are considered *conditionally acceptable* according to the *Noise and Land Use Compatibility Matrix*.

To determine if Project-related traffic noise level increases are significant at off-site non-noise-sensitive land uses, a *barely perceptible* 3 dBA criteria is used. (8) When the without Project noise levels are greater than the *normally acceptable* 67.5 or 70 dBA CNEL land use compatibility criteria, a *barely perceptible* 3 dBA or greater noise level increase is considered a *significant impact* since the noise level criteria is already exceeded.

4.4 SIGNIFICANCE CRITERIA SUMMARY

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 4-2 shows the significance criteria summary matrix.

OFF-SITE TRAFFIC NOISE

- When the noise levels at existing and future noise-sensitive land uses (e.g. residential, etc.):
    - are less than 50 dBA CNEL and the Project creates a 7 dBA CNEL or greater Project-related noise level increase; or
    - range from 50 to 55 dBA CNEL and the Project creates a 5 dBA CNEL or greater Project-related noise level increase; or
    - range from 55 to 60 dBA CNEL and the Project creates a 3 dBA CNEL or greater Project-related noise level increase; or
    - range from 60 to 65 dBA CNEL and the Project creates a 2 dBA CNEL or greater Project-related noise level increase; or
    - range from 65 to 75 dBA CNEL and the Project creates a 1 dBA CNEL or greater Project-related noise level increase; or
    - already exceed 75 dBA CNEL, and the Project creates a community noise level increase of greater than 0 dBA CNEL.
- When the noise levels at existing and future non-noise-sensitive land uses (office buildings, business commercial, and professional):
    - are greater than the *Noise and Land Use Compatibility Matrix* (Exhibit 3-A), *normally acceptable* 67.5 dBA CNEL and the Project creates a *barely perceptible* 3 dBA CNEL or greater Project-related noise level increase.
- When the noise levels at existing and future non-noise-sensitive land uses (industrial, manufacturing, utilities, agriculture):
    - are greater than the *Noise and Land Use Compatibility Matrix* (Exhibit 3-A), *normally acceptable* 70.0 dBA CNEL and the Project creates a *barely perceptible* 3 dBA CNEL or greater Project-related noise level increase.

OPERATIONAL NOISE & VIBRATION

- If Project-related operational (stationary source) noise levels:
    - exceed the exterior 55 dBA L_{50} daytime or 50 dBA L_{50} nighttime noise level standards for residential land uses in Noise Zone 1. These standards shall not be exceeded plus 5 dBA for a cumulative period of 30 minutes in any hour (L_{50}), or plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes (L_{25}) in any hour, or the standard plus 10 dBA for a cumulative period of more than 5 minutes (L_8) in any hour, or the standard plus

15 dBA for a cumulative period of more than 1 minute (L_2) in any hour, or the standard plus 20 dBA for any period of time (L_{max}) (City of Cypress Municipal Code Section 13-68)

- If the existing ambient noise levels at nearby noise-sensitive receivers:
  - are less than 50 dBA L_{eq} and the Project creates a 7 dBA L_{eq} or greater Project-related noise level increase; or
  - range from 50 to 55 dBA L_{eq} and the Project creates a 5 dBA L_{eq} or greater Project-related noise level increase; or
  - range from 55 to 60 dBA L_{eq} and the Project creates a 3 dBA L_{eq} or greater Project-related noise level increase; or
  - range from 60 to 65 dBA L_{eq} and the Project creates a 2 dBA L_{eq} or greater Project-related noise level increase; or
  - range from 65 to 75 dBA L_{eq} and the Project creates a 1 dBA L_{eq} or greater Project-related noise level increase; or
  - already exceed 75 dBA L_{eq}, and the Project creates a community noise level increase of greater than 0 dBA L_{eq}.
- If Project generated operational vibration levels exceed the FTA's 65 VdB threshold of human perception.

CONSTRUCTION NOISE & VIBRATION

- If Project-related construction activities:
  - occur at any time other than the permitted hours of 7:00 a.m. to 8:00 p.m. on weekdays, 9:00 a.m. to 8:00 p.m. on Saturdays except Sunday or a federal holiday. (City of Cypress Municipal Code, Section 13-70(e))
  - create noise levels which exceed the 80 dBA Leq acceptable noise level threshold at the nearby sensitive receiver locations (FTA, Transit Noise and Vibration Impact Assessment Manual)
  - generate temporary Project construction-related noise level increases which exceed the 12 dBA Leq substantial noise level increase threshold at noise-sensitive receiver locations (Caltrans, Traffic Noise Analysis Protocol).
- If Project-related construction activities create vibration levels which exceed the FTA guidelines for the maximum-acceptable vibration criteria of 90 VdB for industrial (workshop) use, 84 VdB for office use, 78 VdB for daytime residential uses and 72 VdB for nighttime uses in buildings where people normally sleep. (FTA, Transit Noise and Vibration Impact Assessment Manual)

TABLE 4-2: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Receiving Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site	Noise-Sensitive[1]	If ambient is < 50 dBA CNEL	≥ 7 dBA CNEL Project increase	
		If ambient is 50 - 55 dBA CNEL	≥ 5 dBA CNEL Project increase	
		If ambient is 55 - 60 dBA CNEL	≥ 3 dBA CNEL Project increase	
		If ambient is 60 - 65 dBA CNEL	≥ 2 dBA CNEL Project increase	
		If ambient is 65 - 75 dBA CNEL	≥ 1 dBA CNEL Project increase	
		If ambient is > 75 dBA CNEL	0 dBA CNEL Project increase	
	Office[2]	if ambient is > 67.5 dBA CNEL	≥ 3 dBA CNEL Project increase	
	Industrial[2]	if ambient is > 70 dBA CNEL	≥ 3 dBA CNEL Project increase	
Operational	Residential	Noise Zone 1[3]	See Table 3-1	
	Noise-Sensitive[1]	If ambient is < 50 dBA L_{eq}	≥ 7 dBA L_{eq} Project increase	
		If ambient is 50 - 55 dBA L_{eq}	≥ 5 dBA L_{eq} Project increase	
		If ambient is 55 - 60 dBA L_{eq}	≥ 3 dBA L_{eq} Project increase	
		If ambient is 60 - 65 dBA L_{eq}	≥ 2 dBA L_{eq} Project increase	
		If ambient is 65 - 75 dBA L_{eq}	≥ 1 dBA L_{eq} Project increase	
		If ambient is > 75 dBA L_{eq}	0 dBA L_{eq} Project increase	
		Vibration Level Threshold[1]	65 VdB	
Construction	Noise-Sensitive	Permitted hours of 7:00 a.m. to 8:00 p.m. on weekdays, 9:00 a.m. to 8:00 p.m. on Saturdays except Sunday or a federal holiday[4]		
		Noise Level Threshold[1]	80 dBA L_{eq}	n/a
		Noise Level Increase[5]	12 dBA L_{eq}	n/a
	Residential	Vibration Level Threshold[1]	78 VdB	72 VdB
	Office		84 VdB	
	Industrial		90 VdB	

[1] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual.
[2] City of Cypress General Plan Noise Element Noise and Land Use Compatibility Matrix
[3] City of Cypress Municipal Code Section 13-68 (Appendix 3.1).
[4] City of Cypress Municipal Code, Section 13-70 (Appendix 3.2).
[5] Caltrans Traffic Noise Analysis Protocol, May 2011.
"Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 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 five locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Wednesday, May 14th, 2020. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (19)

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*. (6) 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*. (11)

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. (6) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after Project noise levels and is necessary to assess potential noise impacts due to the Project's contribution to the ambient noise levels.

5.3 NOISE MEASUREMENT RESULTS

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

- Location L1 represents the noise levels north of the Project site by Holder Street near the existing single-family residential home at 10753 Maple Street. The noise levels at this location consist primarily of traffic noise from Holder Street. The noise level measurements collected show an overall 24-hour exterior noise level of 58.7 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 56.3 dBA L_{eq} with an average nighttime noise level of 50.5 dBA L_{eq}.
- Location L2 represents the noise levels northeast of the Project site by the Hampton Inn at 10900 Yamaha Way. The noise level measurements collected show an overall 24-hour exterior noise level of 61.7 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 57.0 dBA L_{eq} with an average nighttime noise level of 54.6 dBA L_{eq}. The noise levels at this location consist primarily of parking lot vehicle movements.
- Location L3 represents the noise levels southeast of the Project site on Capers Way near existing multi-family residential homes. The 24-hour CNEL indicates that the overall exterior noise level is 53.3 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 48.2 dBA L_{eq} with an average nighttime noise level of 46.3 dBA L_{eq}. Background traffic noise from Caper Way represent the primary source of noise at this location.
- Location L4 represents the noise levels south of the Project site on Holder street near existing single-family residential home at 6471 Cantiles Avenue. The noise level measurements collected show an overall 24-hour exterior noise level of 50.7 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 51.9 dBA L_{eq} with an average nighttime noise level of 49.1 dBA L_{eq}. The noise levels at this location consist primarily of traffic noise from Holder Street.
- Location L5 represents the noise southwest of the Project side by Barbados Avenue by an existing single-family home at 11250 Providencia Street. The 24-hour CNEL indicates that the overall exterior noise level is 54.0 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 52.4 dBA L_{eq} with an average nighttime noise level of 45.0 dBA L_{eq}. Traffic on Providencia Street and Barbados Avenue represents the primary source of noise at this location.

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

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

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

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]		CNEL
		Daytime	Nighttime	
L1	Located north of the Project site by Holder Street near existing single-family residential home at 10753 Maple Street.	56.3	50.5	58.7
L2	Located northeast of the Project site by the Hampton Inn at 10900 Yamaha Way.	57.0	54.6	61.7
L3	Located southeast of the Project site on Capers Way near existing multi-family residential homes.	48.2	46.3	53.3
L4	Located south of the Project site on Holder street near existing single-family residential home at 6471 Cantiles Avenue.	51.9	49.1	50.7
L5	Located southwest of the Project side by Barbados Avenue by existing single-family home at 11250 Providencia Street.	52.4	45.0	54.0

[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.

6 METHODS AND PROCEDURES

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

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The expected roadway noise level increases from vehicular traffic were calculated by Urban Crossroads, Inc. using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (20) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (21) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (22)

6.2 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site dBA CNEL transportation noise impacts. Table 6-1 identifies the 5 study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of Cypress General Plan Circulation Element, and the posted vehicle speeds. The ADT volumes used in this study area presented on Table 6-2 are based on the *Katella Avenue High Cube Warehouse Traffic Impact Analysis*, prepared by Urban Crossroads, Inc. for the following traffic scenarios under both Without and With Project alternatives: Existing (2020), and Opening Year Cumulative (2021). (2)

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

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Receiving Land Use[1]	Distance from Centerline to Receiving Land Use (Feet)[2]	Vehicle Speed (mph)[3]
1	Holder St.	n/o Katella Av.	I	42'	40
2	Holder St.	s/o Katella Av.	I	42'	40
3	Katella Av.	w/o Dwy. 1	A/BC	60'	45
4	Katella Av.	w/o Holder St.	I	60'	45
5	Katella Av.	e/o Holder St.	I	60'	45

[1] Sources: Warland/Cypress Business Center Specific Plan Exhibit 3.
[2] Distance to receiving land use is based upon the right-of-way distances.
[3] Source: Katella Avenue High Cube Warehouse Traffic Impact Analysis.
"I"= Industrial; "A"= Agriculture; "BC"= Business Center.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes[1]			
			Existing 2020		Opening Year Cumulative (2021)	
			Without Project	With Project	Without Project	With Project
1	Holder St.	n/o Katella Av.	8,546	8,577	8,778	8,809
2	Holder St.	s/o Katella Av.	2,274	2,791	3,525	4,042
3	Katella Av.	w/o Dwy. 1	35,430	35,855	37,934	38,359
4	Katella Av.	w/o Holder St.	35,430	35,855	37,934	38,359
5	Katella Av.	e/o Holder St.	37,516	37,910	40,010	40,405

[1] Source: Katella Avenue High Cube Warehouse Traffic Impact Analysis.

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

Table 6-3 provides the time of day (daytime, evening, and nighttime) vehicle splits. The daily Project truck trip-ends were assigned to the individual off-site study area roadway segments based on the Project truck trip distribution percentages documented in the *Traffic Impact Analysis*. Using the Project truck trips in combination with the Project trip distribution, Urban Crossroads, Inc. calculated the number of additional Project truck trips and vehicle mix percentages for each of the study area roadway segments. Table 6-4 shows the traffic flow by vehicle type (vehicle mix) used for all without Project traffic scenarios, and Tables 6-5 to 6-6 show the vehicle mixes used for the with Project traffic scenarios.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

Vehicle Type	Time of Day Splits[1]			Total of Time of Day Splits
	Daytime	Evening	Nighttime	
Autos	77.50%	12.90%	9.60%	100.00%
Medium Trucks	84.80%	4.90%	10.30%	100.00%
Heavy Trucks	86.50%	2.70%	10.80%	100.00%

[1] County of Orange Land Use/Noise Compatibility Manual, December 1993. Values rounded to the nearest one-hundredth.
"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

TABLE 6-4: WITHOUT PROJECT VEHICLE MIX

Classification	Total % Traffic Flow			Total
	Autos	Medium Trucks	Heavy Trucks	
All Segments	98.59%	0.82%	0.59%	100.00%

Based on an existing vehicle count taken at Holder Street and Katella Avenue (Katella Avenue High Cube Warehouse Facility Traffic Impact Analysis, Urban Crossroads, Inc.). Vehicle mix percentage values rounded to the nearest one-hundredth.

Due to the added Project truck trips, the increase in Project traffic volumes and the distributions of trucks on the study area road segments, the percentage of autos, medium trucks and heavy trucks will vary for each of the traffic scenarios. This explains why the existing and future traffic volumes and vehicle mixes vary between seemingly identical study area roadway segments.

TABLE 6-5: EXISTING (2020) WITH PROJECT VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Holder St.	n/o Katella Av.	98.59%	0.81%	0.60%	100.00%
2	Holder St.	s/o Katella Av.	98.59%	0.81%	0.60%	100.00%
3	Katella Av.	w/o Dwy. 1	97.33%	0.49%	2.18%	100.00%
4	Katella Av.	w/o Holder St.	99.09%	0.53%	0.38%	100.00%
5	Katella Av.	e/o Holder St.	98.58%	0.81%	0.61%	100.00%

[1] Source: Katella Avenue High Cube Warehouse Traffic Impact Analysis.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-6: OPENING YEAR CUMULATIVE (2021) WITH PROJECT VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Holder St.	n/o Katella Av.	98.59%	0.81%	0.60%	100.00%
2	Holder St.	s/o Katella Av.	98.59%	0.81%	0.60%	100.00%
3	Katella Av.	w/o Dwy. 1	97.49%	0.53%	1.98%	100.00%
4	Katella Av.	w/o Holder St.	99.08%	0.53%	0.39%	100.00%
5	Katella Av.	e/o Holder St.	98.58%	0.81%	0.61%	100.00%

[1] Source: Katella Avenue High Cube Warehouse Traffic Impact Analysis.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

6.3 VIBRATION ASSESSMENT

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

However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 6-7. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential Project construction vibration levels using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $L_{VdB}(D) = L_{VdB}(25\text{ ft}) - 30\log(D/25)$

TABLE 6-7: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	Vibration Decibels (VdB) at 25 feet
Small bulldozer	58
Jackhammer	79
Loaded Trucks	86
Large bulldozer	87
Pile Driver	93

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

7 OFF-SITE TRANSPORTATION NOISE IMPACTS

To assess the off-site transportation CNEL noise level impacts associated with the proposed Project, noise contours were developed based on the *Katella Avenue High Cube Warehouse Traffic Impact Analysis*. (2) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway.

7.1 TRAFFIC NOISE CONTOURS

Noise contours were used to assess the Project's incremental 24-hour dBA CNEL traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA CNEL noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area.

Tables 7-1 through 7-4 present a summary of the exterior dBA CNEL traffic noise levels without barrier attenuation. Roadway segments are analyzed from the without Project to the with Project conditions in each of the following timeframes: Existing (2020) and Opening Year Cumulative (2021). Appendix 7.1 includes a summary of the dBA CNEL traffic noise level contours for each of the traffic scenarios.

TABLE 7-1: EXISTING WITHOUT PROJECT NOISE CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Holder St.	n/o Katella Av.	I	66.3	RW	52	111
2	Holder St.	s/o Katella Av.	I	60.6	RW	RW	46
3	Katella Av.	w/o Dwy. 1	A/BC	73.9	109	236	508
4	Katella Av.	w/o Holder St.	I	73.9	109	236	508
5	Katella Av.	e/o Holder St.	I	74.2	114	245	528

[1] Sources: Warland/Cypress Business Center Specific Plan Exhibit 3.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road. "I"= Industrial; "A"= Agriculture; "BC"= Business Center.

TABLE 7-2: EXISTING WITH PROJECT NOISE CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Holder St.	n/o Katella Av.	I	66.3	RW	52	111
2	Holder St.	s/o Katella Av.	I	62.2	RW	RW	59
3	Katella Av.	w/o Dwy. 1	A/BC	74.3	116	249	537
4	Katella Av.	w/o Holder St.	I	74.3	116	249	537
5	Katella Av.	e/o Holder St.	I	74.5	120	258	556

[1] Sources: Warland/Cypress Business Center Specific Plan Exhibit 3.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road. "I"= Industrial; "A"= Agriculture; "BC"= Business Center.

TABLE 7-3: OPENING YEAR CUMULATIVE (2021) WITHOUT PROJECT NOISE CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Holder St.	n/o Katella Av.	I	66.5	RW	52	113
2	Holder St.	s/o Katella Av.	I	62.5	RW	RW	62
3	Katella Av.	w/o Dwy. 1	A/BC	74.2	115	247	532
4	Katella Av.	w/o Holder St.	I	74.2	115	247	532
5	Katella Av.	e/o Holder St.	I	74.4	119	256	551

[1] Sources: Warland/Cypress Business Center Specific Plan Exhibit 3.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road. "I"= Industrial; "A"= Agriculture; "BC"= Business Center.

TABLE 7-4: OPENING YEAR CUMULATIVE (2021) WITH PROJECT NOISE CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Holder St.	n/o Katella Av.	I	66.5	RW	53	113
2	Holder St.	s/o Katella Av.	I	63.6	RW	RW	73
3	Katella Av.	w/o Dwy. 1	A/BC	74.6	121	260	560
4	Katella Av.	w/o Holder St.	I	74.6	121	260	560
5	Katella Av.	e/o Holder St.	I	74.8	125	269	579

[1] Sources: Warland/Cypress Business Center Specific Plan Exhibit 3.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road. "I"= Industrial; "A"= Agriculture; "BC"= Business Center.

7.2 EXISTING PROJECT TRAFFIC NOISE LEVEL INCREASES

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project has been included in this report to fully analyze all the existing traffic scenarios identified in the *Katella Avenue High Cube Warehouse Traffic Impact Analysis*. This condition is provided solely for informational purposes and will not occur, since the Project will not be fully developed and occupied under Existing conditions. Table 7-1 shows the Existing without Project conditions CNEL noise levels. The Existing without Project exterior noise levels are expected to range from 60.6 to 74.2 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions will range from 62.2 to 74.5 dBA CNEL. Table 7-5 shows that the Project off-site traffic noise level impacts will range from 0.0 to 1.6 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 4-1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level impacts due to unmitigated Project-related traffic noise levels.

7.3 OPENING YEAR CUMULATIVE (2021) PROJECT TRAFFIC NOISE LEVEL INCREASES

Table 7-3 presents the Opening Year Cumulative (2021) without Project conditions CNEL noise levels. The Opening Year Cumulative (2021) without Project exterior noise levels are expected to range from 62.5 to 74.4 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-4 shows the Opening Year Cumulative (2021) with Project conditions will range from 63.6 to 74.8 dBA CNEL. Table 7-6 shows that the Project off-site traffic noise level increases will range from 0.0 to 1.1 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 4-1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level impacts due to unmitigated Project-related traffic noise levels.

TABLE 7-5: EXISTING WITH PROJECT TRAFFIC NOISE LEVEL INCREASES

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]			Noise Sensitive Land Use?	Exterior Noise Standard	Incremental Noise Level Increase Threshold[3]	
				No Project	With Project	Project Addition			Limit	Exceeded?
1	Holder St.	n/o Katella Av.	I	66.3	66.3	0.0	No	70	n/a	No
2	Holder St.	s/o Katella Av.	I	60.6	62.2	1.6	No	70	n/a	No
3	Katella Av.	w/o Dwy. 1	A/BC	73.9	74.3	0.4	No	70	3.0	No
4	Katella Av.	w/o Holder St.	I	73.9	74.3	0.4	No	70	3.0	No
5	Katella Av.	e/o Holder St.	I	74.2	74.5	0.3	No	70	3.0	No

[1] Sources: Warland/Cypress Business Center Specific Plan Exhibit 3.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[3] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?
"I"= Industrial; "A"= Agriculture; "BC"= Business Center.

TABLE 7-6: OPENING YEAR CUMULATIVE (2021) WITH PROJECT TRAFFIC NOISE INCREASES

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]			Noise Sensitive Land Use?	Exterior Noise Standard	Incremental Noise Level Increase Threshold[3]	
				No Project	With Project	Project Addition			Limit	Exceeded?
1	Holder St.	n/o Katella Av.	I	66.5	66.5	0.0	No	70	n/a	No
2	Holder St.	s/o Katella Av.	I	62.5	63.6	1.1	No	70	n/a	No
3	Katella Av.	w/o Dwy. 1	A/BC	74.2	74.6	0.4	No	70	3.0	No
4	Katella Av.	w/o Holder St.	I	74.2	74.6	0.4	No	70	3.0	No
5	Katella Av.	e/o Holder St.	I	74.4	74.8	0.4	No	70	3.0	No

[1] Sources: Warland/Cypress Business Center Specific Plan Exhibit 3.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[3] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?
"I"= Industrial; "A"= Agriculture; "BC"= Business Center.

8 SENSITIVE RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following sensitive receiver locations, as shown on Exhibit 8-A, were identified as representative locations for analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

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

R1: Location R1 represents the existing noise sensitive residence at 10753 Maple Street, approximately 1,449 feet north of the Project site. R1 is placed at the private outdoor living area (backyard) facing the Project site behind an existing 6-foot high barrier. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the Hampton Inn at 10900 Yamaha Way, approximately 1,378 feet northeast of the Project site. Receiver R2 is placed at the building façade. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents the existing noise sensitive residence at 11250 Holder Street, approximately 122 feet southeast of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receiver R3 is placed at the residential building façade behind an existing 6’ foot high barrier. A 24-hour noise measurement near this location, L4, is used to describe the existing ambient noise environment.

R4: Location R4 represents the existing noise sensitive residence at 6471 Cantiles Avenue, approximately 88 feet south of the Project site. R4 is placed at the private outdoor living area (backyard) facing the Project site behind an existing 6-foot high barrier. A 24-hour noise measurement near this location, L4, is used to describe the existing ambient noise environment.

R5: Location R5 represents the existing noise sensitive residence at 11250 Providencia Street, approximately 408 feet southwest of the Project site. R5 is placed at the private outdoor living area (backyard) facing the Project site behind an existing 6-foot high barrier. A 24-hour noise measurement near this location, L5, is used to describe the existing ambient noise environment.

EXHIBIT 8-A: SENSITIVE RECEIVER LOCATIONS

9 OPERATIONAL NOISE IMPACTS

This section analyzes the potential Project-related long-term stationary-source noise impacts at the nearby receiver locations, identified in Section 8, resulting from the operation of the proposed Katella Avenue High Cube Warehouse Project. Exhibit 9-A identifies the representative noise source locations used to assess the operational noise levels.

9.1 OPERATIONAL NOISE SOURCES

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

9.2 REFERENCE NOISE LEVELS

To estimate the Project operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. This section provides a detailed description of the reference noise level measurements shown on Table 9-1 used to estimate the Project operational noise impacts. It is important to note that the following projected noise levels assume the worst-case noise environment with the loading dock activity, truck movements, roof-top air conditioning units, and trash compactor activity all operating continuously. These sources of noise activity will likely vary throughout the day.

EXHIBIT 9-A: OPERATIONAL NOISE SOURCE LOCATIONS

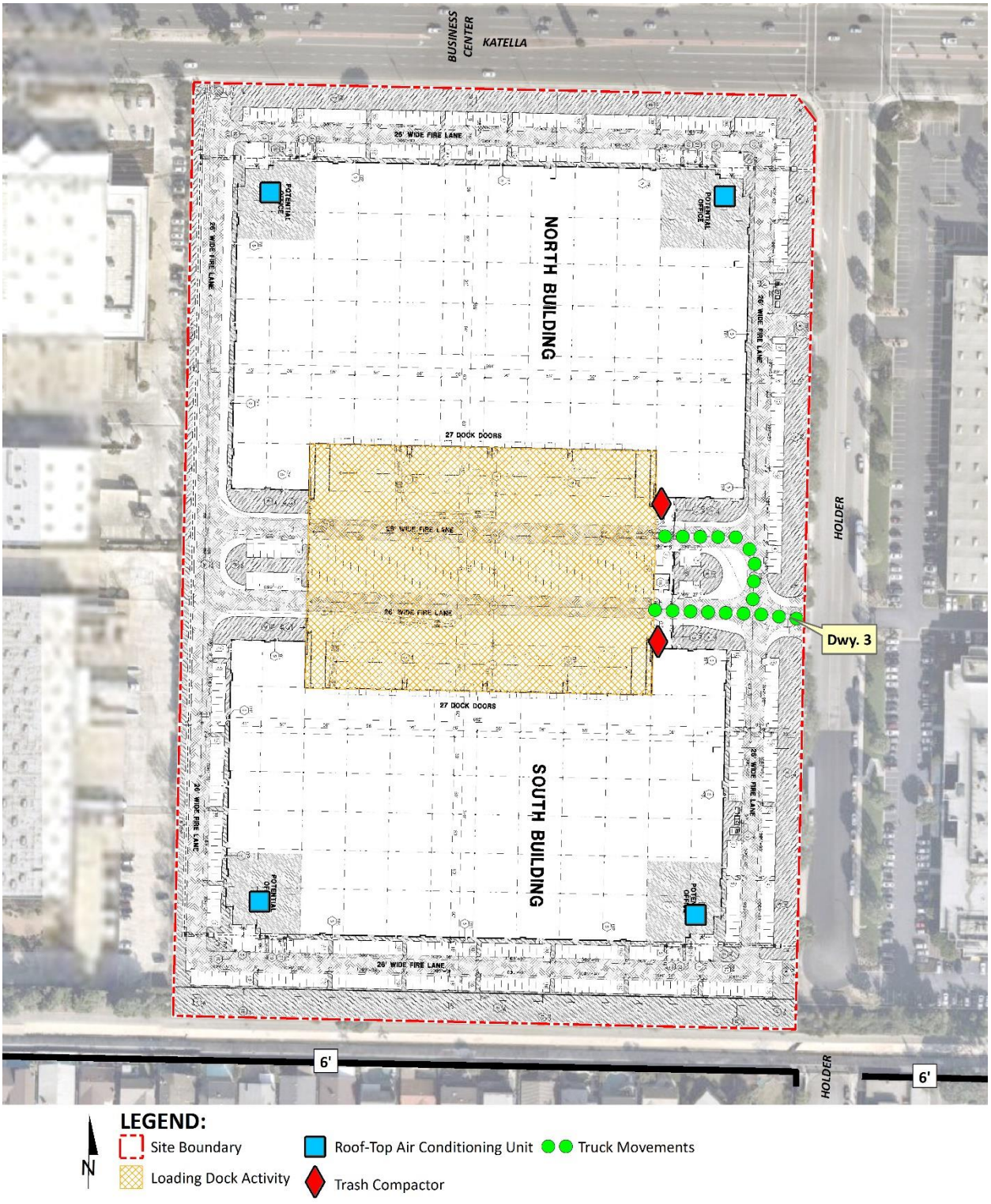

TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source	Duration (hh:mm:ss)	Ref. Distance (Feet)	Noise Source Height (Feet)	Min./Hour[4]		Reference Noise Level (dBA L_{eq})		Sound Power Level (dBA)[5]
				Day	Night	@ Ref. Dist.	@ 50 Feet	
Loading Dock Activity[1]	00:15:00	30'	8'	60	60	67.2	62.8	104.9
Truck Movements[1]	00:15:00	20'	8'	-[6]	-[6]	64.0	58.0	89.7
Roof-Top Air Conditioning[2]	96:00:00	5'	5'	39	28	77.2	57.2	88.9
Trash Compactor Activity[3]	00:02:22	5'	5'	20	20	75.5	55.5	87.2

[1] As measured by Urban Crossroads, Inc. at the Motivational Fulfillment & Logistics Services distribution facility in the City of Chino.
[2] As measured by Urban Crossroads, Inc. at the Santee Walmart located at 170 Town Center Parkway.
[3] As measured by Urban Crossroads, Inc. at the Irvine Walmart located at 16555 Von Karman Avenue.
[4] Anticipated duration (minutes within the hour) of noise activity during typical hourly conditions expected at the Project site. "Day" = 7:00 a.m. to 10:00 p.m.; "Night" = 10:00 p.m. to 7:00 a.m.
[5] Sound power level represents the total amount of acoustical energy (noise level) produced by a sound source independent of distance or surroundings. Sound power levels calculated using the CadnaA noise model at the reference distance to the noise source. Numbers may vary due to size differences between point and area noise sources.
[6] Entry Gate & Truck Movements are calculate based on the number of events by time of day (See Table 9-2).

9.2.1 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. (19)

9.2.2 LOADING DOCK ACTIVITY

Short-term reference noise level measurements were collected at the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino. The noise level measurements represent the typical weekday dry goods logistics warehouse operation in a single building with a loading dock area on the western side of the building façade. Up to ten trucks were observed in the loading dock area including a combination of tractor trailer semi-trucks, two-axle delivery trucks, and background forklift operations. The unloading/docking activity noise level measurement was taken over a fifteen-minute period and represents multiple noise sources taken from the center of loading dock activities generating a reference noise level of 62.8 dBA L_{eq} at a uniform reference distance of 50 feet. At this measurement location, the noise sources associated with 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.

9.2.3 TRUCK MOVEMENTS

An entry gate and truck movements reference noise level measurement were taken at the southern entry gate of the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino over a 15-minute period and represents multiple noise sources producing a reference noise level of 58.0 dBA Leq at 50 feet. The noise sources included at this measurement location account for the rattling and squeaking during normal opening and closing operations, the gate closure equipment, truck engines idling outside the entry gate, truck movements through the entry gate, and background truck court activities and forklift backup alarm noise.

Consistent with the *Katella Avenue High Cube Warehouse Traffic Impact Analysis*, the Project is expected to generate a total of approximately 850 two-way vehicle trips per day (actual vehicles) and includes 232 truck trip-ends per day. (2) This noise study relies on the actual Project trips (as opposed to the passenger car equivalents) to accurately account for the effect of individual truck trips on the study area roadway network. Using the estimated number of truck trips in combination with time of day vehicle splits, the number of entry gate and truck movements by driveway location were calculated. As shown on Table 9-2, this information is then used to calculate the entry gate and truck movements operational noise source activity based on the number of events by time of day.

TABLE 9-2: ENTRY GATE & TRUCK MOVEMENTS BY LOCATION

Entry Gate & Truck Movement Location[1]	Total Project Truck Trips[2]	Trip Dist.[3]	Truck Trips by Location[4]	Time of Day Vehicle Splits[5]			Truck Movements[6]		
				Day	Evening	Night	Day	Evening	Night
Driveway 3	232	100%	232	86.50%	2.70%	10.80%	201	6	25

[1] Driveway locations as shown on the Site Plan Exhibit 9-A.
[2] Total Project truck trips according to Table 4-3 of the Katella Avenue High Cube Warehouse Traffic Impact Analysis.
[3] Project truck trip distribution according to Exhibit 4-2 of the Katella Avenue High Cube Warehouse Traffic Impact Analysis.
[4] Calculated trip trucks per location represents the product of the total project truck trips by and the trip distribution.
[5] Heavy truck time of day vehicle splits as shown on Table 6-3.
[6] Calculated time of day entry gate and truck movements by location.

9.2.4 ROOF-TOP AIR CONDITIONING UNITS

To assess the noise levels created by the roof-top air conditioning units within the planned commercial retail land uses within the Project site, reference noise levels measurements were taken at the Santee Walmart. Located at 170 Town Center Parkway in the City of Santee, the noise level measurements describe a single mechanical roof-top air conditioning unit on the roof of the existing Walmart store. The reference noise level represents a Lennox SCA120 series 10-ton model packaged air conditioning unit. At 5 feet from the roof-top air conditioning unit, the exterior noise levels were measured at 77.2 dBA L_{eq}. 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. The noise attenuation provided by the existing parapet wall is not reflected in this reference noise level measurement.

9.2.5 TRASH COMPACTORS

To assess the noise levels created by the trash compactor planned on the Project site, reference noise levels were gathered from the Irvine Walmart Supercenter located on 16555 Von Karman Avenue, by Urban Crossroads Inc. on Thursday, January 23rd, 2014. The unmitigated exterior noise levels were measured at 75.5 dBA Leq at 5 feet from the compactor. At the uniform reference distance of 50 feet, the reference noise levels are 55.5 dBA Leq. It is expected the trash compactor will operate for a maximum of 20 minutes per hour during typical operating hours.

9.3 CADNAA NOISE PREDICTION MODEL

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

Using the ISO 9613 protocol, CadnaA will calculate the distance from each noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation inputs to provide a summary of noise level at each receiver and the partial noise level contributions by noise source. Consistent with the ISO 9613 protocol, the CadnaA noise prediction model relies on the reference sound power level (PWL) 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 (PWL) 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 noise analysis to account for mixed ground representing a combination of hard and soft surfaces. Appendix 9.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section.

9.4 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed Project operations that include loading dock activity, truck movements, roof-top air conditioning units, and trash compactor

activity, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the Project site and the Project-related noise level increases that would be experienced at each of the sensitive receiver locations. Tables 9-3 shows the Project operational noise levels during the daytime hours of 7:00 a.m. to 10:00 p.m. The daytime hourly noise levels at the off-site receiver locations are expected to range from 23.7 to 36.6 dBA L_{eq}.

TABLE 9-3: DAYTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA L_{eq})				
	R1	R2	R3	R4	R5
Loading Dock Activity	17.4	29.3	24.4	25.5	28.7
Truck Movements	17.8	26.0	28.7	14.2	14.5
Roof-Top Air Conditioning	20.8	24.1	32.6	36.2	29.5
Trash Compactor Activity	0.0	13.9	4.8	5.8	5.5
Total (All Noise Sources)	**23.7**	**31.8**	**34.5**	**36.6**	**32.2**

[1] See Exhibit 9-A for the noise source locations. CadnaA noise model calculations are included in Appendix 9.1.

Table 9-4 shows the Project operational noise levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. The nighttime hourly noise levels at the off-site receiver locations are expected to range from 21.2 to 34.4 dBA L_{eq}. The differences between the daytime and nighttime noise levels is largely related to the duration of noise activity (Table 9-1).

TABLE 9-4: NIGHTTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA L_{eq})				
	R1	R2	R3	R4	R5
Loading Dock Activity	17.4	29.3	24.4	25.5	28.7
Truck Movements	8.8	17.0	19.6	5.1	5.5
Roof-Top Air Conditioning	18.4	21.7	30.2	33.8	27.1
Trash Compactor Activity	0.0	13.0	3.8	4.8	4.5
Total (All Noise Sources)	**21.2**	**30.3**	**31.5**	**34.4**	**31.0**

[1] See Exhibit 9-A for the noise source locations. CadnaA noise model calculations are included in Appendix 9.1.

9.5 PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level thresholds based on the City of Cypress exterior noise level standards at nearby noise-sensitive receiver locations. Table 9-5 shows the operational noise levels associated with Katella Avenue High Cube Warehouse Project will satisfy the City of Cypress 55 dBA L_{eq} daytime and 50 dBA L_{eq} nighttime exterior noise level standards at all nearby receiver locations. Therefore, the operational noise impacts are considered *less than significant* at the nearby noise-sensitive receiver locations.

TABLE 9-5: OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Project Operational Noise Levels (dBA L_{eq})[2]		Noise Level Standards (dBA L_{eq})[3]		Noise Level Standards Exceeded?[4]	
	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
R1	23.7	21.2	55	50	No	No
R2	31.8	30.3	55	50	No	No
R3	34.5	31.5	55	50	No	No
R4	36.6	34.4	55	50	No	No
R5	32.2	31.0	55	50	No	No

[1] See Exhibit 8-A for the receiver locations.
[2] Proposed Project operational noise levels as shown on Tables 9-3 and 9-4.
[3] Exterior noise level standards for noise as shown on Table 4-2.
[4] Do the estimated Project operational noise source activities exceed the noise level standards?
"Day" = 7:00 a.m. to 10:00 p.m.; "Night" = 10:00 p.m. to 7:00 a.m.

9.6 PROJECT OPERATIONAL NOISE LEVEL INCREASES

To describe the Project operational noise level increases, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations potentially impacted by Project operational noise sources. Since the units used to measure noise, decibels (dB), are logarithmic units, the Project-operational and existing ambient noise levels cannot be combined using standard arithmetic equations. (6) 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 describe the Project noise level increases to the existing ambient noise environment. Noise levels that would be experienced at receiver locations when Project-source noise is added to the daytime and nighttime ambient conditions are presented on Tables 9-6 and 9-7, respectively. As indicated on Tables 9-6 and 9-7, the Project will generate a daytime and nighttime operational noise level increases ranging from 0.0 to 3.6 dBA L_{eq} at the nearby receiver locations. Project-related operational noise level increases will satisfy the noise level increase significance criteria presented in Table 4-1. Therefore, the incremental Project operational noise level increase is considered *less than significant* at all receiver locations.

9.7 OPERATIONAL VIBRATION IMPACTS

The Project operational vibration impacts will include heavy trucks moving on site to and from the loading dock areas. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement conditions. According to the FTA *Transit Noise Impact and Vibration Assessment* trucks rarely create vibration that exceed 70 VdB (unless there are bumps due to frequent potholes in the road). Since the trucks transiting on site will be travelling at very low speeds on smooth surfaces, it is expected that delivery truck vibration impacts at nearby receiver

locations will satisfy the vibration perceptibility threshold of 65 VdB and therefore, will be *less than significant*.

TABLE 9-6: 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]	Noise Sensitive Land Use?	Increase Criteria[7]	Increase Criteria Exceeded?[7]
R1	23.7	L1	56.3	56.3	0.0	Yes	3.0	No
R2	31.8	L2	57.0	57.0	0.0	Yes	3.0	No
R3	34.5	L3	48.2	48.4	0.2	Yes	7.0	No
R4	36.6	L4	51.9	52.0	0.1	Yes	5.0	No
R5	32.2	L5	52.4	52.4	0.0	Yes	5.0	No

[1] See Exhibit 8-A for the receiver locations.
[2] Total Project daytime operational noise levels as shown on Table 9-3.
[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 9-7: 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]	Noise Sensitive Land Use?	Increase Criteria[7]	Increase Criteria Exceeded?[7]
R1	21.2	L1	50.5	50.5	0.0	Yes	5.0	No
R2	30.3	L2	54.6	54.6	0.0	Yes	5.0	No
R3	31.5	L3	46.3	46.4	0.1	Yes	7.0	No
R4	34.4	L4	49.1	49.2	0.1	Yes	7.0	No
R5	31.0	L5	45.0	45.2	0.2	Yes	7.0	No

[1] See Exhibit 8-A for the receiver locations.
[2] Total Project nighttime operational noise levels as shown on Table 9-3.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed nighttime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance increase criteria as shown on Table 4-1.

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10 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 10-A shows the construction noise source locations in relation to the nearby sensitive receiver locations previously described in Section 8. To prevent high levels of construction noise from impacting noise-sensitive land uses, City of Cypress Municipal Code Section 13-70, states that construction activities are limited to the hours of 7:00 a.m. to 8:00 p.m. on weekdays, 9:00 a.m. to 8:00 p.m. on Saturdays except Sunday or a federal holiday. (3)

10.1 CONSTRUCTION NOISE LEVELS

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

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

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels.

10.2 CONSTRUCTION REFERENCE NOISE LEVELS

To describe the Project construction noise levels, measurements were collected for similar activities at several construction sites. Table 10-1 provides a summary of the construction reference noise level measurements. Since the reference noise levels were collected at varying distances of 30 feet and 50 feet, all construction noise level measurements presented on Table 10-1 have been adjusted for consistency to describe a uniform reference distance of 50 feet.

EXHIBIT 10-A: TYPICAL CONSTRUCTION NOISE SOURCE LOCATIONS

LEGEND:

- Construction Activity
- Receiver Locations
- Vibration Receiver Locations
- 6' Existing Barrier Height (in feet)
- Existing Barrier
- Distance from receiver to construction activity (in feet)

TABLE 10-1: TYPICAL CONSTRUCTION REFERENCE NOISE LEVELS

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

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.

10.3 TYPICAL CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearby sensitive receiver locations were completed. To assess the worst-case construction noise levels, the Project construction noise analysis relies on the highest noise level impacts when the equipment with the highest reference noise level is operating at the closest point from the edge of primary construction activity (Project site boundary) to each receiver location. As shown on Table 10-2, the construction noise levels are expected to range from 41.9 to 65.3 dBA L_{eq}, and the highest construction levels are expected to range from 52.0 to 65.3 dBA L_{eq} at the nearby receiver locations. Appendix 10.1 includes the detailed CadnaA construction noise model inputs.

TABLE 10-2: TYPICAL 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	48.6	52.0	50.2	48.3	47.9	41.9	52.0
R2	53.6	57.0	55.2	53.3	52.9	46.9	57.0
R3	60.1	63.5	61.7	59.8	59.4	53.4	63.5
R4	61.9	65.3	63.5	61.6	61.2	55.2	65.3
R5	55.6	59.0	57.2	55.3	54.9	48.9	59.0

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Construction noise level calculations based on distance from the project site boundaries (construction activity area) to nearby receiver locations. CadnaA construction noise model inputs are included in Appendix 10.1.

10.4 CONSTRUCTION NOISE THRESHOLDS OF SIGNIFICANCE

The analysis presented below is separated into an evaluation of construction noise level compliance with local regulations and an analysis of temporary, short-term noise level increases due to Project construction activities.

10.4.1 CONSTRUCTION NOISE LEVEL COMPLIANCE

To evaluate whether the Project will generate potentially significant short-term noise levels at nearby receiver locations, a construction-related noise level threshold of 80 dBA L_{eq} is used as a reasonable threshold to assess construction noise level impacts. The construction noise analysis shows that the nearby receiver locations will satisfy the 80 dBA L_{eq} significance threshold during Project construction activities as shown on Table 10-3. Therefore, the noise impacts due to Project construction are considered *less than significant* at all receiver locations.

TABLE 10-3: TYPICAL CONSTRUCTION NOISE LEVEL COMPLIANCE

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})		
	Highest Construction Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	52.0	80	No
R2	57.0	80	No
R3	63.5	80	No
R4	65.3	80	No
R5	59.0	80	No

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Highest construction noise level calculations based on distance from the construction noise source activity to nearby receiver locations as shown on Table 10-2.
[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?

10.4.2 TEMPORARY CONSTRUCTION NOISE LEVEL INCREASES

To describe the temporary Project construction noise level increases to the existing ambient noise environment, the Project construction noise levels were combined with the existing ambient noise levels measurements at the off-site receiver locations. The difference between the combined Project-construction and ambient noise levels are used to describe the construction noise level increases. Temporary noise level increases that would be experienced at sensitive receiver locations when Project construction-source noise is added to the ambient daytime are presented on Tables 10-4. A temporary noise level increase of 12 dBA is considered a potentially significant impact based on the Caltrans substantial noise level increase criteria which is used to assess the Project-construction noise level increases. (18)

TABLE 10-4: TEMPORARY CONSTRUCTION NOISE LEVEL INCREASES (LEQ)

Receiver Location[1]	Distance to Receiver	Highest Construction Noise Levels[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Temporary Worst-Case Project Contribution[6]	Threshold Exceeded?[7]
R1	1,449'	52.0	L1	56.3	57.7	1.4	No
R2	1,378'	57.0	L2	57.0	60.0	3.0	No
R3	122'	63.5	L3	48.2	63.6	15.4	Yes
R4	88'	65.3	L4	51.9	65.5	13.6	Yes
R5	408'	59.0	L5	52.4	59.9	7.5	No

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Highest Project construction noise levels as shown on Table 10-2.
[3] Ambient 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 daytime ambient noise conditions plus the Project construction activities.
[6] The temporary noise level increase expected with the addition of the proposed Project activities.
[7] Based on the 12 dBA temporary increase significance criteria as defined in Section 4.

As indicated in Table 10-4, the Project will contribute, construction noise level increases ranging from 1.4 to 15.4 dBA L_{eq} at the nearest sensitive receiver locations. Since the worst-case temporary noise level increases at receiver locations R3 and R4 exceed the Caltrans *substantial* 12 dBA L_{eq} significance threshold, the construction noise level increases are considered *potentially significant* temporary noise impacts.

Therefore, temporary construction noise mitigation measures are required to reduce these short-term construction noise level increase impacts at receiver locations R3 and R4. This includes mitigation in the form of a 150-foot buffer zone for large construction equipment (e.g. dozers, graders, scrapers, etc.) near the southern Project site boundary or provide sound dampening mats for heavy equipment capable of a minimum 5 dBA L_{eq} noise reduction for heavy mobile equipment engine compartments (e.g., cement mixers, dozers. The construction noise analysis presents a conservative approach with the highest noise-level-producing equipment for each stage of Project construction operating at the closest point from primary construction activity to the nearby sensitive receiver locations. This scenario is unlikely to occur during typical construction activities and likely overstates the construction noise levels which will be

experienced at each receiver location. With the construction noise mitigation measures identified in the Executive Summary the worst-case construction noise level increases at the nearest residential receivers would be reduced to a *less than significant* with mitigation.

10.5 TYPICAL CONSTRUCTION VIBRATION ANALYSIS

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

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

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated using data published by the Federal Transit Administration (FTA). Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site include grading. Using the vibration source level of construction equipment provided on Table 6-7 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 10-5 presents the expected typical construction equipment vibration levels at the nearby receiver locations. In addition to the five nearby noise sensitive receiver locations, Table 10-5 presents the construction vibration levels at the nearest office and industrial land uses.

At distances ranging from 56 feet to 1,449 feet from typical Project construction activities (at the Project site boundary), construction vibration levels are estimated to range from 5.1 to 76.5 VdB, and the highest expected construction vibration levels are estimated to range from 34.1 to 76.5 VdB and will remain below the FTA *Transit Noise and Vibration Impact Assessment Manual* maximum acceptable vibration criteria at all receiver locations. Therefore, the Project-related vibration impacts are considered *less than significant* during typical construction activities at the Project site.

Further, the vibration levels due to Project construction do not represent vibration levels capable of causing building damage to nearby receiver locations since building damage due to construction vibration is generally limited to prolonged annoyance from activities such as pile driving and blasting. Since no pile driving or blasting is planned during the Project construction, the construction vibration levels at nearest receivers 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 10-5: TYPICAL CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver Location[1]	Land Use	Distance to Construction Activity (Feet)	Receiver Vibration Levels (VdB)[2]					Threshold VdB[3]	Threshold Exceeded?[4]
			Small Bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer	Highest Vibration Levels		
R1	Residential	1,449'	5.1	26.1	33.1	34.1	34.1	78	No
R2	Hotel	1,378'	5.8	26.8	33.8	34.8	34.8	78	No
R3	Residential	122'	37.3	58.3	65.3	66.3	66.3	78	No
R4	Residential	88'	41.6	62.6	69.6	70.6	70.6	78	No
R5	Residential	408'	21.6	42.6	49.6	50.6	50.6	78	No
V1	Industrial	137'	35.8	56.8	63.8	64.8	64.8	90	No
V2	Industrial	119'	37.7	58.7	65.7	66.7	66.7	90	No
V3	Industrial	56'	47.5	68.5	75.5	76.5	76.5	90	No
V4	Office	202'	30.8	51.8	58.8	59.8	59.8	84	No
V5	Office	200'	30.9	51.9	58.9	59.9	59.9	84	No
V6	Office	205'	30.6	51.6	58.6	59.6	59.6	84	No
V7	Industrial	181'	32.2	53.2	60.2	61.2	61.2	90	No
V8	Industrial	183'	32.1	53.1	60.1	61.1	61.1	90	No

[1] Receiver locations are shown on Exhibit 10-A.

[2] Based on the Vibration Source Levels of Construction Equipment included on Table 6-7.

[3] FTA Transit Noise and Vibration Impact Assessment Manual maximum acceptable vibration criteria as shown on Table 4-2.

[4] Does the vibration level exceed the maximum acceptable vibration threshold?

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20. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.

21. **California Department of Transportation Environmental Program, Office of Environmental Engineering.** *Use of California Vehicle Noise Reference Energy Mean Emission Levels (Calveno REMELs) in FHWA Highway Traffic Noise Prediction.* September 1995. TAN 95-03.

22. **California Department of Transportation.** *Traffic Noise Attenuation as a Function of Ground and Vegetation Final Report.* June 1995. FHWA/CA/TL-95/23.

12 CERTIFICATION

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

Bill Lawson, P.E., INCE
Principal
URBAN CROSSROADS, INC.
260 E. Baker Street, Suite 200
Costa Mesa, CA 92626
(949) 336-5979
blawson@urbanxroads.com

EDUCATION

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

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

PROFESSIONAL REGISTRATIONS

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

PROFESSIONAL AFFILIATIONS

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

PROFESSIONAL CERTIFICATIONS

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

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APPENDIX 3.1:

CITY OF CYPRESS MUNICIPAL CODE NOISE CRITERIA

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ARTICLE VII. NOISE CONTROL

Note

* **Editor's note:** Ord. No. 563, § 1, adopted Feb. 23, 1976, specifically amended the Code by adding Art. VII, §§ 13-64—13-78 as herein set out.

Cross references: Advertising vehicles with sound-amplifying devices, § 16-82.

Sec. 13-64. Declaration of policy.

(a) In order to control unnecessary, excessive and annoying sounds emanating from incorporated areas of the city, it is hereby declared to be the policy of the city to prohibit such sounds generated from all sources as specified in this chapter.

(b) It is determined that certain noise levels are detrimental to the public health, welfare and safety and contrary to public interest; therefore, the city council does ordain and declare that creating, maintaining, causing or allowing to create, maintain or cause any noise in a manner prohibited by or not in conformity with the provisions of this chapter, is a public nuisance and shall be punishable as such.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-65. Definitions.

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

Ambient noise level shall mean the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

Cumulative period shall mean an additive period of time composed of individual time segments which may be continuous or interrupted.

Decibel (dB) shall mean a unit which denotes the ratio between two (2) quantities which are proportional to power: The number of decibels corresponding to the ratio of two (2) amounts of power is ten (10) times the logarithm to the base ten (10) of this ratio.

Dwelling unit shall mean a single unit providing complete, independent living facilities for one or more persons including permanent provisions for living, sleeping, eating, cooking and sanitation.

Emergency machinery, vehicle or work shall mean any machinery, vehicle or work used, employed or performed in an effort to protect, provide or restore safe conditions in the community or for the citizenry, or work by private or public utilities when restoring utility service.

Fixed noise source shall mean a stationary device which creates sounds while fixed or motionless including but not limited to industrial and commercial machinery and equipment, pumps, fans, compressors, generators, air conditioners and refrigeration equipment.

Grading shall mean any excavating or filling of earth material, or any combination thereof, conducted at a site to prepare said site for construction or other improvements thereon.

Impact noise shall mean the noise produced by the collision of one mass in motion with a second mass which may be either in motion or at rest.

Mobile noise source shall mean any noise source other than a fixed noise source.

Noise level shall mean the "A" weighted sound pressure level in decibels obtained by using a sound level meter at slow response with a reference pressure of twenty (20) microNewtons per square meter. The unit of measurement shall be designated at dB(A).

Noise variance board shall mean an administrative board of five (5) members appointed by the board of supervisors of the County of Orange, per Title 4, Division 6, Article 1 of the Codified Ordinances of the County of Orange.

Person shall mean a person, firm, association, copartnership, joint venture, corporation or any entity, public or private in nature.

Residential property shall mean a parcel of real property which is developed and used either in part or in whole for residential purposes, other than transient uses such as hotels and motels.

Simple tone noise shall mean a noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished.

Sound level meter shall mean an instrument meeting American National Standard Institute's Standard S1.4-1971 for Type 1 or Type 2 sound level meters or an instrument and the associated recording and analyzing equipment which will provide equivalent data.

Sound pressure level of a sound, in decibels, shall mean twenty (20) times the logarithm to the base ten (10) of the ratio of the pressure of the sound to a reference pressure, which reference pressure shall be explicitly stated.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-66. Noise level measurement criteria.

Any noise level measurements made pursuant to the provisions of this chapter shall be performed using a sound level meter as defined in section 13-65.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-67. Designated noise zone.

The residential properties hereinafter described are hereby assigned to the following noise zones:

Noise Zone 1: All residential properties zoned RS-15000 or RS-6000.

Noise Zone 2: All residential property not in Noise Zone 1.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-68. Exterior noise standards.

(a) The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone.

NOISE STANDARDS

Noise Zone	Noise Level	Time Period
1	55 dB(A)	7:00 a.m.—10:00 p.m.
	50 dB(A)	10:00 p.m.—7:00 a.m.
2	60 dB(A)	7:00 a.m.—10:00 p.m.
	55 dB(A)	10:00 p.m.—7:00 a.m.

In the event the alleged offensive noise consists of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five (5) dB(A).

(b) It shall be unlawful for any person at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other residential property, either incorporated or unincorporated, to exceed:

(1) The noise standard for a cumulative period of more than thirty (30) minutes in any hour; or

(2) The noise standard plus five (5) dB(A) for a cumulative period of more than fifteen (15) minutes in any hour; or

(3) The noise standard plus ten (10) dB(A) for a cumulative period of more than five (5) minutes in any hour; or

(4) The noise standard plus fifteen (15) dB(A) for a cumulative period of more than one minute in any hour; or

(5) The noise standard plus twenty (20) dB(A) for any period of time.

(c) In the event the ambient noise level exceeds any of the first four (4) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-69. Interior noise standards.

(a) The following interior noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone:

INTERIOR NOISE STANDARDS

Noise Zone	Noise Level	Time Period
1 and 2	55 dB(A)	7:00 a.m.—10:00 p.m.
	45 dB(A)	10:00 p.m.—7:00 a.m.

In the event the alleged offensive noise consists of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by five (5) dB(A).

(b) It shall be unlawful for any person at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, when the foregoing causes the noise level when measured within any other dwelling unit on any residential property, either incorporated or unincorporated, to exceed:

(1) The interior noise standard for a cumulative period of more than five (5) minutes in any hour; or

(2) The interior noise standard plus five (5) dB(A) for a cumulative period of more than one minute in any hour; or

(3) The interior noise standard plus ten (10) dB(A) for any period of time.

(c) In the event the ambient noise level exceeds either of the first two (2) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-70. Special provisions.

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

(a) Authorized activities conducted on the grounds of any public or private nursery, elementary, intermediate or secondary school or college.

(b) Reserved.

(c) Activities conducted on any park, playground, or street, provided such park, playground, or street, is owned and operated by a public entity.

(d) Any mechanical device, apparatus or equipment used, related to or connected with emergency machinery, vehicle or work.

(e) Noise sources associated with construction, repair, remodeling or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, before 9:00 a.m. and after 8:00 p.m. on Saturday, or at any time on Sunday or a federal holiday.

(f) All mechanical devices, apparatus or equipment which are utilized for the protection or salvage of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions.

(g) Mobile noise sources associated with agricultural operations provided such operations do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday.

(h) Mobile noise sources associated with agricultural pest control through pesticide application provided that the application is made in accordance with restricted material permits issued by or regulations enforced by the agricultural commissioner.

(i) Noise sources, excepting leaf blowers as defined in section 13-72.1(a) of this Code, associated with the maintenance of real property provided said activities take place between the hours of 7:00 a.m. and 8:00 p.m. on any day except Saturday, Sunday or federal holiday, or between the hours of 8:00 a.m. and 8:00 p.m. on Saturday, Sunday or federal holiday.

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

(Ord. No. 563, § 1, 2-23-76; Ord. No. 854, § 4, 8-27-90; Ord. No. 856, § 2, 10-29-90; Ord. No. 994, §§ 1, 2, 9-27-99; Ord. No. 1137, § 1, 10-28-13.)

Sec. 13-71. Schools, hospitals and churches; special provisions.

It shall be unlawful for any person to create any noise which causes the noise level at any school, hospital or church while the same is in use, to exceed the noise limits as specified in section 13-68 prescribed for the assigned noise zone in which the school, hospital or church is located, or which noise level unreasonably interferes with the use of such institutions or which unreasonably disturbs or annoys patients in the hospital, provided conspicuous signs are displayed in three (3) separate locations within one-tenth (0.1) of a mile of the institution indicating the presence of a school, church or hospital.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-72. Air conditioning and refrigeration; special provisions.

Until September 15, 1978, the noise standards enumerated in sections 13-68 and 13-69 shall be increased eight (8) dB(A) where the alleged offensive noise source is an air conditioning or refrigeration system or associated equipment which was installed prior to the effective date of this article.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-72.1. Leaf blower operation; definitions.

As used in this section, the following terms shall have meanings as set forth below:

Leaf blower means any machine however powered used to blow leaves, dirt and other debris off sidewalks, driveways, lawns and other surfaces.

Parcel means an area of real property with a separate or distinct number or other designation shown on a plat recorded in the office of the county recorder. Contiguous parcels owned by the same individual or entity shall be considered one (1) parcel for purposes of this section.

(Ord. No. 856, § 1, 10-29-90.)

Sec. 13-72.2. Restrictions on operation of leaf blowers.

It shall be unlawful for any person within a residential zone or within two hundred (200) feet of a residential zone to operate any type of leaf blower within the city except under the following restrictions:

(a) Time restriction: Notwithstanding section 13-70(i), leaf blowers shall not be operated except between the hours of 8:00 a.m. and 6:00 p.m. Monday through Friday and 9:00 a.m. to 6:00 p.m. on Saturday;

(b) Distance restriction: Leaf blowers shall not be operated within a horizontal distance of ten (10) feet of any operable window, door, or mechanical air intake opening or duct;

(c) Duration of use restriction: Leaf blowers shall not be operated for more than fifteen (15) minutes per hour on parcels less than one-half acre and no more than thirty (30) minutes per hour on parcels greater than one-half acre.

(d) Number restriction: No person shall operate more than one (1) leaf blower per parcel.

(Ord. No. 856, § 1, 10-29-90.)

Sec. 13-72.3. Unlawful to propel debris beyond parcel boundary.

It shall be unlawful for any person to use or operate any leaf blower in such a manner as to blow, dispel, or make airborne, dust, leaves, grass cuttings, paper, trash, or any other type of unattached debris or material which by its use will cause said dust, leaves, grass cuttings, paper, trash, or any other type of unattached debris or material to become airborne or travel beyond the parcel boundaries in which it is being used to adjoining properties. It shall be unlawful for any person to use or operate any leaf blower within the city in such a way as to blow leaves, dirt, and other debris onto the public rights-of-way and to allow the material to remain there for more than fifteen (15) minutes.

(Ord. No. 856, § 1, 10-29-90.)

Sec. 13-72.4. Exemptions regarding leaf blower operation.

The following are exempted from the operation of this section.

(a) Any publicly owned properties, including but not limited to public schools, parks, fire stations, etc.

(b) Privately owned schools.

(Ord. No. 856, § 1, 10-29-90.)

Sec. 13-72.5. Violations: infractions.

Any person violating any of the provisions of sections 13-72.1 through 13-72.4 is deemed an infraction and upon conviction thereof, shall be fined in an amount not exceeding fifty dollars ($50.00). Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such.

(Ord. No. 856, § 1, 10-29-90.)

Sec. 13-72.6. Violations; additional remedies; injunctions.

As an additional remedy, the operation of any leaf blower in violation of any provision of sections 13-72.1 through 13-72.4 which operation causes discomfort or annoyance to reasonable persons of normal sensitiveness or which endangers the comfort, repose, health or peace of residents in the area, shall be deemed and is declared to be a public nuisance and may be subject to abatement summarily by a restraining order or injunction issued by a court of competent jurisdiction.

Any violation of sections 13-72.1 through 72.4 is declared to be a public nuisance and may be abated in accordance with law. The expense of such abatement may be by resolution of the city council declared to be a lien against the property in which such nuisances are maintained, and such lien shall be made a personal obligation of the property owner.

(Ord. No. 856, § 1, 10-29-90.)

Sec. 13-73. Noise level measurement.

The location selected for measuring exterior noise levels shall be at any point on the affected property. Interior noise measurements shall be made within the affected dwelling unit. The measurement shall be made at a point at least four (4) feet from the wall, ceiling or floor nearest the alleged offensive noise source and may be made with the windows of the affected unit open.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-74. Manner of enforcement.

(a) The Orange County Health Officer and his duly authorized representatives are directed to enforce the provisions of this chapter. The Orange County Health Officer and his duly authorized representatives are authorized, pursuant to Penal Code Section 836.5, to arrest any person without a warrant when they have reasonable cause to believe that such person has committed a misdemeanor in their presence.

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

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-75. Variance procedure.

(a) The owner or operator of a noise source which violates any of the provisions of this chapter may file an application with the community development department for a variance from the provisions thereof wherein said owner or operator shall set forth all actions taken to comply with said provisions, the reasons why immediate compliance cannot be achieved, a proposed method of achieving compliance, and a proposed time schedule for its accomplishment. Said application shall be accompanied by a fee in the amount prescribed by the master fee schedule, which may be updated by resolution from time to time. A separate application shall be filed for each noise source; provided, however, that several mobile sources under common ownership, or several fixed sources on a single property may be combined into one application. Upon receipt of said application and fee, the community development department shall refer it with his recommendation thereon within thirty (30) days to the noise variance board for action thereon in accordance with the provisions of this chapter.

(b) An applicant for a variance shall remain subject to prosecution under the terms of this article until a variance is granted.

(Ord. No. 563, § 1, 2-23-76; Ord. No. 1103, § 11, 10-27-08.)

Sec. 13-76. Noise variance board.

The noise variance board shall evaluate all applications for variance from the requirements of this chapter and may grant said variances with respect to time for compliance, subject to such terms, conditions and requirements as it may deem reasonable to achieve maximum compliance with the provisions of this chapter. Said terms, conditions and requirements may include, but shall not be limited to limitations on noise levels and operating hours. Each such variance shall set forth in detail the approved method of achieving maximum compliance and a time schedule for its accomplishment. In its determinations, said board shall consider the magnitude of nuisance caused by the offensive noise; the uses of property within the area of impingement by the noise; the time factors related to study, design, financing and construction of remedial work; the economic factors related to age and useful life of equipment; and the general public interest and welfare. Any variance granted by said board shall be by resolution and shall be transmitted to the health officer for enforcement. Any violation of the terms of said variance shall be unlawful.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-77. Appeals.

(a) Within fifteen (15) days following the decision of the variance board on an application, the applicant, the health officer, or any member of the city council, may appeal the decision to the city council by filing a notice of appeal with the secretary of the variance board. In the case of an appeal by the applicant for a variance, the notice of appeal shall be

accompanied by a fee to be computed by the secretary on the basis of the estimated cost of preparing the materials required to be forwarded to the city council as discussed hereafter. If the actual cost of such preparation differs from the estimated cost, appropriate payments shall be made either to or by the secretary.

(b) Within fifteen (15) days following receipt of a notice of appeal and the appeal fee, the secretary of the variance board shall forward to the city council copies of the application for variance; the recommendation of the health officer; the notice of appeal; all evidence concerning said application received by the variance board and its decision thereon. In addition, any person may file with the city council written arguments supporting or attacking said decision and the city council may in its discretion hear oral arguments thereon. The city clerk shall mail to the applicant a notice of the date set for hearing of the appeal. The notice shall be mailed at least ten (10) days prior to the hearing date.

(c) Within sixty (60) days following its receipt of the notice of the appeal, the city council shall either affirm, modify or reverse the decision of the variance board. Such decision shall be based upon the city council's evaluation of the matters submitted to the city council in light of the powers conferred on the variance board and the factors to be considered, both as enumerated in sections 13-75 and 13-76.

(d) As part of its decision, the council may direct the variance board to conduct further proceedings on said application. Failure of the city council to affirm, modify or reverse the decision of the variance board within said sixty (60) day period shall constitute an affirmance of the decision.

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-78. Violations: Misdemeanors.

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

(Ord. No. 563, § 1, 2-23-76.)

Sec. 13-79. Reserved.

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APPENDIX 3.2:

CITY OF CYPRESS MUNICIPAL VIBRATION CRITERIA

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3.10.120. Vibration.

Uses shall not generate inherent and recurrent ground vibrations that are perceptible, without the aid of instruments, at the boundary of the parcel on which a use is located. This restriction shall not apply to temporary construction activity.

(Ord. No. 1062, § 2(Exh. A), 11-25-04.)

View the mobile version.

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APPENDIX 5.1:

STUDY AREA PHOTOS

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JN: 13358 Study Area Photos

L1_E
33, 48' 23.160000", 118, 1' 8.800000"

L1_N
33, 48' 23.180000", 118, 1' 8.910000"

L1_S
33, 48' 23.180000", 118, 1' 8.910000"

L1_W
33, 48' 23.160000", 118, 1' 8.800000"

L2_E
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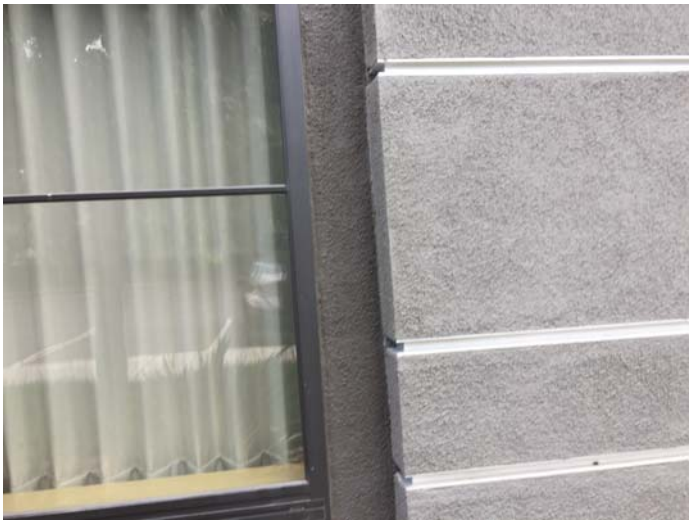

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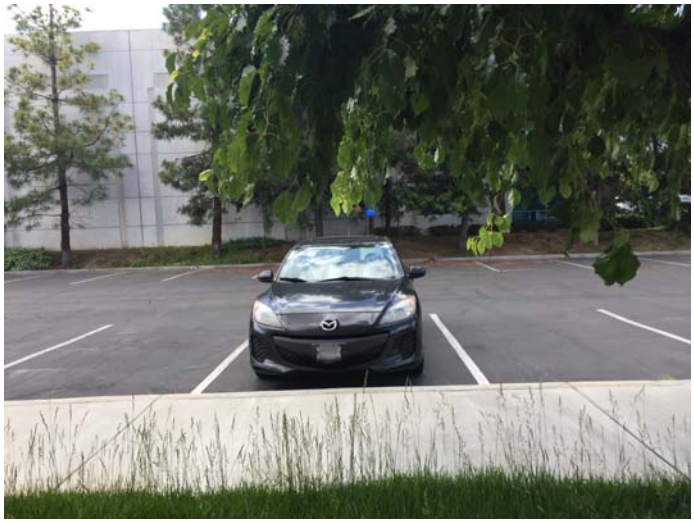

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L3_N
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L3_S
33, 47' 57.430000", 118, 1' 6.250000"

L3_W
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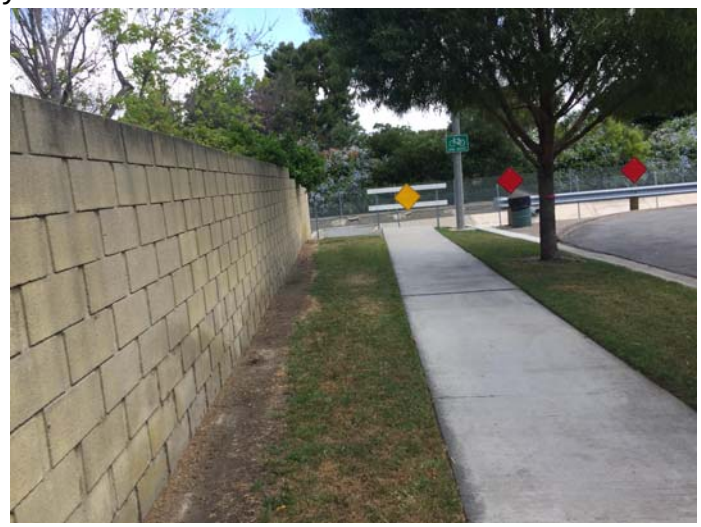

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L4_S
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L4_W
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L5_E
33, 47' 57.540000", 118, 1' 26.960000"

L5_N
33, 47' 57.540000", 118, 1' 26.960000"

L5_S
33, 47' 57.550000", 118, 1' 26.960000"

L5_W
33, 47' 57.540000", 118, 1' 26.960000"

L6_E
33, 48' 15.270000", 118, 1' 34.590000"

L6_N
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L6_S
33, 48' 15.270000", 118, 1' 34.620000"

L6_W
33, 48' 15.280000", 118, 1' 34.590000"

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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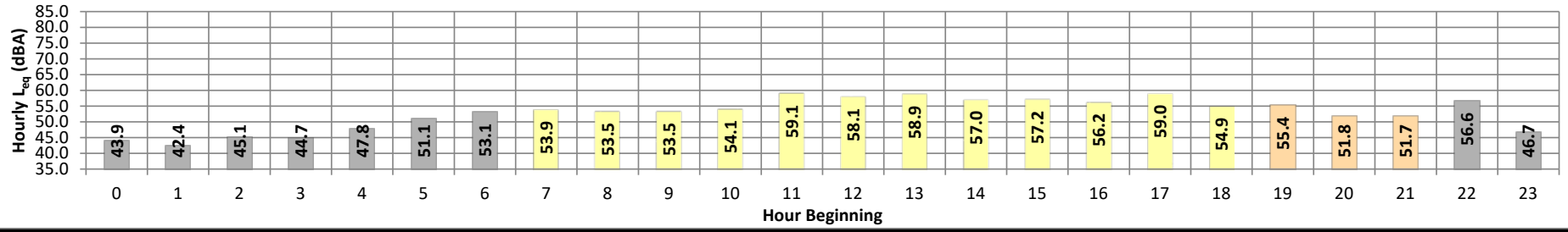
24-Hour Noise Level Measurement Summary

Date: Thursday, May 14, 2020 *Location:* L1 - Located north of the Project site by Holder Street near existing single-family residential home at 10753 Maple Street. *Meter:* Piccolo II *JN:* 13358

Project: Katella Avenue Amazon Facility *Analyst:* P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	43.9	51.9	39.1	51.6	51.1	49.5	48.0	43.8	41.6	39.5	39.4	39.2	43.9	10.0	53.9
	1	42.4	49.8	39.1	49.5	49.0	47.5	46.1	42.1	40.5	39.5	39.4	39.2	42.4	10.0	52.4
	2	45.1	50.8	40.9	50.6	50.3	49.7	49.0	45.8	43.2	41.4	41.2	41.0	45.1	10.0	55.1
	3	44.7	53.4	41.5	52.9	52.3	50.2	48.4	43.8	42.5	41.8	41.7	41.6	44.7	10.0	54.7
	4	47.8	56.8	43.7	56.5	55.9	53.8	52.1	46.7	45.0	44.2	44.0	43.8	47.8	10.0	57.8
	5	51.1	59.3	46.7	59.0	58.5	56.9	55.3	50.7	48.4	47.2	47.0	46.8	51.1	10.0	61.1
	6	53.1	61.5	47.2	61.2	60.7	59.0	57.5	53.0	50.2	47.8	47.6	47.3	53.1	10.0	63.1
Day	7	53.9	62.1	45.4	61.9	61.4	60.0	58.9	54.3	50.7	46.3	45.9	45.5	53.9	0.0	53.9
	8	53.5	61.5	45.0	61.2	60.7	59.3	58.2	54.3	50.1	45.9	45.5	45.1	53.5	0.0	53.5
	9	53.5	62.8	45.4	62.3	61.7	60.2	58.5	53.5	49.3	46.2	45.8	45.5	53.5	0.0	53.5
	10	54.1	62.6	46.7	62.1	61.6	60.0	58.6	54.6	51.2	47.6	47.2	46.8	54.1	0.0	54.1
	11	59.1	68.8	47.9	68.4	68.0	66.4	64.9	58.8	53.1	48.7	48.3	48.0	59.1	0.0	59.1
	12	58.1	67.0	49.6	66.7	66.3	64.6	63.1	57.6	53.8	50.5	50.1	49.7	58.1	0.0	58.1
	13	58.9	65.9	51.1	65.5	65.0	63.8	63.3	60.1	56.2	52.3	51.8	51.2	58.9	0.0	58.9
	14	57.0	65.0	51.1	64.6	64.2	62.6	61.5	57.0	55.0	52.2	51.6	51.2	57.0	0.0	57.0
	15	57.2	63.9	51.1	63.6	63.1	61.9	61.0	58.1	55.4	52.2	51.7	51.3	57.2	0.0	57.2
	16	56.2	64.2	48.4	63.8	63.3	61.8	60.8	56.8	53.7	49.4	48.9	48.5	56.2	0.0	56.2
	17	59.0	68.3	50.6	67.6	67.0	65.5	64.1	58.7	55.0	51.7	51.3	50.7	59.0	0.0	59.0
	18	54.9	63.3	47.7	62.9	62.3	60.7	59.4	55.2	52.0	48.8	48.3	47.8	54.9	0.0	54.9
Evening	19	55.4	64.6	47.0	64.2	63.6	61.3	59.9	55.7	52.0	48.0	47.6	47.2	55.4	5.0	60.4
	20	51.8	60.9	44.3	60.6	60.0	58.1	56.5	51.5	48.3	45.0	44.7	44.4	51.8	5.0	56.8
	21	51.7	61.5	45.2	61.1	60.5	58.3	56.1	51.3	47.9	45.7	45.5	45.3	51.7	5.0	56.7
Night	22	56.6	64.6	49.7	64.1	63.5	62.0	61.2	57.7	53.4	50.3	50.0	49.7	56.6	10.0	66.6
	23	46.7	54.4	43.2	54.1	53.6	52.3	51.0	45.9	44.4	43.7	43.5	43.4	46.7	10.0	56.7

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	53.5	61.5	45.0	61.2	60.7	59.3	58.2	53.5	49.3	45.9	45.5	45.1
	Max	59.1	68.8	51.1	68.4	68.0	66.4	64.9	60.1	56.2	52.3	51.8	51.3
Energy Average		56.8	Average:		64.2	63.7	62.2	61.0	56.6	52.9	49.3	48.9	48.5
Evening	Min	51.7	60.9	44.3	60.6	60.0	58.1	56.1	51.3	47.9	45.0	44.7	44.4
	Max	55.4	64.6	47.0	64.2	63.6	61.3	59.9	55.7	52.0	48.0	47.6	47.2
Energy Average		53.3	Average:		62.0	61.4	59.2	57.5	52.8	49.4	46.2	45.9	45.6
Night	Min	42.4	49.8	39.1	49.5	49.0	47.5	46.1	42.1	40.5	39.5	39.4	39.2
	Max	56.6	64.6	49.7	64.1	63.5	62.0	61.2	57.7	53.4	50.3	50.0	49.7
Energy Average		50.5	Average:		55.5	55.0	53.4	52.1	47.7	45.5	43.9	43.8	43.6

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
54.9	56.3	50.5

24-Hour CNEL (dBA)

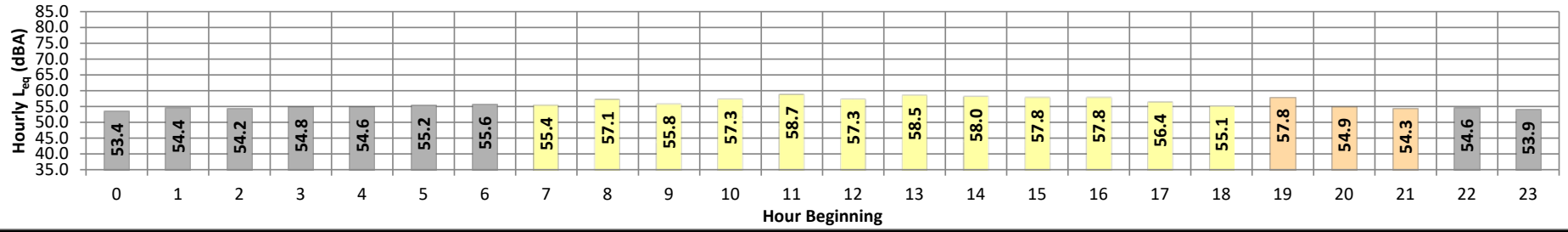
58.7

24-Hour Noise Level Measurement Summary

Date: Thursday, May 14, 2020 *Location:* L2 - Located northeast of the Project site by the Hampton Inn at 10900 Yamaha Way. *Meter:* Piccolo II *JN:* 13358

Project: Katella Avenue Amazon Facility *Analyst:* P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	53.4	55.0	52.4	54.8	54.8	54.6	54.5	53.7	53.2	52.7	52.6	52.4	53.4	10.0	63.4
	1	54.4	56.3	53.5	55.9	55.6	55.2	55.1	54.7	54.3	53.7	53.6	53.5	54.4	10.0	64.4
	2	54.2	55.3	53.4	55.2	55.1	54.9	54.8	54.6	54.2	53.7	53.6	53.5	54.2	10.0	64.2
	3	54.8	56.3	53.7	56.2	56.1	55.9	55.8	55.3	54.5	54.0	53.9	53.8	54.8	10.0	64.8
	4	54.6	56.0	53.9	55.9	55.7	55.3	55.2	54.8	54.5	54.2	54.1	54.0	54.6	10.0	64.6
	5	55.2	56.9	54.3	56.7	56.5	56.1	56.0	55.6	55.1	54.5	54.5	54.4	55.2	10.0	65.2
	6	55.6	57.8	54.5	57.6	57.3	56.7	56.5	55.8	55.3	54.9	54.8	54.6	55.6	10.0	65.6
Day	7	55.4	58.4	53.9	58.0	57.7	57.1	56.8	55.7	55.1	54.3	54.1	54.0	55.4	0.0	55.4
	8	57.1	59.2	56.0	58.9	58.7	58.3	58.1	57.6	56.9	56.3	56.2	56.1	57.1	0.0	57.1
	9	55.8	60.0	53.7	59.5	59.1	58.3	57.8	56.2	55.1	54.2	54.0	53.8	55.8	0.0	55.8
	10	57.3	63.7	53.5	63.3	62.9	62.0	61.1	57.7	55.3	53.9	53.7	53.6	57.3	0.0	57.3
	11	58.7	65.8	53.6	65.4	65.0	64.3	63.6	59.0	56.3	54.2	53.9	53.7	58.7	0.0	58.7
	12	57.3	63.2	54.5	62.8	62.2	60.9	59.9	57.8	56.1	55.0	54.9	54.6	57.3	0.0	57.3
	13	58.5	64.9	54.7	64.3	63.7	62.3	61.4	59.4	57.3	55.3	55.1	54.8	58.5	0.0	58.5
	14	58.0	64.4	54.7	64.0	63.3	61.9	60.7	58.4	56.9	55.3	55.1	54.8	58.0	0.0	58.0
	15	57.8	63.7	54.1	63.3	62.8	61.9	61.4	58.4	56.4	54.6	54.4	54.2	57.8	0.0	57.8
	16	57.8	64.5	53.6	64.2	63.8	63.2	62.6	57.6	55.4	54.2	54.0	53.8	57.8	0.0	57.8
	17	56.4	61.4	53.5	61.1	60.7	59.5	58.8	57.1	55.4	54.1	53.9	53.6	56.4	0.0	56.4
	18	55.1	59.0	53.2	58.6	58.2	57.3	56.8	55.7	54.7	53.6	53.5	53.3	55.1	0.0	55.1
Evening	19	57.8	64.7	53.5	64.4	64.0	63.2	62.1	57.9	55.4	53.8	53.7	53.5	57.8	5.0	62.8
	20	54.9	58.5	53.4	58.1	57.8	57.0	56.5	55.2	54.4	53.8	53.7	53.5	54.9	5.0	59.9
	21	54.3	56.2	53.3	56.0	55.8	55.5	55.3	54.7	54.0	53.6	53.6	53.4	54.3	5.0	59.3
Night	22	54.6	57.5	53.0	57.3	57.0	56.5	56.1	55.4	54.0	53.3	53.2	53.1	54.6	10.0	64.6
	23	53.9	55.2	53.2	55.0	54.9	54.5	54.4	54.1	53.8	53.4	53.3	53.2	53.9	10.0	63.9

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	55.1	58.4	53.2	58.0	57.7	57.1	56.8	55.7	54.7	53.6	53.5	53.3
	Max	58.7	65.8	56.0	65.4	65.0	64.3	63.6	59.4	57.3	56.3	56.2	56.1
Energy Average		57.2	Average:		62.0	61.5	60.6	59.9	57.5	55.9	54.6	54.4	54.2
Evening	Min	54.3	56.2	53.3	56.0	55.8	55.5	55.3	54.7	54.0	53.6	53.6	53.4
	Max	57.8	64.7	53.5	64.4	64.0	63.2	62.1	57.9	55.4	53.8	53.7	53.5
Energy Average		56.0	Average:		59.5	59.2	58.6	58.0	55.9	54.6	53.7	53.6	53.5
Night	Min	53.4	55.0	52.4	54.8	54.8	54.5	54.4	53.7	53.2	52.7	52.6	52.4
	Max	55.6	57.8	54.5	57.6	57.3	56.7	56.5	55.8	55.3	54.9	54.8	54.6
Energy Average		54.6	Average:		56.1	55.9	55.5	55.4	54.9	54.3	53.8	53.7	53.6

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
56.2	57.0	54.6

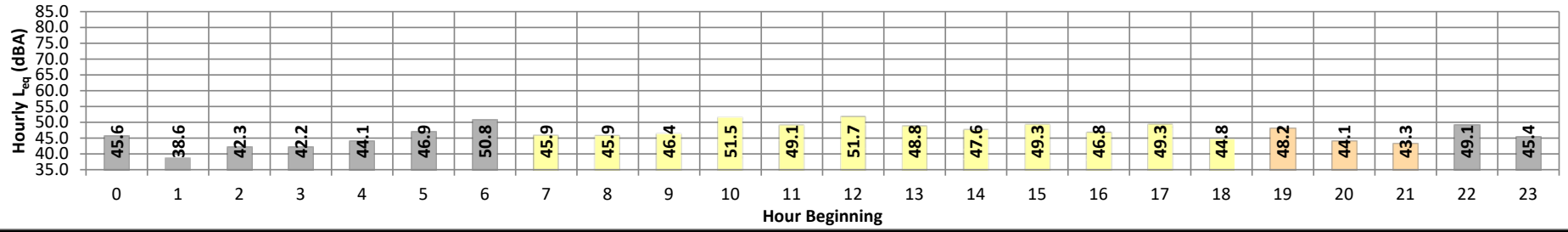
24-Hour CNEL (dBA)
61.7

24-Hour Noise Level Measurement Summary

Date: Thursday, May 14, 2020 *Location:* L3 - Located southeast of the Project site on Capers Way near existing multi-family residential homes. *Meter:* Piccolo II *JN:* 13358

Project: Katella Avenue Amazon Facility *Analyst:* P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	45.6	60.8	36.9	59.5	57.7	48.0	46.0	41.7	38.1	37.3	37.1	37.0	45.6	10.0	55.6
	1	38.6	42.8	37.1	42.3	41.8	40.7	40.4	38.6	38.1	37.5	37.4	37.2	38.6	10.0	48.6
	2	42.3	51.3	38.0	50.2	49.6	47.4	46.6	42.2	39.2	38.4	38.3	38.1	42.3	10.0	52.3
	3	42.2	50.6	39.4	50.2	49.6	47.0	45.1	41.7	40.2	39.7	39.6	39.5	42.2	10.0	52.2
	4	44.1	52.5	41.7	51.1	49.4	47.7	46.8	43.6	42.8	42.0	41.9	41.8	44.1	10.0	54.1
	5	46.9	53.5	44.6	53.1	52.4	50.4	49.8	46.9	45.6	45.0	44.9	44.7	46.9	10.0	56.9
	6	50.8	57.0	45.5	56.4	55.7	54.7	54.2	52.0	50.0	46.0	45.8	45.6	50.8	10.0	60.8
Day	7	45.9	52.1	41.7	51.7	51.1	50.1	49.6	46.8	44.2	42.3	42.1	41.8	45.9	0.0	45.9
	8	45.9	53.6	40.3	53.0	52.2	50.8	49.7	46.3	43.9	41.6	40.9	40.5	45.9	0.0	45.9
	9	46.4	54.1	41.1	53.6	52.9	51.1	50.2	47.3	44.4	41.9	41.6	41.2	46.4	0.0	46.4
	10	51.5	60.2	42.5	59.8	59.3	58.3	57.3	51.4	46.9	43.3	43.0	42.6	51.5	0.0	51.5
	11	49.1	57.6	41.8	57.1	56.6	55.2	53.9	49.2	45.5	42.8	42.3	41.9	49.1	0.0	49.1
	12	51.7	64.1	42.7	63.2	61.9	57.7	54.7	50.7	47.2	43.7	43.3	42.8	51.7	0.0	51.7
	13	48.8	55.9	44.0	55.5	54.9	53.3	52.3	49.3	47.3	44.9	44.6	44.2	48.8	0.0	48.8
	14	47.6	53.9	43.8	53.5	53.1	52.1	51.2	47.9	46.0	44.5	44.2	43.9	47.6	0.0	47.6
	15	49.3	57.8	43.5	57.2	56.4	54.5	53.3	49.6	46.8	44.2	43.9	43.6	49.3	0.0	49.3
	16	46.8	53.7	42.5	53.2	52.6	51.4	50.3	47.5	45.1	43.1	42.9	42.7	46.8	0.0	46.8
	17	49.3	55.5	44.2	55.1	54.6	53.6	52.9	50.3	47.8	45.1	44.6	44.3	49.3	0.0	49.3
	18	44.8	52.9	41.4	51.8	50.8	49.1	47.9	45.0	43.4	42.0	41.8	41.6	44.8	0.0	44.8
Evening	19	48.2	54.4	41.1	54.2	53.9	53.3	52.8	49.6	46.1	41.7	41.4	41.2	48.2	5.0	53.2
	20	44.1	50.4	40.2	49.9	49.2	48.2	47.5	44.8	42.7	40.8	40.6	40.3	44.1	5.0	49.1
	21	43.3	49.7	40.3	49.3	48.9	47.7	47.1	43.1	41.7	40.8	40.6	40.4	43.3	5.0	48.3
Night	22	49.1	51.4	47.4	51.1	50.9	50.5	50.4	49.5	48.8	47.8	47.7	47.5	49.1	10.0	59.1
	23	45.4	53.8	43.0	53.3	52.8	49.9	47.8	44.3	43.9	43.4	43.2	43.1	45.4	10.0	55.4

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	44.8	52.1	40.3	51.7	50.8	49.1	47.9	45.0	43.4	41.6	40.9	40.5
	Max	51.7	64.1	44.2	63.2	61.9	58.3	57.3	51.4	47.8	45.1	44.6	44.3
Energy Average		48.6	Average:		55.4	54.7	53.1	51.9	48.4	45.7	43.3	42.9	42.6
Evening	Min	43.3	49.7	40.2	49.3	48.9	47.7	47.1	43.1	41.7	40.8	40.6	40.3
	Max	48.2	54.4	41.1	54.2	53.9	53.3	52.8	49.6	46.1	41.7	41.4	41.2
Energy Average		45.8	Average:		51.1	50.7	49.7	49.2	45.8	43.5	41.1	40.9	40.6
Night	Min	38.6	42.8	36.9	42.3	41.8	40.7	40.4	38.6	38.1	37.3	37.1	37.0
	Max	50.8	60.8	47.4	59.5	57.7	54.7	54.2	52.0	50.0	47.8	47.7	47.5
Energy Average		46.3	Average:		51.9	51.1	48.5	47.5	44.5	43.0	41.9	41.8	41.6

L_{eq} (dBA)

24-Hour	*Daytime*	*Nighttime*
47.6	**48.2**	**46.3**

24-Hour CNEL (dBA)

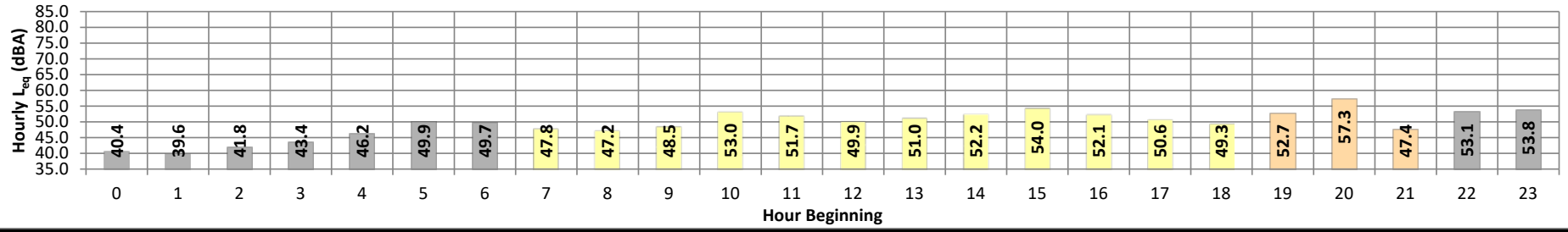
53.3

24-Hour Noise Level Measurement Summary

Date: Thursday, May 14, 2020 *Location:* L4 - Located south of the Project site on Holder street near existing single-family residential home at 6471 Cantiles Avenue. *Meter:* Piccolo II *JN:* 13358

Project: Katella Avenue Amazon Facility *Analyst:* P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	40.4	44.5	38.1	44.3	44.1	43.4	42.8	41.1	39.6	38.4	38.3	38.2	40.4	10.0	50.4
	1	39.6	41.7	38.5	41.6	41.4	41.0	40.8	39.9	39.4	38.7	38.7	38.5	39.6	10.0	49.6
	2	41.8	45.4	39.7	45.2	45.0	44.5	43.9	42.2	41.3	40.3	40.1	39.8	41.8	10.0	51.8
	3	43.4	49.4	40.3	48.7	48.0	47.2	46.9	44.1	41.7	40.7	40.5	40.4	43.4	10.0	53.4
	4	46.2	50.3	43.9	50.0	49.6	49.1	48.7	46.8	45.4	44.4	44.2	44.0	46.2	10.0	56.2
	5	49.9	54.2	47.6	53.7	53.4	52.3	51.7	50.4	49.4	48.3	48.1	47.8	49.9	10.0	59.9
	6	49.7	57.2	47.5	55.9	54.9	52.7	51.6	49.6	48.8	48.0	47.8	47.6	49.7	10.0	59.7
Day	7	47.8	53.2	44.0	52.7	52.4	51.5	50.8	48.5	46.6	44.6	44.4	44.1	47.8	0.0	47.8
	8	47.2	56.1	42.8	55.0	53.9	51.9	50.8	47.3	45.0	43.4	43.2	42.9	47.2	0.0	47.2
	9	48.5	54.9	45.3	54.2	53.5	52.0	51.1	49.0	47.4	45.9	45.7	45.4	48.5	0.0	48.5
	10	53.0	62.9	46.4	61.6	60.4	57.8	56.8	53.8	50.0	47.0	46.7	46.5	53.0	0.0	53.0
	11	51.7	59.2	45.4	58.7	58.3	57.2	56.4	52.3	48.8	46.2	45.7	45.5	51.7	0.0	51.7
	12	49.9	57.1	45.1	56.6	56.0	54.6	53.4	50.5	48.5	45.9	45.5	45.2	49.9	0.0	49.9
	13	51.0	58.5	45.8	58.1	57.4	56.1	55.1	51.7	48.9	46.5	46.2	45.9	51.0	0.0	51.0
	14	52.2	61.0	46.0	60.3	59.6	57.8	55.7	52.1	50.1	47.2	46.6	46.1	52.2	0.0	52.2
	15	54.0	64.7	46.4	64.0	63.0	60.0	58.8	53.1	50.1	47.3	46.9	46.5	54.0	0.0	54.0
	16	52.1	62.5	44.0	61.9	60.9	58.9	57.0	51.1	48.0	44.9	44.5	44.1	52.1	0.0	52.1
	17	50.6	58.7	44.8	58.1	57.5	55.9	55.0	50.8	48.0	45.6	45.3	45.0	50.6	0.0	50.6
	18	49.3	56.8	45.5	56.3	55.9	54.3	52.6	49.0	47.6	46.3	46.0	45.6	49.3	0.0	49.3
Evening	19	52.7	62.0	44.2	60.9	60.0	58.0	57.1	53.5	49.2	45.9	45.1	44.4	52.7	5.0	57.7
	20	57.3	67.7	43.6	67.1	66.4	65.1	64.2	52.4	47.8	44.6	44.2	43.9	57.3	5.0	62.3
	21	47.4	52.2	45.7	51.6	50.9	49.6	49.1	48.0	46.8	46.0	45.9	45.8	47.4	5.0	52.4
Night	22	53.1	67.2	52.0	66.7	66.2	64.8	62.9	60.2	55.3	53.1	52.6	52.0	53.1	10.0	63.1
	23	53.8	58.2	52.0	57.8	57.3	55.9	55.5	53.6	53.4	53.0	52.4	52.1	53.8	10.0	63.8

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	47.2	53.2	42.8	52.7	52.4	51.5	50.8	47.3	45.0	43.4	43.2	42.9
	Max	54.0	64.7	46.4	64.0	63.0	60.0	58.8	53.8	50.1	47.3	46.9	46.5
Energy Average		51.1	Average:		58.1	57.4	55.7	54.5	50.8	48.3	45.9	45.6	45.2
Evening	Min	47.4	52.2	43.6	51.6	50.9	49.6	49.1	48.0	46.8	44.6	44.2	43.9
	Max	57.3	67.7	45.7	67.1	66.4	65.1	64.2	53.5	49.2	46.0	45.9	45.8
Energy Average		54.1	Average:		59.9	59.1	57.6	56.8	51.3	47.9	45.5	45.1	44.7
Night	Min	39.6	41.7	38.1	41.6	41.4	41.0	40.8	39.9	39.4	38.4	38.3	38.2
	Max	53.8	67.2	52.0	66.7	66.2	64.8	62.9	60.2	55.3	53.1	52.6	52.1
Energy Average		49.1	Average:		51.5	51.1	50.1	49.4	47.5	46.0	45.0	44.7	44.5

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
51.0	51.9	49.1

24-Hour CNEL (dBA)

56.7

24-Hour Noise Level Measurement Summary

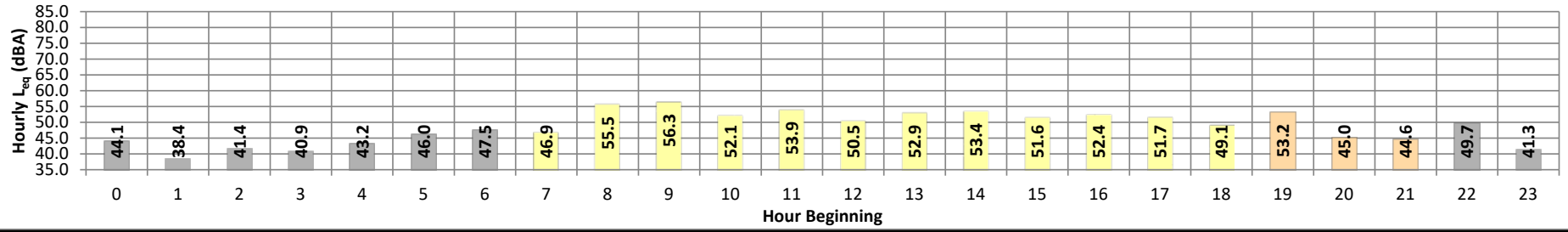
Date: Thursday, May 14, 2020
Project: Katella Avenue Amazon Facility

Location: L5 - Located southwest of the Project side by Barbados Avenue by existing single-family home at 11250 Providencia Street.

Meter: Piccolo II

JN: 13358
Analyst: P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	44.1	49.8	37.6	49.5	49.2	49.0	48.7	45.6	40.9	37.9	37.8	37.7	44.1	10.0	54.1
	1	38.4	41.9	37.4	41.3	40.7	39.7	39.3	38.6	38.1	37.6	37.6	37.5	38.4	10.0	48.4
	2	41.4	44.3	38.5	44.1	44.0	43.7	43.6	42.4	41.0	38.9	38.7	38.5	41.4	10.0	51.4
	3	40.9	43.9	39.4	43.7	43.4	42.6	42.3	41.3	40.5	39.7	39.6	39.5	40.9	10.0	50.9
	4	43.2	46.6	41.9	46.3	46.0	45.3	44.8	43.4	42.8	42.2	42.1	41.9	43.2	10.0	53.2
	5	46.0	48.5	44.8	48.2	48.0	47.6	47.2	46.4	45.8	45.1	45.0	44.8	46.0	10.0	56.0
	6	47.5	51.9	45.7	51.4	51.0	50.1	49.3	47.7	46.9	46.1	46.0	45.8	47.5	10.0	57.5
Day	7	46.9	53.7	42.5	53.3	52.9	51.4	50.5	47.6	45.4	43.1	42.9	42.7	46.9	0.0	46.9
	8	55.5	65.2	44.6	64.6	63.9	62.5	61.1	54.9	51.1	45.7	45.2	44.7	55.5	0.0	55.5
	9	56.3	59.2	54.9	58.8	58.5	57.9	57.6	56.7	56.0	55.2	55.1	55.0	56.3	0.0	56.3
	10	52.1	60.1	43.4	59.4	58.8	57.9	57.3	53.7	47.9	44.5	44.1	43.6	52.1	0.0	52.1
	11	53.9	62.7	44.3	62.1	61.1	59.9	59.2	55.0	48.3	45.0	44.7	44.4	53.9	0.0	53.9
	12	50.5	57.9	45.1	57.5	56.9	55.5	54.2	51.4	48.1	45.9	45.5	45.2	50.5	0.0	50.5
	13	52.9	59.8	47.1	59.4	58.9	57.8	56.7	54.5	49.9	47.8	47.5	47.2	52.9	0.0	52.9
	14	53.4	61.7	47.2	61.4	60.9	59.1	57.9	53.6	50.7	48.1	47.8	47.4	53.4	0.0	53.4
	15	51.6	58.1	45.8	57.6	57.1	55.8	55.1	52.9	50.5	46.6	46.2	45.9	51.6	0.0	51.6
	16	52.4	62.5	45.1	61.7	60.6	57.6	56.4	52.4	49.6	46.6	46.0	45.4	52.4	0.0	52.4
	17	51.7	61.1	45.2	60.4	59.6	58.2	56.4	50.9	48.4	46.1	45.8	45.3	51.7	0.0	51.7
	18	49.1	56.0	45.3	55.3	54.6	52.8	51.6	49.5	48.1	46.2	45.9	45.5	49.1	0.0	49.1
Evening	19	53.2	61.7	44.0	61.1	60.6	59.1	58.3	54.8	47.6	45.0	44.6	44.1	53.2	5.0	58.2
	20	45.0	51.6	40.8	51.1	50.6	49.2	48.1	45.7	43.6	41.4	41.2	40.9	45.0	5.0	50.0
	21	44.6	49.6	41.1	49.3	48.9	48.1	47.6	45.6	43.3	41.6	41.4	41.3	44.6	5.0	49.6
Night	22	49.7	57.8	40.8	57.5	56.9	55.5	54.7	50.8	45.4	41.3	41.1	40.9	49.7	10.0	59.7
	23	41.3	45.2	40.0	44.7	44.2	43.2	42.6	41.5	40.8	40.3	40.2	40.1	41.3	10.0	51.3

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	46.9	53.7	42.5	53.3	52.9	51.4	50.5	47.6	45.4	43.1	42.9	42.7
	Max	56.3	65.2	54.9	64.6	63.9	62.5	61.1	56.7	56.0	55.2	55.1	55.0
Energy Average		52.8	Average:		59.3	58.6	57.2	56.2	52.8	49.5	46.7	46.4	46.0
Evening	Min	44.6	49.6	40.8	49.3	48.9	48.1	47.6	45.6	43.3	41.4	41.2	40.9
	Max	53.2	61.7	44.0	61.1	60.6	59.1	58.3	54.8	47.6	45.0	44.6	44.1
Energy Average		49.6	Average:		53.8	53.4	52.2	51.3	48.7	44.9	42.7	42.4	42.1
Night	Min	38.4	41.9	37.4	41.3	40.7	39.7	39.3	38.6	38.1	37.6	37.6	37.5
	Max	49.7	57.8	45.7	57.5	56.9	55.5	54.7	50.8	46.9	46.1	46.0	45.8
Energy Average		45.0	Average:		47.4	47.1	46.3	45.8	44.2	42.5	41.0	40.9	40.7

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
50.8	52.4	45.0

24-Hour CNEL (dBA)
54.0

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APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE CONTOURS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2020) | Project Name: Katella Avenue HCW Nois
Road Name: Holder St. | Job Number: 13358
Road Segment: n/o Katella Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,546 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	712 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.59%
Medium Trucks:	84.8%	4.9%	10.3%	0.82%
Heavy Trucks:	86.5%	2.7%	10.8%	0.59%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.828
Medium Trucks:	34.573
Heavy Trucks:	34.598

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-2.86	2.25	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-23.68	2.30	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-25.09	2.30	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.7	63.6	61.8	55.8	64.4	65.0
Medium Trucks:	55.1	54.4	48.1	46.5	55.0	55.2
Heavy Trucks:	59.0	58.4	49.3	50.6	58.9	59.1
Vehicle Noise:	66.1	65.1	62.2	57.3	65.9	66.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	22	48	103	222
CNEL:	24	52	111	239

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2020) | Project Name: Katella Avenue HCW Nois
Road Name: Holder St. | Job Number: 13358
Road Segment: s/o Katella Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,274 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	189 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.59%
Medium Trucks:	84.8%	4.9%	10.3%	0.82%
Heavy Trucks:	86.5%	2.7%	10.8%	0.59%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.828
Medium Trucks:	34.573
Heavy Trucks:	34.598

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-8.61	2.25	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-29.43	2.30	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-30.84	2.30	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	59.0	57.8	56.1	50.0	58.6	59.3
Medium Trucks:	49.4	48.7	42.3	40.8	49.2	49.5
Heavy Trucks:	53.3	52.6	43.6	44.8	53.2	53.3
Vehicle Noise:	60.3	59.4	56.5	51.6	60.1	60.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	9	20	43	92
CNEL:	10	21	46	99

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2020) | Project Name: Katella Avenue HCW Nois
Road Name: Holder St. | Job Number: 13358
Road Segment: n/o Dwy. 3

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,900 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	158 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.59%
Medium Trucks:	84.8%	4.9%	10.3%	0.82%
Heavy Trucks:	86.5%	2.7%	10.8%	0.59%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.828
Medium Trucks:	34.573
Heavy Trucks:	34.598

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-9.39	2.25	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-30.21	2.30	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-31.62	2.30	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.2	57.1	55.3	49.2	57.9	58.5
Medium Trucks:	48.6	47.9	41.5	40.0	48.4	48.7
Heavy Trucks:	52.5	51.8	42.8	44.1	52.4	52.5
Vehicle Noise:	59.6	58.6	55.7	50.8	59.3	59.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	8	18	38	82
CNEL:	9	19	41	88

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2020) | Project Name: Katella Avenue HCW Nois
Road Name: Holder St. | Job Number: 13358
Road Segment: s/o Dwy. 3

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	671 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	56 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.59%
Medium Trucks:	84.8%	4.9%	10.3%	0.82%
Heavy Trucks:	86.5%	2.7%	10.8%	0.59%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.828
Medium Trucks:	34.573
Heavy Trucks:	34.598

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-13.91	2.25	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-34.73	2.30	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-36.14	2.30	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	53.7	52.5	50.8	44.7	53.3	54.0
Medium Trucks:	44.1	43.4	37.0	35.5	43.9	44.2
Heavy Trucks:	48.0	47.3	38.3	39.5	47.9	48.0
Vehicle Noise:	55.0	54.1	51.2	46.3	54.8	55.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	4	9	19	41
CNEL:	4	9	20	44

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2020) | Project Name: Katella Avenue HCW Nois
Road Name: Katella Av. | Job Number: 13358
Road Segment: w/o Dwy. 1

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,430	vehicles
Peak Hour Percentage:	8.33%	
Peak Hour Volume:	2,951	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	99	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.59%
Medium Trucks:	84.8%	4.9%	10.3%	0.82%
Heavy Trucks:	86.5%	2.7%	10.8%	0.59%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.275
Medium Trucks:	34.016
Heavy Trucks:	34.041

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.80	2.36	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-18.02	2.41	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-19.42	2.40	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.4	71.3	69.5	63.5	72.1	72.7
Medium Trucks:	62.6	61.9	55.6	54.0	62.5	62.7
Heavy Trucks:	66.0	65.4	56.4	57.6	66.0	66.1
Vehicle Noise:	73.7	72.7	69.9	64.9	73.4	73.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	101	219	471	1,015
CNEL:	109	236	508	1,095

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2020) | Project Name: Katella Avenue HCW Nois
Road Name: Katella Av. | Job Number: 13358
Road Segment: w/o Holder St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,430	vehicles
Peak Hour Percentage:	8.33%	
Peak Hour Volume:	2,951	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	99	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.59%
Medium Trucks:	84.8%	4.9%	10.3%	0.82%
Heavy Trucks:	86.5%	2.7%	10.8%	0.59%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.275
Medium Trucks:	34.016
Heavy Trucks:	34.041

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.80	2.36	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-18.02	2.41	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-19.42	2.40	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.4	71.3	69.5	63.5	72.1	72.7
Medium Trucks:	62.6	61.9	55.6	54.0	62.5	62.7
Heavy Trucks:	66.0	65.4	56.4	57.6	66.0	66.1
Vehicle Noise:	73.7	72.7	69.9	64.9	73.4	73.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	101	219	471	1,015
CNEL:	109	236	508	1,095

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2020) | Project Name: Katella Avenue HCW Nois
Road Name: Katella Av. | Job Number: 13358
Road Segment: e/o Holder St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,516	vehicles
Peak Hour Percentage:	8.33%	
Peak Hour Volume:	3,125	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	99	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.59%
Medium Trucks:	84.8%	4.9%	10.3%	0.82%
Heavy Trucks:	86.5%	2.7%	10.8%	0.59%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.275
Medium Trucks:	34.016
Heavy Trucks:	34.041

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.05	2.36	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-17.77	2.41	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-19.18	2.40	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.7	71.6	69.8	63.7	72.4	73.0
Medium Trucks:	62.9	62.2	55.8	54.3	62.7	63.0
Heavy Trucks:	66.3	65.7	56.6	57.9	66.2	66.3
Vehicle Noise:	73.9	72.9	70.2	65.1	73.7	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	105	227	489	1,054
CNEL:	114	245	528	1,137

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project | Project Name: Katella Avenue HCW Nois
Road Name: Holder St. | Job Number: 13358
Road Segment: n/o Katella Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,577	vehicles
Peak Hour Percentage:	8.33%	
Peak Hour Volume:	714	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	42.0	feet
Centerline Dist. to Observer:	42.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.60%
Medium Trucks:	84.8%	4.9%	10.3%	0.81%
Heavy Trucks:	86.5%	2.7%	10.8%	0.59%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.828
Medium Trucks:	34.573
Heavy Trucks:	34.598

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-2.85	2.25	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-23.68	2.30	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-25.09	2.30	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.7	63.6	61.8	55.8	64.4	65.0
Medium Trucks:	55.1	54.4	48.1	46.5	55.0	55.2
Heavy Trucks:	59.0	58.4	49.3	50.6	58.9	59.1
Vehicle Noise:	66.1	65.1	62.3	57.3	65.9	66.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	22	48	103	223
CNEL:	24	52	111	240

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Holder St.
Road Segment: s/o Katella Av.
Project Name: Katella Avenue HCW Nois
Job Number: 13358

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,791 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	232 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.03%
Medium Trucks:	84.8%	4.9%	10.3%	0.81%
Heavy Trucks:	86.5%	2.7%	10.8%	1.16%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.828
Medium Trucks:	34.573
Heavy Trucks:	34.598

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-7.75	2.25	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-28.59	2.30	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-27.01	2.30	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	59.8	58.7	56.9	50.9	59.5	60.1
Medium Trucks:	50.2	49.5	43.2	41.6	50.1	50.3
Heavy Trucks:	57.1	56.5	47.4	48.7	57.0	57.1
Vehicle Noise:	62.0	61.1	57.6	53.2	61.8	62.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	12	26	55	119
CNEL:	13	27	59	127

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Holder St.
Road Segment: n/o Dwy. 3
Project Name: Katella Avenue HCW Nois
Job Number: 13358

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,472 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	206 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	89.53%
Medium Trucks:	84.8%	4.9%	10.3%	2.25%
Heavy Trucks:	86.5%	2.7%	10.8%	8.22%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.828
Medium Trucks:	34.573
Heavy Trucks:	34.598

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-8.67	2.25	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-24.68	2.30	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-19.04	2.30	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.9	57.8	56.0	50.0	58.6	59.2
Medium Trucks:	54.1	53.4	47.1	45.5	54.0	54.2
Heavy Trucks:	65.0	64.4	55.4	56.6	65.0	65.1
Vehicle Noise:	66.3	65.5	59.0	57.8	66.2	66.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	23	50	108	233
CNEL:	24	52	112	241

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Holder St.
Road Segment: s/o Dwy. 3
Project Name: Katella Avenue HCW Nois
Job Number: 13358

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	764 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	64 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.76%
Medium Trucks:	84.8%	4.9%	10.3%	0.72%
Heavy Trucks:	86.5%	2.7%	10.8%	0.52%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.828
Medium Trucks:	34.573
Heavy Trucks:	34.598

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-13.34	2.25	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-34.73	2.30	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-36.14	2.30	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	54.2	53.1	51.3	45.3	53.9	54.5
Medium Trucks:	44.1	43.4	37.0	35.5	43.9	44.2
Heavy Trucks:	48.0	47.3	38.3	39.5	47.9	48.0
Vehicle Noise:	55.5	54.5	51.7	46.7	55.2	55.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	4	9	20	43
CNEL:	5	10	22	47

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Katella Av.
Road Segment: w/o Dwy. 1
Project Name: Katella Avenue HCW Nois
Job Number: 13358

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,855 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	2,987 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	99 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.29%
Medium Trucks:	84.8%	4.9%	10.3%	0.86%
Heavy Trucks:	86.5%	2.7%	10.8%	0.85%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.275
Medium Trucks:	34.016
Heavy Trucks:	34.041

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.84	2.36	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-17.73	2.41	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-17.78	2.40	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.5	71.4	69.6	63.5	72.2	72.8
Medium Trucks:	62.9	62.2	55.9	54.3	62.8	63.0
Heavy Trucks:	67.7	67.0	58.0	59.3	67.6	67.7
Vehicle Noise:	74.1	73.1	70.0	65.3	73.8	74.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	108	232	500	1,078
CNEL:	116	249	537	1,158

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project | Project Name: Katella Avenue HCW Nois
Road Name: Katella Av. | Job Number: 13358
Road Segment: w/o Holder St.

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	35,855 vehicles	Autos:	15
Peak Hour Percentage:	8.33%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	2,987 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	99 feet		

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.29%
Medium Trucks:	84.8%	4.9%	10.3%	0.86%
Heavy Trucks:	86.5%	2.7%	10.8%	0.85%

Site Data		Noise Source Elevations (in feet)			
Barrier Height:	**0.0 feet**	Autos:	0.000		
Barrier Type (0-Wall, 1-Berm):	0.0	Medium Trucks:	2.297		
Centerline Dist. to Barrier:	60.0 feet	Heavy Trucks:	8.004	Grade Adjustment:	0.0
Centerline Dist. to Observer:	60.0 feet				
Barrier Distance to Observer:	0.0 feet	**Lane Equivalent Distance (in feet)**			
Observer Height (Above Pad):	5.0 feet	Autos:	34.275		
Pad Elevation:	0.0 feet	Medium Trucks:	34.016		
Road Elevation:	0.0 feet	Heavy Trucks:	34.041		
Road Grade:	0.0%				
Left View:	-90.0 degrees				
Right View:	90.0 degrees				

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.84	2.36	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-17.73	2.41	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-17.78	2.40	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.5	71.4	69.6	63.5	72.2	72.8
Medium Trucks:	62.9	62.2	55.9	54.3	62.8	63.0
Heavy Trucks:	67.7	67.0	58.0	59.3	67.6	67.7
Vehicle Noise:	74.1	73.1	70.0	65.3	73.8	74.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	108	232	500	1,078
CNEL:	116	249	537	1,158

Sunday, April 26, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project | Project Name: Katella Avenue HCW Nois
Road Name: Katella Av. | Job Number: 13358
Road Segment: e/o Holder St.

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	37,910 vehicles	Autos:	15
Peak Hour Percentage:	8.33%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	3,158 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	99 feet		

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.30%
Medium Trucks:	84.8%	4.9%	10.3%	0.86%
Heavy Trucks:	86.5%	2.7%	10.8%	0.84%

Site Data		Noise Source Elevations (in feet)			
Barrier Height:	**0.0 feet**	Autos:	0.000		
Barrier Type (0-Wall, 1-Berm):	0.0	Medium Trucks:	2.297		
Centerline Dist. to Barrier:	60.0 feet	Heavy Trucks:	8.004	Grade Adjustment:	0.0
Centerline Dist. to Observer:	60.0 feet				
Barrier Distance to Observer:	0.0 feet	**Lane Equivalent Distance (in feet)**			
Observer Height (Above Pad):	5.0 feet	Autos:	34.275		
Pad Elevation:	0.0 feet	Medium Trucks:	34.016		
Road Elevation:	0.0 feet	Heavy Trucks:	34.041		
Road Grade:	0.0%				
Left View:	-90.0 degrees				
Right View:	90.0 degrees				

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.08	2.36	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-17.49	2.41	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-17.61	2.40	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.7	71.6	69.8	63.8	72.4	73.0
Medium Trucks:	63.2	62.4	56.1	54.5	63.0	63.2
Heavy Trucks:	67.8	67.2	58.2	59.4	67.8	67.9
Vehicle Noise:	74.3	73.3	70.3	65.5	74.0	74.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	112	240	518	1,116
CNEL:	120	258	556	1,199

Sunday, April 26, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021) | Project Name: Katella Avenue HCW Nois
Road Name: Holder St. | Job Number: 13358
Road Segment: n/o Katella Av.

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	8,778 vehicles	Autos:	15
Peak Hour Percentage:	8.33%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	731 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	40 mph		
Near/Far Lane Distance:	48 feet		

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.59%
Medium Trucks:	84.8%	4.9%	10.3%	0.82%
Heavy Trucks:	86.5%	2.7%	10.8%	0.59%

Site Data		Noise Source Elevations (in feet)			
Barrier Height:	**0.0 feet**	Autos:	0.000		
Barrier Type (0-Wall, 1-Berm):	0.0	Medium Trucks:	2.297		
Centerline Dist. to Barrier:	42.0 feet	Heavy Trucks:	8.004	Grade Adjustment:	0.0
Centerline Dist. to Observer:	42.0 feet				
Barrier Distance to Observer:	0.0 feet	**Lane Equivalent Distance (in feet)**			
Observer Height (Above Pad):	5.0 feet	Autos:	34.828		
Pad Elevation:	0.0 feet	Medium Trucks:	34.573		
Road Elevation:	0.0 feet	Heavy Trucks:	34.598		
Road Grade:	0.0%				
Left View:	-90.0 degrees				
Right View:	90.0 degrees				

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-2.75	2.25	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-23.57	2.30	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-24.97	2.30	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.8	63.7	61.9	55.9	64.5	65.1
Medium Trucks:	55.2	54.5	48.2	46.6	55.1	55.3
Heavy Trucks:	59.1	58.5	49.5	50.7	59.1	59.2
Vehicle Noise:	66.2	65.2	62.4	57.4	66.0	66.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	23	49	105	226
CNEL:	24	52	113	244

Sunday, April 26, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021) | Project Name: Katella Avenue HCW Nois
Road Name: Holder St. | Job Number: 13358
Road Segment: s/o Katella Av.

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	3,525 vehicles	Autos:	15
Peak Hour Percentage:	8.33%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	294 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	40 mph		
Near/Far Lane Distance:	48 feet		

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.59%
Medium Trucks:	84.8%	4.9%	10.3%	0.82%
Heavy Trucks:	86.5%	2.7%	10.8%	0.59%

Site Data		Noise Source Elevations (in feet)			
Barrier Height:	**0.0 feet**	Autos:	0.000		
Barrier Type (0-Wall, 1-Berm):	0.0	Medium Trucks:	2.297		
Centerline Dist. to Barrier:	42.0 feet	Heavy Trucks:	8.004	Grade Adjustment:	0.0
Centerline Dist. to Observer:	42.0 feet				
Barrier Distance to Observer:	0.0 feet	**Lane Equivalent Distance (in feet)**			
Observer Height (Above Pad):	5.0 feet	Autos:	34.828		
Pad Elevation:	0.0 feet	Medium Trucks:	34.573		
Road Elevation:	0.0 feet	Heavy Trucks:	34.598		
Road Grade:	0.0%				
Left View:	-90.0 degrees				
Right View:	90.0 degrees				

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-6.71	2.25	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-27.53	2.30	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-28.93	2.30	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.9	59.7	58.0	51.9	60.6	61.2
Medium Trucks:	51.3	50.6	44.2	42.7	51.1	51.4
Heavy Trucks:	55.2	54.5	45.5	46.7	55.1	55.2
Vehicle Noise:	62.3	61.3	58.4	53.5	62.0	62.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	12	27	57	123
CNEL:	13	29	62	133

Sunday, April 26, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021) | Project Name: Katella Avenue HCW Nois
Road Name: Holder St. | Job Number: 13358
Road Segment: n/o Dwy. 3

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,368 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	197 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.59%
Medium Trucks:	84.8%	4.9%	10.3%	0.82%
Heavy Trucks:	86.5%	2.7%	10.8%	0.59%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.828
Medium Trucks:	34.573
Heavy Trucks:	34.598

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-8.44	2.25	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-29.26	2.30	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-30.66	2.30	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	59.1	58.0	56.3	50.2	58.8	59.4
Medium Trucks:	49.6	48.8	42.5	40.9	49.4	49.6
Heavy Trucks:	53.4	52.8	43.8	45.0	53.4	53.5
Vehicle Noise:	60.5	59.5	56.7	51.7	60.3	60.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	9	20	44	94
CNEL:	10	22	47	102

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021) | Project Name: Katella Avenue HCW Nois
Road Name: Holder St. | Job Number: 13358
Road Segment: s/o Dwy. 3

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	684 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	57 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.59%
Medium Trucks:	84.8%	4.9%	10.3%	0.82%
Heavy Trucks:	86.5%	2.7%	10.8%	0.59%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.828
Medium Trucks:	34.573
Heavy Trucks:	34.598

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-13.83	2.25	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-34.65	2.30	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-36.05	2.30	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	53.7	52.6	50.9	44.8	53.4	54.0
Medium Trucks:	44.2	43.5	37.1	35.5	44.0	44.2
Heavy Trucks:	48.0	47.4	38.4	39.6	48.0	48.1
Vehicle Noise:	55.1	54.2	51.3	46.3	54.9	55.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	4	9	19	41
CNEL:	4	10	21	44

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021) | Project Name: Katella Avenue HCW Nois
Road Name: Katella Av. | Job Number: 13358
Road Segment: w/o Dwy. 1

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,934 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	3,160 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	99 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.59%
Medium Trucks:	84.8%	4.9%	10.3%	0.82%
Heavy Trucks:	86.5%	2.7%	10.8%	0.59%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.275
Medium Trucks:	34.016
Heavy Trucks:	34.041

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.10	2.36	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-17.72	2.41	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-19.13	2.40	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.7	71.6	69.8	63.8	72.4	73.0
Medium Trucks:	62.9	62.2	55.9	54.3	62.8	63.0
Heavy Trucks:	66.3	65.7	56.7	57.9	66.3	66.4
Vehicle Noise:	74.0	73.0	70.2	65.2	73.7	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	106	229	493	1,062
CNEL:	115	247	532	1,146

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021) | Project Name: Katella Avenue HCW Nois
Road Name: Katella Av. | Job Number: 13358
Road Segment: w/o Holder St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,934 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	3,160 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	99 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.59%
Medium Trucks:	84.8%	4.9%	10.3%	0.82%
Heavy Trucks:	86.5%	2.7%	10.8%	0.59%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.275
Medium Trucks:	34.016
Heavy Trucks:	34.041

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.10	2.36	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-17.72	2.41	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-19.13	2.40	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.7	71.6	69.8	63.8	72.4	73.0
Medium Trucks:	62.9	62.2	55.9	54.3	62.8	63.0
Heavy Trucks:	66.3	65.7	56.7	57.9	66.3	66.4
Vehicle Noise:	74.0	73.0	70.2	65.2	73.7	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	106	229	493	1,062
CNEL:	115	247	532	1,146

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYC (2021) | Project Name: Katella Avenue HCW Nois
Road Name: Katella Av. | Job Number: 13358
Road Segment: e/o Holder St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	40,010 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	3,333 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	99 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.59%
Medium Trucks:	84.8%	4.9%	10.3%	0.82%
Heavy Trucks:	86.5%	2.7%	10.8%	0.59%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.275
Medium Trucks:	34.016
Heavy Trucks:	34.041

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.33	2.36	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-17.49	2.41	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.90	2.40	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.9	71.8	70.1	64.0	72.6	73.2
Medium Trucks:	63.2	62.5	56.1	54.5	63.0	63.2
Heavy Trucks:	66.6	65.9	56.9	58.1	66.5	66.6
Vehicle Noise:	74.2	73.2	70.4	65.4	74.0	74.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	110	237	511	1,100
CNEL:	119	256	551	1,187

Sunday, April 26, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYCP (2021) | Project Name: Katella Avenue HCW Nois
Road Name: Holder St. | Job Number: 13358
Road Segment: n/o Katella Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,809 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	734 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.60%
Medium Trucks:	84.8%	4.9%	10.3%	0.81%
Heavy Trucks:	86.5%	2.7%	10.8%	0.59%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.828
Medium Trucks:	34.573
Heavy Trucks:	34.598

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-2.73	2.25	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-23.57	2.30	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-24.97	2.30	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.8	63.7	62.0	55.9	64.5	65.1
Medium Trucks:	55.2	54.5	48.2	46.6	55.1	55.3
Heavy Trucks:	59.1	58.5	49.5	50.7	59.1	59.2
Vehicle Noise:	66.2	65.2	62.4	57.4	66.0	66.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	23	49	105	227
CNEL:	24	53	113	244

Sunday, April 26, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYCP (2021) | Project Name: Katella Avenue HCW Nois
Road Name: Holder St. | Job Number: 13358
Road Segment: s/o Katella Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,042 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	337 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.20%
Medium Trucks:	84.8%	4.9%	10.3%	0.81%
Heavy Trucks:	86.5%	2.7%	10.8%	0.99%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.828
Medium Trucks:	34.573
Heavy Trucks:	34.598

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-6.13	2.25	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-26.96	2.30	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-26.12	2.30	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.4	60.3	58.6	52.5	61.1	61.7
Medium Trucks:	51.9	51.1	44.8	43.2	51.7	51.9
Heavy Trucks:	58.0	57.3	48.3	49.6	57.9	58.0
Vehicle Noise:	63.4	62.4	59.1	54.6	63.1	63.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	15	32	68	147
CNEL:	16	34	73	157

Sunday, April 26, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYCP (2021) | Project Name: Katella Avenue HCW Nois
Road Name: Holder St. | Job Number: 13358
Road Segment: n/o Dwy. 3

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,940 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	245 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	90.98%
Medium Trucks:	84.8%	4.9%	10.3%	2.02%
Heavy Trucks:	86.5%	2.7%	10.8%	7.01%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.828
Medium Trucks:	34.573
Heavy Trucks:	34.598

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-7.85	2.25	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-24.39	2.30	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-18.98	2.30	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	59.7	58.6	56.8	50.8	59.4	60.0
Medium Trucks:	54.4	53.7	47.4	45.8	54.3	54.5
Heavy Trucks:	65.1	64.5	55.4	56.7	65.0	65.2
Vehicle Noise:	66.5	65.8	59.5	58.0	66.4	66.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	24	52	112	241
CNEL:	25	54	116	250

Sunday, April 26, 2020

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYCP (2021) | Project Name: Katella Avenue HCW Nois
Road Name: Holder St. | Job Number: 13358
Road Segment: s/o Dwy. 3

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	777 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	65 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.76%
Medium Trucks:	84.8%	4.9%	10.3%	0.72%
Heavy Trucks:	86.5%	2.7%	10.8%	0.52%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.828
Medium Trucks:	34.573
Heavy Trucks:	34.598

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-13.27	2.25	-1.20	-4.60	0.000	0.000
Medium Trucks:	77.72	-34.65	2.30	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-36.05	2.30	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	54.3	53.2	51.4	45.4	54.0	54.6
Medium Trucks:	44.2	43.5	37.1	35.5	44.0	44.2
Heavy Trucks:	48.0	47.4	38.4	39.6	48.0	48.1
Vehicle Noise:	55.5	54.6	51.8	46.7	55.3	55.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	4	9	20	44
CNEL:	5	10	22	47

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYCP (2021) | Project Name: Katella Avenue HCW Nois
Road Name: Katella Av. | Job Number: 13358
Road Segment: w/o Dwy. 1

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,359 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	3,195 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	99 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.31%
Medium Trucks:	84.8%	4.9%	10.3%	0.86%
Heavy Trucks:	86.5%	2.7%	10.8%	0.83%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.275
Medium Trucks:	34.016
Heavy Trucks:	34.041

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.13	2.36	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-17.45	2.41	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-17.58	2.40	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.8	71.6	69.9	63.8	72.4	73.1
Medium Trucks:	63.2	62.5	56.1	54.6	63.0	63.3
Heavy Trucks:	67.9	67.2	58.2	59.5	67.8	67.9
Vehicle Noise:	74.3	73.4	70.3	65.5	74.1	74.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	112	242	522	1,124
CNEL:	121	260	560	1,207

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYCP (2021) | Project Name: Katella Avenue HCW Nois
Road Name: Katella Av. | Job Number: 13358
Road Segment: w/o Holder St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,359 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	3,195 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	99 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.31%
Medium Trucks:	84.8%	4.9%	10.3%	0.86%
Heavy Trucks:	86.5%	2.7%	10.8%	0.83%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.275
Medium Trucks:	34.016
Heavy Trucks:	34.041

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.13	2.36	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-17.45	2.41	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-17.58	2.40	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.8	71.6	69.9	63.8	72.4	73.1
Medium Trucks:	63.2	62.5	56.1	54.6	63.0	63.3
Heavy Trucks:	67.9	67.2	58.2	59.5	67.8	67.9
Vehicle Noise:	74.3	73.4	70.3	65.5	74.1	74.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	112	242	522	1,124
CNEL:	121	260	560	1,207

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OYCP (2021) | Project Name: Katella Avenue HCW Nois
Road Name: Katella Av. | Job Number: 13358
Road Segment: e/o Holder St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	40,405 vehicles
Peak Hour Percentage:	8.33%
Peak Hour Volume:	3,366 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	99 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	98.32%
Medium Trucks:	84.8%	4.9%	10.3%	0.86%
Heavy Trucks:	86.5%	2.7%	10.8%	0.82%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	34.275
Medium Trucks:	34.016
Heavy Trucks:	34.041

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.36	2.36	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-17.23	2.41	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-17.42	2.40	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.0	71.9	70.1	64.1	72.7	73.3
Medium Trucks:	63.4	62.7	56.3	54.8	63.3	63.5
Heavy Trucks:	68.0	67.4	58.4	59.6	68.0	68.1
Vehicle Noise:	74.5	73.6	70.6	65.8	74.3	74.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	116	250	539	1,161
CNEL:	125	269	579	1,247

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APPENDIX 9.1:

CADNAA OPERATIONAL NOISE MODEL INPUTS

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13358

CadnaA Noise Prediction Model: 13358_HCW.cna
Date: 16.05.20
Analyst: B. Lawson

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	23.8	21.2	28.0	55.0	50.0	0.0				5.00	a	6024298.35	2241694.44	5.00
RECEIVERS		R2	31.8	30.3	37.1	55.0	50.0	0.0				5.00	a	6025247.08	2240870.03	5.00
RECEIVERS		R3	34.6	31.5	38.4	55.0	50.0	0.0				5.00	a	6024094.15	2239014.30	5.00
RECEIVERS		R4	36.6	34.4	41.1	55.0	50.0	0.0				5.00	a	6023761.99	2238998.55	5.00
RECEIVERS		R5	32.2	31.0	37.7	55.0	50.0	0.0				5.00	a	6022794.97	2239016.75	5.00

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			K0	Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night				X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(dB)	(ft)		(ft)	(ft)	(ft)
POINTSOURCE		AC01	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	0.0	5.00	g	6023299.03	2239246.47	45.00
POINTSOURCE		AC02	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	0.0	5.00	g	6023313.33	2240163.71	45.00
POINTSOURCE		AC03	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	0.0	5.00	g	6023900.83	2240159.02	45.00
POINTSOURCE		AC04	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	0.0	5.00	g	6023863.33	2239229.33	45.00
POINTSOURCE		TRASH01	87.2	87.2	87.2	Lw	87.2		300.00	0.00	180.00	0.0	5.00	a	6023818.93	2239760.71	5.00
POINTSOURCE		TRASH02	87.2	87.2	87.2	Lw	87.2		300.00	0.00	180.00	0.0	5.00	a	6023814.58	2239582.21	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		DWY03	90.5	75.2	81.4	72.7	57.5	63.7	PWL-Pt	89.7					201.0	6.0	25.0	6.2	8
LINESOURCE		DWY03	90.9	75.6	81.8	72.7	57.5	63.7	PWL-Pt	89.7					201.0	6.0	25.0	6.2	8

Name	Height			Coordinates			
	Begin		End	x	y	z	Ground
	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
LINESOURCE	8.00	a		6023809.28	2239623.42	8.00	0.00
				6023941.84	2239618.11	8.00	0.00
				6023953.12	2239617.25	8.00	0.00
				6024003.80	2239611.24	8.00	0.00
LINESOURCE	8.00	a		6023811.15	2239718.85	8.00	0.00
				6023915.82	2239717.25	8.00	0.00
				6023940.22	2239695.49	8.00	0.00
				6023936.44	2239618.33	8.00	0.00

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li			Operating Time			Height
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)
AREASOURCE		DOCK	104.9	104.9	104.9	63.7	63.7	63.7	Lw	104.9					8

Name	Height			Coordinates			
	Begin		End	x	y	z	Ground
	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
AREASOURCE	8.00	a		6023364.25	2239838.40	8.00	0.00
				6023812.67	2239828.68	8.00	0.00
				6023812.13	2239768.71	8.00	0.00
				6023808.28	2239572.23	8.00	0.00
				6023807.03	2239513.93	8.00	0.00
				6023358.17	2239522.08	8.00	0.00
				6023358.80	2239582.26	8.00	0.00
				6023363.17	2239777.89	8.00	0.00

Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height			Coordinates			
			left	right		horz.	vert.	Begin		End	x	y	z	Ground
					(ft)	(ft)	(ft)	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
BARRIERS		BARRIERS00001						6.00	a		6024078.32	2239019.99	6.00	0.00
											6026524.50	2238966.17	6.00	0.00
BARRIERS		BARRIERS00002						6.00	a		6023993.03	2239006.68	6.00	0.00
											6023993.03	2239026.21	6.00	0.00
											6022694.52	2239050.98	6.00	0.00
BARRIERS		BARRIERS00003						6.00	a		6024215.89	2241748.03	6.00	0.00
											6024222.40	2241707.67	6.00	0.00
											6024316.15	2241668.60	6.00	0.00

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)
											6024637.77	2241625.63	6.00	0.00
BARRIERS		BARRIERS00001						0.00	a		6024078.32	2239019.99	0.00	0.00
											6026524.50	2238966.17	0.00	0.00
BARRIERS		BARRIERS00002						0.00	a		6023993.03	2239006.68	0.00	0.00
											6023993.03	2239026.21	0.00	0.00
											6022694.52	2239050.98	0.00	0.00
BARRIERS		BARRIERS00003						0.00	a		6024215.89	2241748.03	0.00	0.00
											6024222.40	2241707.67	0.00	0.00
											6024316.15	2241668.60	0.00	0.00
											6024637.77	2241625.63	0.00	0.00

Building(s)

Name	M.	ID	RB	Residents	Absorption	Height		Coordinates			
						Begin		x	y	z	Ground
						(ft)		(ft)	(ft)	(ft)	(ft)
BUILDING		NORTH	x	0		40.00	a	6023316.17	2240204.70	40.00	0.00
								6023889.93	2240192.81	40.00	0.00
								6023933.69	2240158.23	40.00	0.00
								6023926.66	2239767.09	40.00	0.00
								6023812.13	2239768.71	40.00	0.00
								6023812.67	2239828.68	40.00	0.00
								6023364.25	2239838.40	40.00	0.00
								6023363.17	2239777.89	40.00	0.00
								6023263.76	2239779.51	40.00	0.00
								6023269.71	2240171.20	40.00	0.00
BUILDING		SOUTH	x	0		40.00	a	6023263.51	2239583.52	40.00	0.00
								6023358.80	2239582.26	40.00	0.00
								6023358.17	2239522.08	40.00	0.00
								6023807.03	2239513.93	40.00	0.00
								6023808.28	2239572.23	40.00	0.00
								6023903.57	2239570.98	40.00	0.00
								6023896.67	2239226.82	40.00	0.00
								6023848.40	2239193.59	40.00	0.00
								6023298.62	2239205.50	40.00	0.00
								6023255.36	2239238.73	40.00	0.00

APPENDIX 10.1:

CADNAA CONSTRUCTION NOISE MODEL INPUTS

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13358

CadnaA Noise Prediction Model: 13358_Construction.cna
Date: 15.05.20
Analyst: B. Lawson

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	52.0	52.0	58.6	55.0	50.0	0.0				5.00	a	6024298.35	2241694.44	5.00
RECEIVERS		R2	57.0	57.0	63.7	55.0	50.0	0.0				5.00	a	6025247.08	2240870.03	5.00
RECEIVERS		R3	63.5	63.5	70.1	55.0	50.0	0.0				5.00	a	6024094.15	2239014.30	5.00
RECEIVERS		R4	65.3	65.3	72.0	55.0	50.0	0.0				5.00	a	6023761.99	2238998.55	5.00
RECEIVERS		R5	59.0	59.0	65.7	55.0	50.0	0.0				5.00	a	6022794.97	2239016.75	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	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)
SITEBOUNDARY		CONSTRUCTION	124.9	124.9	124.9	75.3	75.3	75.3	Lw''	75.3					8

Name	Height				Coordinates			
	Begin		End		x	y	z	Ground
	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
SITEBOUNDARY	8.00	a			6023187.21	2239098.46	8.00	0.00
					6023197.57	2239563.95	8.00	0.00
					6023200.69	2239704.32	8.00	0.00
					6023204.39	2239874.79	8.00	0.00
					6023213.53	2240295.69	8.00	0.00
					6023214.05	2240305.70	8.00	0.00
					6023993.53	2240288.72	8.00	0.00
					6024017.85	2240257.18	8.00	0.00
					6023992.26	2239081.09	8.00	0.00

Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height			Coordinates			
			left	right		horz.	vert.	Begin		End	x	y	z	Ground
					(ft)	(ft)	(ft)	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
BARRIERS		BARRIERS00001						6.00	a		6024078.32	2239019.99	6.00	0.00
											6026524.50	2238966.17	6.00	0.00
BARRIERS		BARRIERS00002						6.00	a		6023993.03	2239006.68	6.00	0.00
											6023993.03	2239026.21	6.00	0.00
											6022694.52	2239050.98	6.00	0.00
BARRIERS		BARRIERS00003						6.00	a		6024215.89	2241748.03	6.00	0.00
											6024222.40	2241707.67	6.00	0.00
											6024316.15	2241668.60	6.00	0.00
											6024637.77	2241625.63	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		45.00	a	6023269.06	2239519.65	45.00	0.00
								6023654.23	2239512.52	45.00	0.00
								6023647.57	2239150.65	45.00	0.00
								6023260.98	2239160.64	45.00	0.00

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