Appendix J
Noise and Vibration Analysis

534 Struck Avenue

NOISE AND VIBRATION ANALYSIS

CITY OF ORANGE

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TABLE OF CONTENTS

APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

LIST OF ABBREVIATED TERMS

(1)	Reference
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
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
mph	Miles per hour
PPV	Peak Particle Velocity
Project	534 Struck Avenue
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 noise exposure and the necessary noise mitigation measures for the proposed 534 Struck Avenue ("Project"). The Project site is located south of Struck Avenue and east of Batavia in the City of Orange. The Project is proposing to redevelop the site with a 57,900-square foot, 45-foot-tall truck terminal, including 52,900-square feet of warehouse space and 5,000-square feet of office uses. This noise study has been prepared to satisfy applicable City of Orange noise standards and significance criteria based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

The results of this Noise and Vibration 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*	-
Construction Noise	10	*Less Than Significant*	-
Construction Vibration		*Less Than Significant*	-

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1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed 534 Struck Avenue ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, sets out the local regulatory setting, presents the study methods and procedures for 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 534 Struck Avenue Project is located south of Struck Avenue and east of Batavia Street in the City of Orange, as shown on Exhibit 1-A. Existing uses that surround the Project site includes mostly manufacturing industrial land uses to the west and east, with public-institutional uses to the north and the nearest multi-family residential land uses located northeast of the Project site.

1.2 BACKGROUND

The site is currently occupied by Nursery Supplies, Inc., a manufacturer of plastic nursery planting pots. Site improvements consist of an approximate 40,000 square-foot concrete tilt-up building, 5 open canopy storage areas, 14 silos for plastic granule storage, open storage areas, and parking. The Project site is designated Light Industrial in the City of Orange General Plan and zoned under City of Orange Zoning Map as Industrial Manufacturing (M-2).

1.3 PROJECT DESCRIPTION

The Project is proposing to redevelop the site with a 57,900-square foot, 45-foot-tall truck terminal, including 52,900-square feet of warehouse space and 5,000-square feet of office uses (see Exhibit 1-B). The site also includes a 5,400 square foot maintenance building. The Project would construct 62 passenger car parking stalls (including 3 accessible parking spaces) and 188 trailer parking stalls (for a total of 250 parking stalls) on-site. The building is proposed to include 84 dock doors (cross-dock configuration). The Project is proposed to operate 24-hours a day, 7 days a week with 3 shifts. The anticipated Opening Year for the proposed Project is 2024.

At the time this noise analysis was prepared, the future tenants of the proposed Project were unknown. The on-site Project-related noise sources are expected to include loading dock activity, truck terminal activity, roof-top air conditioning units trash enclosure activity, parking lot vehicle movements and truck movements.

EXHIBIT 1-A: LOCATION MAP

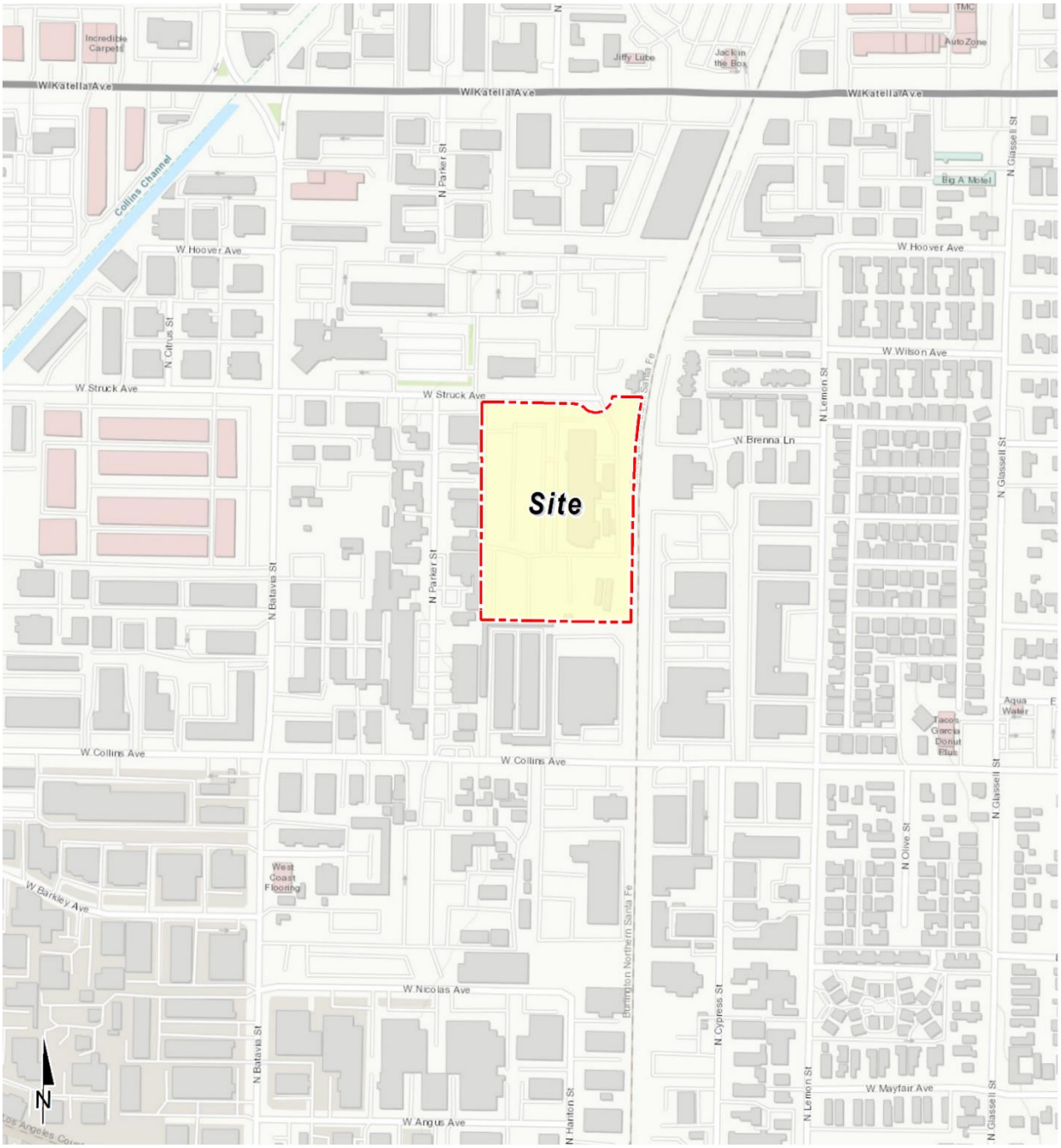
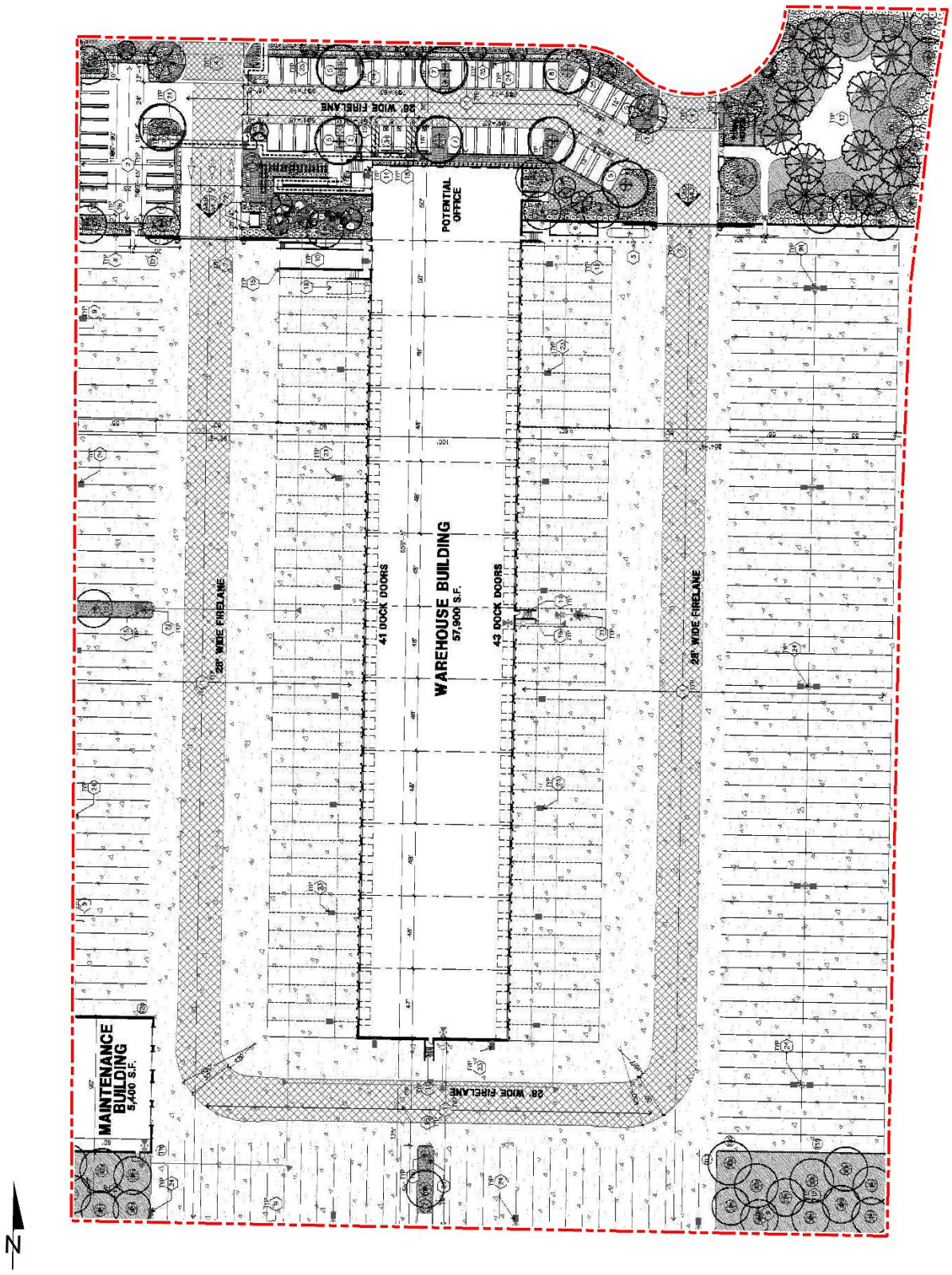


EXHIBIT 1-B: SITE PLAN



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2 FUNDAMENTALS

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

EXHIBIT 2-A: TYPICAL NOISE LEVELS

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

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

2.1 RANGE OF NOISE

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

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

2.2 NOISE DESCRIPTORS

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

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

2.3 SOUND PROPAGATION

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

2.3.1 GEOMETRIC SPREADING

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

2.3.2 GROUND ABSORPTION

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

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

2.3.3 ATMOSPHERIC EFFECTS

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

2.3.4 SHIELDING

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

2.4 NOISE CONTROL

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

2.5 NOISE BARRIER ATTENUATION

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

2.6 LAND USE COMPATIBILITY WITH NOISE

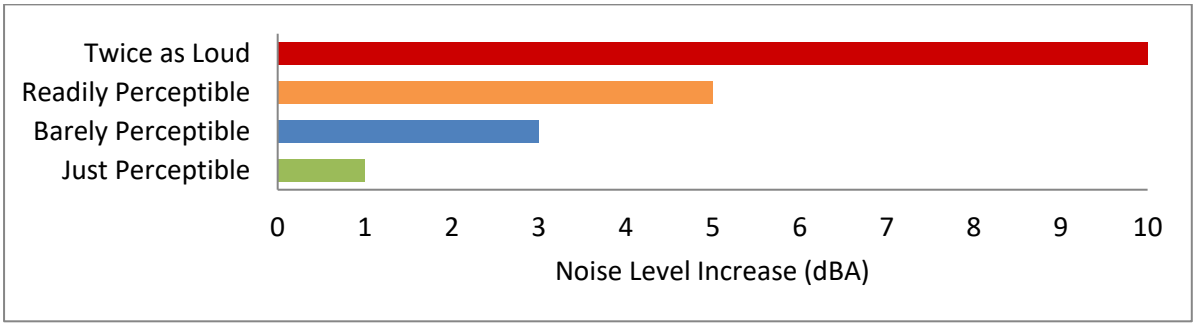
Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development,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

2.7 COMMUNITY RESPONSE TO NOISE

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

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

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



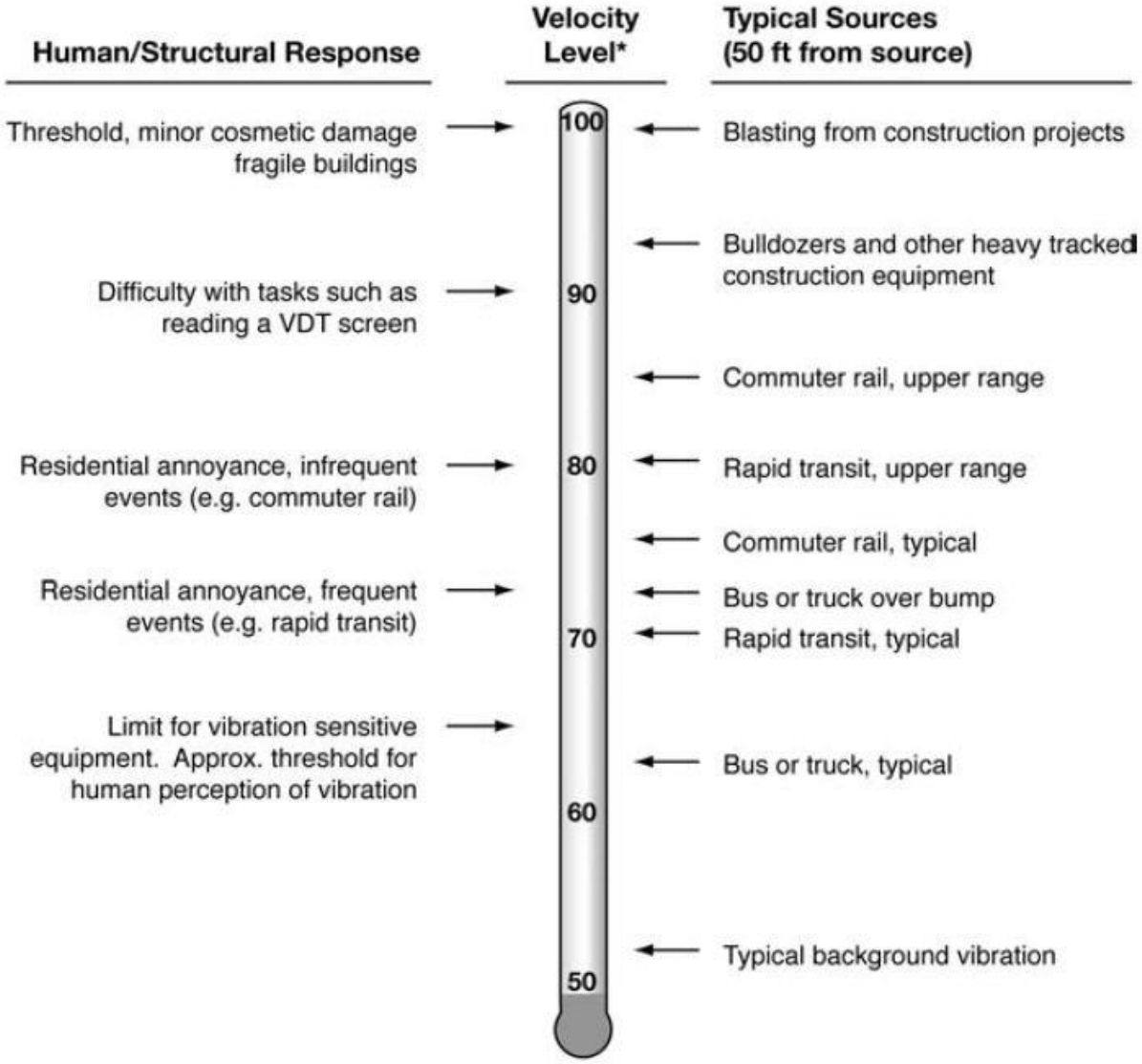
2.8 VIBRATION

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

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

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

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



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

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

3 REGULATORY SETTING

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

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

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

3.2 CITY OF ORANGE GENERAL PLAN NOISE ELEMENT

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

Policy 1.1: Consider potential excessive noise levels when making land use planning decisions.

Policy 1.2: Encourage new development projects to provide sufficient spatial buffers to separate excessive noise generating land uses and noise-sensitive land uses.

Policy 1.4: Ensure that acceptable noise levels are maintained near noise-sensitive uses.

Policy 1.5: Reduce impacts of high-noise activity centers located near residential areas.

Policy 6.1: Encourage the design and construction of industrial uses to minimize excessive noise through project design features that include noise control.

Policy 6.2: Encourage industrial uses to locate vehicular traffic and operations away from abutting residential zones as much as possible.

Policy 7.2: Require developers and contractors to employ noise minimizing techniques during construction and maintenance operations.

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

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

3.3 CITY OF ORANGE MUNICIPAL CODE STANDARDS

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

3.3.1 OPERATIONAL NOISE STANDARDS

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

3.3.2 CONSTRUCTION NOISE STANDARDS

The City of Orange has set restrictions to control noise impacts associated with the construction of the proposed Project. Section 8.24.050[E] of the City's Municipal Code states: *Noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities take place between the hours of 7:00 a.m. and 8:00 p.m. on any day except for Sunday or a Federal holiday, or between the hours of 9:00 a.m. and 8:00 p.m. on Sunday or a Federal holiday.* Neither the City's General Plan nor Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow

for a quantified determination of what CEQA constitutes a *substantial temporary or periodic noise increase*. Therefore, a numerical construction threshold based on Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* is used for analysis of daytime construction impacts, as discussed below.

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

3.4 VIBRATION STANDARDS

Construction activity can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. (8)

To analyze vibration impacts originating from the operation and construction of the 534 Struck Avenue, vibration-generating activities are appropriately evaluated against standards established under a City's Municipal Code, if such standards exist. However, the City of Orange does not identify specific vibration level limits. Therefore, for analysis purposes, the Caltrans *Transportation and Construction Vibration Guidance Manual*, (12 p. 38) Table 19, vibration damage are used in this noise study to assess potential temporary construction-related impacts at adjacent building locations. The nearest noise sensitive buildings adjacent to the Project site can best be described as "older residential structures" with a maximum acceptable continuous vibration threshold of 0.3 PPV (in/sec).

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4 SIGNIFICANCE CRITERIA

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

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

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

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

4.1 NOISE LEVEL INCREASES (THRESHOLD A)

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing baseline ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (13) 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.

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

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

4.2 VIBRATION (THRESHOLD B)

As described in Section 3.4, the vibration impacts originating from the construction of 534 Struck Avenue, vibration-generating activities are appropriately evaluated using the Caltrans vibration damage thresholds to assess potential temporary construction-related impacts at adjacent building locations. The nearest noise sensitive buildings adjacent to the Project site can best be

described as "older residential structures" with a maximum acceptable continuous vibration threshold of 0.3 PPV (in/sec).

4.3 CEQA GUIDELINES NOT FURTHER ANALYZED (THRESHOLD C)

The Project site is not located within two miles of a public airport or within an airport land use plan; nor is the Project within the vicinity of a private airstrip. As such, the Project site would not be exposed to excessive noise levels from airport operations, and therefore, impacts are considered *less than significant,* and no further noise analysis is conducted in relation to Guideline C.

4.4 SIGNIFICANCE CRITERIA SUMMARY

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

TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Condition(s)	Significance Criteria	
		Daytime	Nighttime
Off-Site Traffic	If ambient is < 65 dBA CNEL[1]	≥ 5 dBA CNEL Project increase	
	If ambient is > 65 dBA CNEL[1]	≥ 3 dBA CNEL Project increase	
Operational	Exterior Noise Level Standards[2]	55 dBA L_{eq}	50 dBA L_{eq}
	If ambient is < 65 dBA Leq[1]	≥ 5 dBA L_{eq} Project increase	
	If ambient is > 65 dBA Leq[1]	≥ 3 dBA L_{eq} Project increase	
Construction	Permitted between 7:00 a.m. and 8:00 p.m. on any day except for Sunday or a Federal holiday[3]		
	Noise Level Threshold[4]	80 dBA L_{eq}	n/a
	Vibration Level Threshold[5]	0.3 PPV (in/sec)	n/a

[1] City Orange General Plan Noise Element, Table N-3.
[2] City Orange Municipal Code Section 8.24.040.
[3] City Orange Municipal Code Section 8.24.050[E].
[4] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual.
[5] Caltrans Transportation and Construction Vibration Manual, April 2020 Table 19.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

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 Monday, April 18th, 2022. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the equivalent daytime and nighttime hourly noise levels. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (14)

5.2 NOISE MEASUREMENT LOCATIONS

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

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

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

5.3 NOISE MEASUREMENT RESULTS

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

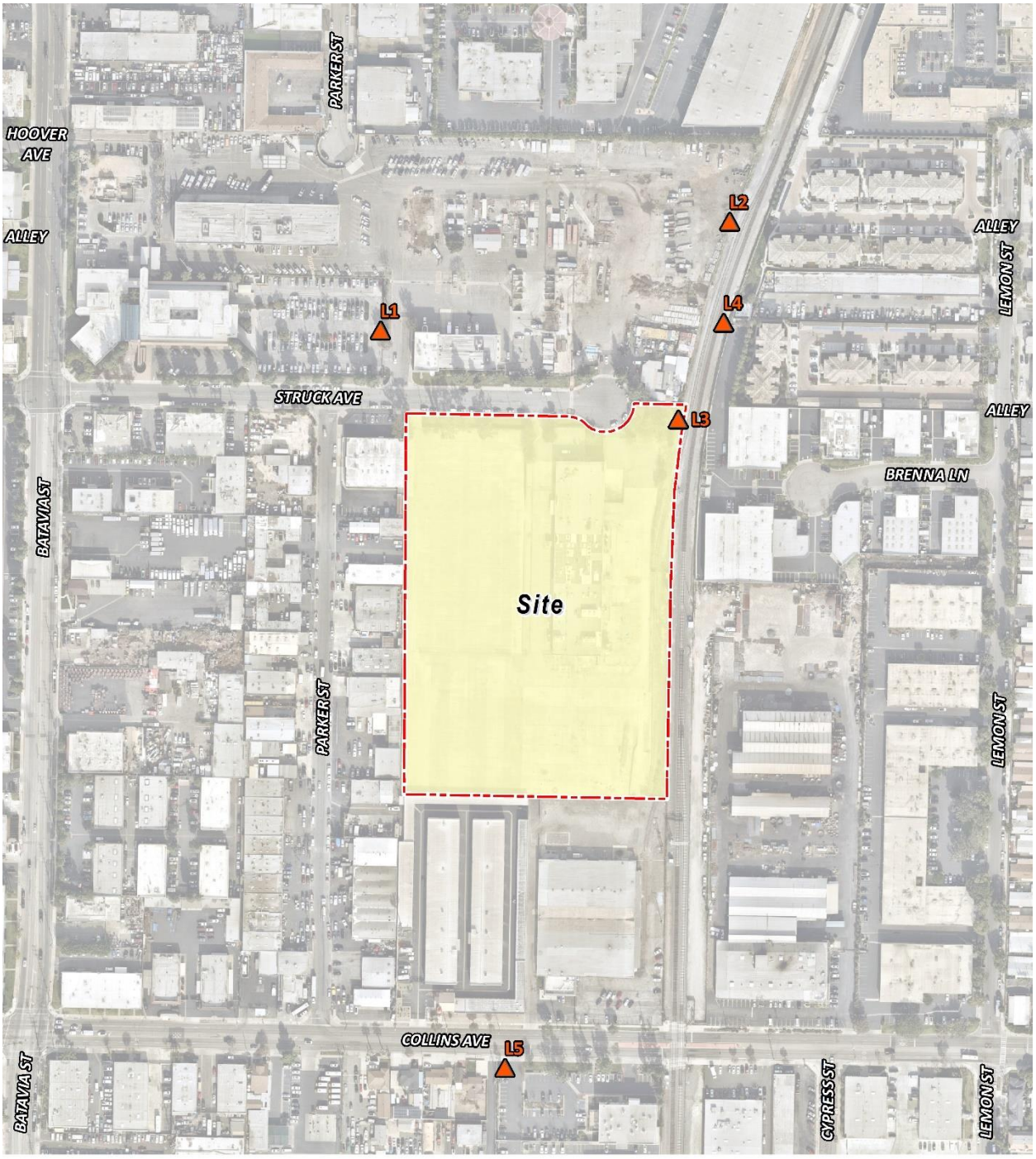
TABLE 5-1: AMBIENT NOISE LEVEL MEASUREMENTS

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]	
		Daytime	Nighttime
L1	Located northwest of the Project site near the Department of Public Works at 637 West Struck Avenue.	54.3	50.5
L2	Located northeast of the Project site near proposed residential development north of West Struck Avenue.	51.2	47.2
L3	Located northeast of the Project site near The HUB OC (Mary's Kitchen) at 517 West Struck Avenue.	52.6	49.3
L4	Located northeast of the Project site near the Citrus Grove Apartments at 1120 North Lemon Street.	51.0	46.8
L5	Located south of the Project site near the Top Dog Inn at 606 West Collins Avenue.	68.0	63.0

[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.

Table 5-1 provides the equivalent noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Appendix 5.2 provides summary worksheets of the noise levels for each of the daytime and nighttime hours.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS



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6 TRAFFIC NOISE METHODS AND PROCEDURES

The following section outlines the methods and procedures used to estimate and analyze the future traffic noise environment. Consistent with City of Orange Noise and Land Use Compatibility Guidelines (10), 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. (15) 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. (16) 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. (17)

6.1.1 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. Table 6-1 identifies the 13 off-site study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of Orange General Plan Circulation Element, and the vehicle speeds. The ADT volumes used in this study area presented on Table 6-2 are based on the *534 Struck Avenue Traffic Analysis*, prepared by Urban Crossroads, Inc. for the following traffic scenarios. (18)

- Existing (E)
- Existing plus Project (E+P)
- Opening Year Cumulative without Project Conditions (OYC)
- Opening Year Cumulative with Project Conditions (OYC+P)

The ADT volumes vary for each roadway segment based on the existing traffic volumes and the combination of project traffic distributions. This analysis relies on a comparative evaluation of the off-site traffic noise impacts at the boundary of the right-of-way of the receiving adjacent land use, without and with project ADT traffic volumes from the Project traffic analysis. The Project is anticipated to generate a net total of 396 two-way trips per day (actual vehicles) that include 176 truck trips.

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Classification[1]	Distance from Centerline to Receiving Land Use (Feet)[2]	Vehicle Speed (mph)[3]
1	Main St.	n/o Struck Av.	Primary Arterial	50'	40
2	Main St.	s/o Struck Av.	Primary Arterial	50'	40
3	Batavia St.	n/o Katella Av.	Primary Arterial	50'	40
4	Batavia St.	s/o Katella Av.	Primary Arterial	50'	40
5	Batavia St.	s/o Struck Av.	Primary Arterial	50'	40
6	Katella Av.	w/o Main St.	Smart Street	67'	40
7	Katella Av.	e/o Main St.	Smart Street	67'	40
8	Katella Av.	e/o Batavia Av.	Smart Street	67'	40
9	Katella Av.	w/o SR-57 SB Ramps	Smart Street	67'	40
10	Katella Av.	e/o SR-57 NB Ramps	Smart Street	67'	40
11	Struck Av.	w/o Main St.	Collector	33'	40
12	Struck Av.	e/o Main St.	Collector	33'	40
13	Struck Av.	e/o Batavia Av.	Collector	33'	40

[1] City of Orange General Plan Circulation Element functional roadway classification.
[2] Distance to receiving land use is based upon the right-of-way distances.
[3] 534 Struck Avenue Traffic Analysis, Urban Crossroads, Inc.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes[1]			
			Existing		OYC (2024)	
			Without Project	With Project	Without Project	With Project
1	Main St.	n/o Struck Av.	15,522	15,533	16,205	16,216
2	Main St.	s/o Struck Av.	18,156	18,167	19,026	19,037
3	Batavia St.	n/o Katella Av.	12,119	12,149	13,174	13,205
4	Batavia St.	s/o Katella Av.	9,676	9,975	10,417	10,716
5	Batavia St.	s/o Struck Av.	10,892	10,923	11,648	11,679
6	Katella Av.	w/o Main St.	24,088	24,268	25,269	25,449
7	Katella Av.	e/o Main St.	28,483	28,663	29,870	30,050
8	Katella Av.	e/o Batavia Av.	31,672	31,760	33,328	33,416
9	Katella Av.	w/o SR-57 SB Ramps	36,377	36,388	38,027	38,038
10	Katella Av.	e/o SR-57 NB Ramps	35,065	35,289	37,009	37,234
11	Struck Av.	w/o Main St.	5,142	5,186	5,668	5,712
12	Struck Av.	e/o Main St.	1,525	1,591	1,823	1,889
13	Struck Av.	e/o Batavia Av.	1,477	1,873	1,875	2,271

[1] 534 Struck Avenue Traffic Analysis, Urban Crossroads, Inc.

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 *534 Struck Avenue Traffic 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	75.46%	12.53%	12.02%	100.00%
Medium Trucks	81.62%	5.32%	13.06%	100.00%
Heavy Trucks	79.88%	6.17%	13.95%	100.00%

[1] Based on the August 31, 2022, 24-hour directional vehicle classification count collected on Katella Avenue west of Struck Avenue (534 Struck Avenue Traffic Analysis, Urban Crossroads, Inc.) "Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

TABLE 6-4: WITHOUT PROJECT VEHICLE MIX

Classification	Total % Traffic Flow[1]			Total
	Autos	Medium Trucks	Heavy Trucks	
All Segments	91.47%	6.36%	2.17%	100.00%

[1] Based on the August 31, 2022, 24-hour directional vehicle classification count collected on Katella Avenue west of Struck Avenue (534 Struck Avenue Traffic Analysis, Urban Crossroads, Inc.)

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 WITH PROJECT VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Main St.	n/o Struck Av.	91.48%	6.35%	2.17%	100.00%
2	Main St.	s/o Struck Av.	91.48%	6.35%	2.17%	100.00%
3	Batavia St.	n/o Katella Av.	91.42%	6.35%	2.23%	100.00%
4	Batavia St.	s/o Katella Av.	90.05%	6.42%	3.53%	100.00%
5	Batavia St.	s/o Struck Av.	91.41%	6.35%	2.24%	100.00%
6	Katella Av.	w/o Main St.	91.06%	6.38%	2.56%	100.00%
7	Katella Av.	e/o Main St.	91.12%	6.38%	2.50%	100.00%
8	Katella Av.	e/o Batavia Av.	91.36%	6.36%	2.29%	100.00%
9	Katella Av.	w/o SR-57 SB Ramps	91.47%	6.35%	2.17%	100.00%
10	Katella Av.	e/o SR-57 NB Ramps	91.20%	6.36%	2.44%	100.00%
11	Struck Av.	w/o Main St.	91.54%	6.30%	2.16%	100.00%
12	Struck Av.	e/o Main St.	91.82%	6.09%	2.08%	100.00%
13	Struck Av.	e/o Batavia Av.	83.88%	6.42%	9.70%	100.00%

[1] 534 Struck Avenue Traffic Analysis, Urban Crossroads, Inc.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-6: OYC WITH PROJECT VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Main St.	n/o Struck Av.	91.48%	6.35%	2.17%	100.00%
2	Main St.	s/o Struck Av.	91.47%	6.35%	2.17%	100.00%
3	Batavia St.	n/o Katella Av.	91.42%	6.35%	2.23%	100.00%
4	Batavia St.	s/o Katella Av.	90.15%	6.41%	3.44%	100.00%
5	Batavia St.	s/o Struck Av.	91.42%	6.35%	2.23%	100.00%
6	Katella Av.	w/o Main St.	91.08%	6.38%	2.54%	100.00%
7	Katella Av.	e/o Main St.	91.14%	6.37%	2.48%	100.00%
8	Katella Av.	e/o Batavia Av.	91.36%	6.36%	2.28%	100.00%
9	Katella Av.	w/o SR-57 SB Ramps	91.47%	6.35%	2.17%	100.00%
10	Katella Av.	e/o SR-57 NB Ramps	91.21%	6.36%	2.42%	100.00%
11	Struck Av.	w/o Main St.	91.54%	6.31%	2.16%	100.00%
12	Struck Av.	e/o Main St.	91.77%	6.13%	2.10%	100.00%
13	Struck Av.	e/o Batavia Av.	85.21%	6.41%	8.38%	100.00%

[1] 534 Struck Avenue Traffic Analysis, Urban Crossroads, Inc.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

7 OFF-SITE TRAFFIC NOISE ANALYSIS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed based on *the 534 Struck Avenue Traffic Analysis* prepared by Urban Crossroads, Inc. (19) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway.

7.1 TRAFFIC NOISE CONTOURS

Noise contours were used to assess the Project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area. Tables 7-1 to 7-5 present a summary of the exterior traffic noise levels for each traffic condition. Appendix 7.1 includes the traffic noise level contours worksheets for each traffic condition.

TABLE 7-1: EXISTING WITHOUT PROJECT CONTOURS

ID	Road	Segment	CNEL at Nearest Receiving Land Use (dBA)[1]	Distance to Contour from Centerline (Feet)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Main St.	n/o Struck Av.	71.0	58	125	269
2	Main St.	s/o Struck Av.	71.6	64	138	298
3	Batavia St.	n/o Katella Av.	69.9	RW	106	228
4	Batavia St.	s/o Katella Av.	68.9	RW	91	196
5	Batavia St.	s/o Struck Av.	69.4	RW	98	212
6	Katella Av.	w/o Main St.	71.2	81	174	375
7	Katella Av.	e/o Main St.	71.9	90	194	419
8	Katella Av.	e/o Batavia Av.	72.4	97	209	450
9	Katella Av.	w/o SR-57 SB Ramps	73.0	106	229	493
10	Katella Av.	e/o SR-57 NB Ramps	72.8	104	223	481
11	Struck Av.	w/o Main St.	68.0	RW	52	113
12	Struck Av.	e/o Main St.	62.7	RW	RW	50
13	Struck Av.	e/o Batavia Av.	62.6	RW	RW	49

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use. "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-2: EXISTING WITH PROJECT CONTOURS

ID	Road	Segment	CNEL at Nearest Receiving Land Use (dBA)[1]	Distance to Contour from Centerline (Feet)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Main St.	n/o Struck Av.	71.0	58	125	269
2	Main St.	s/o Struck Av.	71.6	64	138	298
3	Batavia St.	n/o Katella Av.	69.9	RW	107	230
4	Batavia St.	s/o Katella Av.	69.9	RW	106	229
5	Batavia St.	s/o Struck Av.	69.5	RW	99	214
6	Katella Av.	w/o Main St.	71.5	85	182	392
7	Katella Av.	e/o Main St.	72.2	94	202	436
8	Katella Av.	e/o Batavia Av.	72.5	98	212	456
9	Katella Av.	w/o SR-57 SB Ramps	73.0	106	229	493
10	Katella Av.	e/o SR-57 NB Ramps	73.1	107	231	497
11	Struck Av.	w/o Main St.	68.0	RW	53	113
12	Struck Av.	e/o Main St.	62.8	RW	RW	51
13	Struck Av.	e/o Batavia Av.	67.1	RW	46	98

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use. "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-3: OYC WITHOUT PROJECT CONTOURS

ID	Road	Segment	CNEL at Nearest Receiving Land Use (dBA)[1]	Distance to Contour from Centerline (Feet)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Main St.	n/o Struck Av.	71.1	60	128	276
2	Main St.	s/o Struck Av.	71.8	66	143	308
3	Batavia St.	n/o Katella Av.	70.2	52	112	241
4	Batavia St.	s/o Katella Av.	69.2	RW	96	206
5	Batavia St.	s/o Struck Av.	69.7	RW	103	222
6	Katella Av.	w/o Main St.	71.4	83	180	387
7	Katella Av.	e/o Main St.	72.1	93	201	432
8	Katella Av.	e/o Batavia Av.	72.6	100	216	465
9	Katella Av.	w/o SR-57 SB Ramps	73.2	109	236	508
10	Katella Av.	e/o SR-57 NB Ramps	73.1	107	232	499
11	Struck Av.	w/o Main St.	68.4	RW	56	121
12	Struck Av.	e/o Main St.	63.5	RW	RW	57
13	Struck Av.	e/o Batavia Av.	63.6	RW	RW	58

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use. "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-4: OYC WITH PROJECT CONTOURS

ID	Road	Segment	CNEL at Nearest Receiving Land Use (dBA)[1]	Distance to Contour from Centerline (Feet)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Main St.	n/o Struck Av.	71.1	60	128	276
2	Main St.	s/o Struck Av.	71.8	66	143	308
3	Batavia St.	n/o Katella Av.	70.3	52	113	243
4	Batavia St.	s/o Katella Av.	70.2	51	111	238
5	Batavia St.	s/o Struck Av.	69.8	RW	104	224
6	Katella Av.	w/o Main St.	71.7	87	188	404
7	Katella Av.	e/o Main St.	72.4	97	208	449
8	Katella Av.	e/o Batavia Av.	72.7	102	219	471
9	Katella Av.	w/o SR-57 SB Ramps	73.2	109	236	508
10	Katella Av.	e/o SR-57 NB Ramps	73.3	111	239	514
11	Struck Av.	w/o Main St.	68.5	RW	56	121
12	Struck Av.	e/o Main St.	63.6	RW	RW	57
13	Struck Av.	e/o Batavia Av.	67.5	RW	49	105

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use. "RW" = Location of the respective noise contour falls within the right-of-way of the road.

7.2 EXISTING PROJECT TRAFFIC NOISE LEVEL INCREASES

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project has been included in this report for informational purposes and to fully analyze all the existing traffic scenarios identified in the Traffic Analysis prepared by Urban Crossroads, Inc. However, the analysis of existing off-site traffic noise levels plus traffic noise generated by the proposed Project scenario will not actually occur since the Project would not be fully constructed and operational until Year 2024 conditions. Table 7-1 shows the Existing without Project conditions CNEL noise levels. The Existing without Project exterior noise levels range from 62.6 to 73.0 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions ranging from 62.8 to 73.1 dBA CNEL. Table 7-5 shows that the Project off-site traffic noise level increases range from 0.0 to 4.5 dBA CNEL on the study area roadway segments. 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 increases on receiving land uses due to the Project-related traffic.

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

ID	Road	Segment	CNEL at Receiving Land Use (dBA)[1]			Incremental Noise Level Increase Threshold[2]	
			No Project	With Project	Project Increment	Limit	Exceeded?
1	Main St.	n/o Struck Av.	71.0	71.0	0.0	3.0	No
2	Main St.	s/o Struck Av.	71.6	71.6	0.0	3.0	No
3	Batavia St.	n/o Katella Av.	69.9	69.9	0.0	3.0	No
4	Batavia St.	s/o Katella Av.	68.9	69.9	1.0	3.0	No
5	Batavia St.	s/o Struck Av.	69.4	69.5	0.1	3.0	No
6	Katella Av.	w/o Main St.	71.2	71.5	0.3	3.0	No
7	Katella Av.	e/o Main St.	71.9	72.2	0.3	3.0	No
8	Katella Av.	e/o Batavia Av.	72.4	72.5	0.1	3.0	No
9	Katella Av.	w/o SR-57 SB Ramps	73.0	73.0	0.0	3.0	No
10	Katella Av.	e/o SR-57 NB Ramps	72.8	73.1	0.3	3.0	No
11	Struck Av.	w/o Main St.	68.0	68.0	0.0	3.0	No
12	Struck Av.	e/o Main St.	62.7	62.8	0.1	5.0	No
13	Struck Av.	e/o Batavia Av.	62.6	67.1	4.5	5.0	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[2] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?

7.3 OYC TRAFFIC NOISE LEVEL INCREASES

Table 7-3 presents the Opening Year Cumulative (OYC) without Project conditions CNEL noise levels. The OYC without Project exterior noise levels range from 63.5 to 73.2 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-4 shows that the OYC with Project conditions will range from 63.6 to 73.3 dBA CNEL. Table 7-6 shows that the Project off-site traffic noise level increases range from 0.0 to 3.9 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 increases on receiving land uses due to the Project-related traffic under OYC traffic conditions.

TABLE 7-6: OYC WITH PROJECT TRAFFIC NOISE LEVEL INCREASES

ID	Road	Segment	CNEL at Receiving Land Use (dBA)[1]			Incremental Noise Level Increase Threshold[2]	
			No Project	With Project	Project Increment	Limit	Exceeded?
1	Main St.	n/o Struck Av.	71.1	71.1	0.0	3.0	No
2	Main St.	s/o Struck Av.	71.8	71.8	0.0	3.0	No
3	Batavia St.	n/o Katella Av.	70.2	70.3	0.1	3.0	No
4	Batavia St.	s/o Katella Av.	69.2	70.2	1.0	3.0	No
5	Batavia St.	s/o Struck Av.	69.7	69.8	0.1	3.0	No
6	Katella Av.	w/o Main St.	71.4	71.7	0.3	3.0	No
7	Katella Av.	e/o Main St.	72.1	72.4	0.3	3.0	No
8	Katella Av.	e/o Batavia Av.	72.6	72.7	0.1	3.0	No
9	Katella Av.	w/o SR-57 SB Ramps	73.2	73.2	0.0	3.0	No
10	Katella Av.	e/o SR-57 NB Ramps	73.1	73.3	0.2	3.0	No
11	Struck Av.	w/o Main St.	68.4	68.5	0.1	3.0	No
12	Struck Av.	e/o Main St.	63.5	63.6	0.1	5.0	No
13	Struck Av.	e/o Batavia Av.	63.6	67.5	3.9	5.0	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[2] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?

7.4 CUMULATIVE OFF-SITE TRAFFIC NOISE IMPACTS

Table 7-7 presents a summary of the cumulative noise level increases for each of the study area roadway segments. The cumulative traffic noise level increase increment describes the difference between the OYC with Project conditions and the Existing (baseline) conditions. Cumulative impacts are caused by Project traffic in combination with traffic from other closely related past, present, and reasonably foreseeable future projects rather than Project-only traffic.

The cumulative off-site traffic noise level increases presented on Table 7-7 are expected to range from 0.1 to 4.9 dBA CNEL and will not exceed the cumulative off-site traffic noise level increase thresholds on any of the study area roadway segments due to the cumulative and Project-related traffic. Therefore, the cumulative noise impacts are not *cumulatively considerable,* and the off-site traffic noise impacts are *less than significant*.

TABLE 7-7: CUMULATIVE NOISE LEVEL INCREASES

ID	Road	Segment	CNEL at Receiving Land Use (dBA)[1]			Noise Level Increase Threshold[2]	
			Existing No Project	OYC With Project	Cumulative Increase	Limit	Cumulative Impact?
1	Main St.	n/o Struck Av.	71.0	71.1	0.1	3.0	No
2	Main St.	s/o Struck Av.	71.6	71.8	0.2	3.0	No
3	Batavia St.	n/o Katella Av.	69.9	70.3	0.4	3.0	No
4	Batavia St.	s/o Katella Av.	68.9	70.2	1.3	3.0	No
5	Batavia St.	s/o Struck Av.	69.4	69.8	0.4	3.0	No
6	Katella Av.	w/o Main St.	71.2	71.7	0.5	3.0	No
7	Katella Av.	e/o Main St.	71.9	72.4	0.5	3.0	No
8	Katella Av.	e/o Batavia Av.	72.4	72.7	0.3	3.0	No
9	Katella Av.	w/o SR-57 SB Ramps	73.0	73.2	0.2	3.0	No
10	Katella Av.	e/o SR-57 NB Ramps	72.8	73.3	0.5	3.0	No
11	Struck Av.	w/o Main St.	68.0	68.5	0.5	3.0	No
12	Struck Av.	e/o Main St.	62.7	63.6	0.9	5.0	No
13	Struck Av.	e/o Batavia Av.	62.6	67.5	4.9	5.0	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[2] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?

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, four receiver locations in the vicinity of the Project site were identified. The selection of receiver locations is based on FHWA guidelines and is consistent with additional guidance provided by Caltrans and the FTA, as previously described in Section 5.2. Other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures. Distance is measured in a straight line from the project boundary to each receiver location.

R1: Location R1 represents the City of Orange Department of Public Works at 637 West Struck Avenue, approximately 96 feet north of the Project site. Receiver R1 is placed at the building façade. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the proposed noise sensitive multi-family residential project north of West Struck Avenue, approximately 245 feet north of the Project site. Receiver R2 is placed at the planned future residential 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 HUB OC (previously Mary's Kitchen) at 517 West Struck Avenue, approximately 31 feet north of the Project site. The HUB OC provides food, showers, rest rooms and laundry facilities for the homeless community during the daytime hours between 9:00 a.m. and 3:00 p.m. with no services provide during the nighttime hours. Receiver R3 is placed at the future building façade. A 24-hour noise measurement was taken near this location, L3, to describe the existing ambient noise environment.

R4: Location R4 represents the Citrus Grove Apartments at 1120 North Lemon Street, approximately 126 feet northeast of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receiver R4 is placed at the building façade. A 24-hour noise measurement was taken near this location, L4, to describe the existing ambient noise environment.

R5: Location R5 represents the existing noise sensitive residence at 618 West Collins Avenue, approximately 563 feet south of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receiver R5 is placed at the building façade. A 24-hour noise measurement was taken near this location, L5, to describe the existing ambient noise environment.

R6: Location R6 represents the adjacent industrial land uses located on N Parker Street approximately 59 feet west of the Project site near the planned maintenance building. The City of Orange Municipal Code does not identify any exterior noise level standards for non-residential land uses. Noise level measurement location L1 is used to describe the ambient conditions at this location.

EXHIBIT 8-A: RECEIVER LOCATIONS

9 OPERATIONAL NOISE IMPACTS

This section analyzes the potential stationary-source operational noise impacts at the nearest receiver locations, identified in Section 8, resulting from the operation of the proposed 534 Struck Avenue Project. Exhibit 9-A identifies the noise source locations used to assess the operational noise levels.

9.1 OPERATIONAL NOISE SOURCES

At the time this noise analysis was prepared the future tenants of the proposed Project were unknown. Therefore, this operational noise analysis is intended to describe noise level impacts associated with the expected typical of warehouse use activities at the Project site. To present the potential worst-case noise conditions, this analysis assumes the Project would be operational 24 hours per day, seven days per week. The on-site Project-related noise sources are expected to include: loading dock activity, truck terminal activity, roof-top air conditioning units trash enclosure activity, parking lot vehicle movements and truck movements.

9.2 REFERENCE NOISE LEVELS

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

9.2.1 MEASUREMENT PROCEDURES

The reference noise level measurements presented in this section were collected using a Larson Davis LxT Type 1 precision sound level meter (serial number 01146). The LxT sound level meter was calibrated using a Larson-Davis calibrator, Model CAL 200, was programmed in "slow" mode to record noise levels in "A" weighted form and was located at approximately five feet above the ground elevation for each measurement. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (14)

EXHIBIT 9-A: OPERATIONAL NOISE SOURCE LOCATIONS

TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS

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

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

9.2.2 LOADING DOCK AND TRUCK TERMINAL ACTIVITY

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

9.2.3 ROOF-TOP AIR CONDITIONING UNITS

The noise level measurements describe a single mechanical roof-top air conditioning unit. The reference noise level represents a Lennox SCA120 series 10-ton model packaged air conditioning unit. At the uniform reference distance of 50 feet, the reference noise levels are 57.2 dBA L_{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.

9.2.4 TRASH ENCLOSURE ACTIVITY

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

9.2.5 PARKING LOT VEHICLE MOVEMENTS

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

9.2.6 TRUCK MOVEMENTS

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

9.3 CADNAA NOISE PREDICTION MODEL

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

Using the ISO 9613-2 protocol, CadnaA will calculate the distance from each noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation inputs to provide a summary of noise level at each receiver and the partial noise level contributions by noise source. Consistent with the ISO 9613-2 protocol, the CadnaA noise prediction model relies on the reference sound power level (L_w) to describe individual noise

sources. While sound pressure levels (e.g., L_{eq}) quantify in decibels the intensity of given sound sources at a reference distance, sound power levels (L_w) are connected to the sound source and are independent of distance. Sound pressure levels vary substantially with distance from the source and diminish because of intervening obstacles and barriers, air absorption, wind, and other factors. Sound power is the acoustical energy emitted by the sound source and is an absolute value that is not affected by the environment.

The operational noise level calculations provided in this noise study account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. A default ground attenuation factor of 0.5 was used in the CadnaA noise analysis to account for mixed ground representing a combination of hard and soft surfaces. Appendix 9.1 includes the detailed noise model inputs including the planned 8-foot-high screen wall 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 terminal activity, roof-top air conditioning units trash enclosure activity, parking lot vehicle movements and truck movements, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the Project site and the Project-related noise level increases that would be experienced at each of the sensitive receiver locations. Table 9-2 shows the Project operational noise levels during the daytime hours of 7:00 a.m. to 10:00 p.m. The daytime hourly noise levels at the off-site receiver locations are expected to range from 40.6 to 52.2 dBA L_{eq}.

TABLE 9-2: DAYTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA Leq)					
	R1	R2	R3	R4	R5	R6
Loading Dock and Truck Terminal Activity	42.8	41.2	44.2	43.7	42.5	37.2
Roof-Top Air Conditioning Units	39.3	33.2	37.1	34.8	27.7	37.5
Trash Enclosure Activity	32.0	24.4	21.6	13.5	11.1	9.7
Parking Lot Vehicle Movements	48.4	41.5	45.9	40.3	24.3	23.1
Truck Movements	48.4	42.2	48.8	42.2	29.9	24.7
Total (All Noise Sources)	**52.2**	**46.7**	**51.7**	**47.3**	**42.9**	**40.6**

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

Tables 9-3 shows the Project operational noise levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. The nighttime hourly noise levels at the off-site receiver locations are expected to range from 40.6 to 52.2 dBA L_{eq}. The differences between the daytime and nighttime noise levels are largely related to the estimated duration of noise activity as outlined in Table 9-1 and Appendix 9.1.

TABLE 9-3: NIGHTTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA Leq)					
	R1	R2	R3	R4	R5	R6
Loading Dock and Truck Terminal Activity	42.8	41.2	44.2	43.7	42.5	37.2
Roof-Top Air Conditioning Units	39.3	33.2	37.1	34.8	27.7	37.5
Trash Enclosure Activity	32.0	24.4	21.6	13.5	11.1	9.7
Parking Lot Vehicle Movements	48.4	41.5	45.9	40.3	24.3	23.1
Truck Movements	48.4	42.2	48.8	42.2	29.9	24.7
Total (All Noise Sources)	**52.2**	**46.7**	**51.7**	**47.3**	**42.9**	**40.6**

[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 Orange exterior noise level standards at nearby noise-sensitive receiver locations. Table 9-4 shows the operational noise levels associated with 534 Struck Avenue Project will satisfy the City of Orange daytime and nighttime exterior noise level standards. Therefore, the operational noise impacts are considered *less than significant* at the nearby noise-sensitive receiver locations.

TABLE 9-4: OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Land Use	Project Operational Noise Levels (dBA Leq)[2]		Noise Level Standards (dBA Leq)[3]		Noise Level Standards Exceeded?[4]	
		Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
R1	Public-Institutional	52.2	52.2	n/a	n/a	No	No
R2	Proposed Residential	46.7	46.7	55	50	No	No
R3	The HUB OC	51.7	51.7	n/a	n/a	No	No
R4	Residential	47.3	47.3	55	50	No	No
R5	Residential	42.9	42.9	55	50	No	No
R6	Industrial	40.6	40.6	n/a	n/a	No	No

[1] See Exhibit 8-A for the receiver locations.
[2] Proposed Project operational noise levels as shown on Tables 9-2 and 9-3.
[3] Exterior noise level standards, as shown on Table 4-1.
[4] Do the estimated Project operational noise source activities exceed the noise level standards?
[5] The City of Orange Municipal Code does not identify any exterior noise level standards for non-residential land uses.
"Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 7:00 a.m.

9.5 PROJECT OPERATIONAL NOISE LEVEL INCREASES

To describe the Project operational noise level increases, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations potentially impacted by Project operational noise sources. Since the units used to measure noise, decibels (dB), are logarithmic units, the Project-operational and existing ambient noise levels

cannot be combined using standard arithmetic equations. (2) Instead, they must be logarithmically added using the following base equation:

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

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describes the Project noise level increases to the existing ambient noise environment. Noise levels that would be experienced at receiver locations when Project-source noise is added to the daytime and nighttime ambient conditions are presented on Tables 9-5 and 9-6, respectively. As indicated on Tables 9-5, the Project will generate a daytime operational noise level increases ranging from 0.0 to 2.6 dBA L_{eq} at the nearest receiver locations. Table 9-6 shows that the Project will generate a nighttime operational noise level increases ranging from 0.0 to 4.3 dBA L_{eq} at the nearest receiver locations. Project-related operational noise level increases will satisfy the operational noise level increase significance criteria presented in Table 4-1, and the increases at the sensitive receiver locations will be *less than significant.*

TABLE 9-5: DAYTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria[7]	Increase Criteria Exceeded?
R1	52.2	L1	54.3	56.4	2.1	5.0	No
R2	46.7	L2	51.2	52.5	1.3	5.0	No
R3	51.7	L3	52.6	55.2	2.6	5.0	No
R4	47.3	L4	51.0	52.5	1.5	5.0	No
R5	42.9	L5	68.0	68.0	0.0	1.5	No
R6	40.6	L1	54.3	54.5	0.2	5.0	No

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

TABLE 9-6: NIGHTTIME OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria[7]	Increase Criteria Exceeded?
R1	52.2	L1	50.5	54.5	4.0	5.0	No
R2	46.7	L2	47.2	49.9	2.7	5.0	No
R3	51.7	L3	49.3	53.6	4.3	5.0	No
R4	47.3	L4	46.8	50.1	3.3	5.0	No
R5	42.9	L5	63.0	63.0	0.0	5.0	No
R6	40.6	L1	50.5	50.9	0.4	5.0	No

[1] See Exhibit 9-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.

10 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 8-A shows the construction activity boundaries in relation to the nearest sensitive receiver locations previously described in Section 6. According to Section 8.24.050[E] of the City's Municipal Code, *noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities take place between the hours of 7:00 a.m. and 8:00 p.m. on any day except for Sunday or a Federal holiday, or between the hours of 9:00 a.m. and 8:00 p.m. on Sunday or a Federal holiday.* (20)

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

10.1 CONSTRUCTION NOISE LEVELS

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

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

10.2 CONSTRUCTION REFERENCE NOISE LEVELS

To describe construction noise activities, this construction noise analysis was prepared using reference construction equipment noise levels from the Federal Highway Administration (FHWA) published the Roadway Construction Noise Model (RCNM), which includes a national database of construction equipment reference noise emission levels. (21) The RCNM equipment database, provides a comprehensive list of the noise generating characteristics for specific types of construction equipment. In addition, the database provides an acoustical usage factor to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

EXHIBIT 10-A: CONSTRUCTION NOISE SOURCE LOCATIONS

10.3 CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearby sensitive receiver locations were completed. Consistent with FTA guidance for general construction noise assessment, Table 10-1 presents the combined noise levels for the loudest construction equipment, assuming they operate at the same time. As shown on Table 10-2, the construction noise levels when operating at the property line are expected to range from 51.1 to 78.7 dBA L_{eq} at the nearby receiver locations. Appendix 10.1 includes the detailed CadnaA construction noise model inputs.

TABLE 10-1: CONSTRUCTION REFERENCE NOISE LEVELS

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

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

TABLE 10-2: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})[2]					
	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Highest Levels
R1	70.8	73.8	71.8	73.8	67.8	73.8
R2	63.2	66.2	64.2	66.2	60.2	66.2
R3	75.7	78.7	76.7	78.7	72.7	78.7
R4	67.3	70.3	68.3	70.3	64.3	70.3
R5	56.0	59.0	57.0	59.0	53.0	59.0
R6	54.1	57.1	55.1	57.1	51.1	57.1

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] CadnaA construction noise model inputs are included in Appendix 10.1.

10.4 CONSTRUCTION NOISE LEVEL COMPLIANCE

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

TABLE 10-3: CONSTRUCTION NOISE LEVEL COMPLIANCE

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})		
	Highest Construction Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	73.8	80	No
R2	66.2	80	No
R3	78.7	80	No
R4	70.3	80	No
R5	59.0	81	No
R6	57.1	82	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 the nearest 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?

10.6 CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Ground vibration levels associated with various types of construction equipment are summarized on Table 10-4. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential for human response (annoyance) and building damage using the following vibration assessment methods defined by the FTA. To describe the vibration impacts the FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 10-4: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

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

Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual

Table 10-5 presents the expected Project related vibration levels at the nearby receiver locations. At distances ranging from 31 to 563 feet from Project construction activities, construction vibration velocity levels are estimated to range from 0.001 to 0.064 PPV (in/sec). Based on maximum acceptable continuous vibration threshold of 0.3 PPV (in/sec), the typical Project construction vibration levels will fall below the building damage thresholds at all the noise sensitive receiver locations. Therefore, the Project-related vibration impacts are considered *less than significant* during typical construction activities at the Project site.

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

TABLE 10-5: PROJECT CONSTRUCTION VIBRATION LEVELS

Location[1]	Distance to Const. Activity (Feet)[2]	Typical Construction Vibration Levels PPV (in/sec)[3]					Thresholds PPV (in/sec)[4]	Thresholds Exceeded?[5]
		Small bulldozer	Jackhammer	Loaded Trucks	Large bulldozer	Highest Vibration Level		
R1	96'	0.000	0.005	0.010	0.012	0.012	0.3	No
R2	245'	0.000	0.001	0.002	0.003	0.003	0.3	No
R3	31'	0.002	0.025	0.055	0.064	0.064	0.3	No
R4	126'	0.000	0.003	0.007	0.008	0.008	0.3	No
R5	563'	0.000	0.000	0.001	0.001	0.001	0.3	No
R6	59'	0.001	0.010	0.021	0.025	0.025	0.3	No

[1] Receiver locations are shown on Exhibit 10-A.
[2] Distance from receiver to Project construction boundary.
[3] Based on the Vibration Source Levels of Construction Equipment (Table 10-4).
[4] Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, Table 19, p. 38.
[5] Does the peak vibration exceed the acceptable vibration thresholds?
"PPV" = Peak Particle Velocity

11 REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G.* 2018.
2. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
3. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March 1974. EPA/ONAC 550/9/74-004.
4. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* December 2011.
5. **U.S. Department of Transportation Federal Highway Administration.** *Highway Noise Barrier Design Handbook.* 2001.
6. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
7. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.
8. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment Manual.* September 2018.
9. **Office of Planning and Research.** *State of California General Plan Guidelines.* 2019.
10. **City of Orange.** *General Plan Noise Element.* March 2010.
11. **California Department of Transportation.** *Transportation and Construction Vibration Guidance Manual.* April 2020.
12. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
13. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
14. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.
15. **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.
16. **California Department of Transportation.** *Traffic Noise Attenuation as a Function of Ground and Vegetation Final Report.* June 1995. FHWA/CA/TL-95/23.
17. **Urban Crossroads, Inc.** *534 Struck Avenue Traffic Analysis.* October 2022.
18. —. *Patterson & Harvill Warehouse Traffic Analysis.* September 2022.
19. **City of Orange.** *Municipal Code, Chapter 8.24 - Noise Control.*
20. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning.** *FHWA Roadway Construction Noise Model.* January, 2006.

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12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed 534 Struck Avenue Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 584-3148.

Bill Lawson, P.E., INCE
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URBAN CROSSROADS, INC.
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Newport Beach, CA 92658
(949) 581-3148
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 San Diego • March, 2018
Certified Acoustical Consultant – County of Orange • February, 2011
FHWA-NHI-142051 Highway Traffic Noise Certificate of Training • February, 2013

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APPENDIX 3.1:

CITY OF ORANGE MUNICIPAL CODE

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Chapter 8.24 - NOISE CONTROL[2]

Sections:

Footnotes:

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

8.24.010 - Policy.

A. In order to control unnecessary, excessive and annoying sounds emanating from the City, it is the policy of the City to regulate such sounds generated from all sources as specified in this chapter. The intent of this chapter is to protect residential land uses from unnecessary, excessive and annoying sounds.

B. It is determined that certain sound levels are detrimental to the public health, welfare and safety, and contrary to public interest.

(Ord. No. 1-14, § I, 8-12-14)

8.24.020 - Definitions.

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

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

B. "Adjusted ambient noise level" means the measured ambient noise level plus 3 dB (A). Three (3) dB (A) is the industry-accepted threshold of human perceptibility for a change in the noise environment.

C. "Decibel (dB)" means a unit which denotes the ratio between two quantities which are proportional to power: the number of decibels corresponding to the ratio of two amounts of power is ten times the logarithm to the base ten of this ratio.

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

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

F. "Grading" means any excavating or filling of earth material or any combination thereof conducted to prepare a site for construction or other improvements thereon.

G. "Hourly Average" (L_{eq}) means the energy mean or average sound level over a one (1) hour period of time.

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

I. "Mobile noise source" means any noise source other than a fixed noise source.

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

K. "Person" means a person, firm, association, co-partnership, joint venture, corporation or any entity, public or private in nature.

L. "Recurring impulsive noise" means a noise of short duration, usually less than one (1) second, with an abrupt onset and rapid decay, which occurs repeatedly or in a cyclical manner. Examples include jack hammering, pile driving, or operational noise from a generator or other mechanical equipment that is cyclical in nature.

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

N. "Simple tone noise" means a noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished.

O. "Sound level meter" means an instrument meeting American National Standard Institute's Standard Sl.4- 1983 for Type 1 sound level meters or an instrument and the associated recording and analyzing equipment which will provide equivalent data.

P. "Sound pressure level" of a sound, in decibels, means twenty times the logarithm to the base ten of the ratio of the pressure of the sound to a reference pressure, which reference pressure shall be explicitly stated.

(Ord. No. 1-14, § I, 8-12-14)

8.24.030 - Noise Level Measurement Criteria.

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

(Ord. No. 1-14, § I, 8-12-14)

8.24.040 - Exterior Standards.

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

Table 8.24.040 Exterior Noise Standards

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

B. It is unlawful for any person at any location within the City to create any noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level when measured on any other residential property to exceed the noise standards identified in Table 8.24.040. For multi-family residential or mixed use developments located within the City's Urban Mixed Use, Neighborhood Mixed Use, Old Towne Mixed Use or Medium Density Residential General Plan land use districts, exterior noise standards shall apply to common recreation areas only and shall not apply to private exterior space (such as a private yard, patio, or balcony).

C. In the event the ambient noise level exceeds the noise standards identified in Table 8.24.040 of this section, the "adjusted ambient noise level" shall be applied as the noise standard. In cases where the noise standard is adjusted due to a high ambient noise level, the noise standard shall not exceed the "adjusted ambient noise level", or 70 dB (A), whichever is less. In cases where the ambient noise level is already greater than 70 dB (A), the ambient noise level shall be applied as the noise standard.

D. Each of the noise limits specified in Table 8.24.040 shall be reduced by 5 dB(A) for impact or simple tone noises, recurring impulsive noises, or for noises consisting of speech or music.

(Ord. No. 1-14, § I, 8-12-14)

8.24.050 - Exemptions from Chapter Provisions.

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

A. School bands, school athletic and school entertainment events;

B. Outdoor gatherings, public dances, shows, and sporting and entertainment events provided such events are conducted pursuant to any permit requirements established by the City;

C. Activities conducted on public parks, public playgrounds, and public or private school grounds;

D. Any mechanical device, apparatus or equipment used, related to or connected with emergency machinery, vehicle or work;

E. Noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities take place between the hours of 7:00 a.m. and 8:00 p.m. on any day except for Sunday or a Federal holiday, or between the hours of 9:00 a.m. and 8:00 p.m. on Sunday or a Federal holiday. Noise generated outside of the hours specified are subject to the noise standards identified in Table 8.24.040;

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

G. Noise sources associated with agricultural operations provided such operations take place between the hours of 7:00 a.m. and 8:00 p.m. on any day except Sunday or a Federal holiday, or between the hours of 9:00 a.m. and 8:00 p.m. on Sunday or a Federal holiday;

H. Noise sources associated with agricultural pest control through pesticide application, provided that the application is made in accordance with restricted material permits issued by or regulations enforced by the Agricultural Commissioner;

I. Noise sources associated with the maintenance of real property, provided such activities take place between the hours of 7:00 a.m. and 8:00 p.m. on any day except Sunday or a Federal holiday, or between the hours of 9:00 a.m. and 8:00 p.m. on Sunday or a Federal holiday. Operation of leaf blowers are regulated under OMC Chapter 8.26;

J. Industrial or commercial noise affecting residential units, when the residential unit is associated with said industrial or commercial use (e.g. caretaker's dwellings);

K. Any maintenance or construction activity undertaken by a public agency or utility within street right of way;

L. Mobile noise sources including but not limited to operational noise from trains, or automobiles or trucks traveling on roadways. Transportation noise as related to noise/land use compatibility is subject to the City's General Plan Noise Element;

M. Any activity to the extent regulation thereof has been preempted by State or Federal Law.

(Ord. No. 1-14, § I, 8-12-14)

8.24.060 - Special Provisions for Schools, Hospitals and Churches.

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

(Ord. No. 1-14, § I, 8-12-14)

8.24.070 - Measurement of Noise Levels.

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

(Ord. No. 1-14, § I, 8-12-14)

8.24.080 - Enforcement Authority.

A. The Chief Building Official or his/her designee are directed to enforce the provisions of this chapter. The Chief Building Official or his/her designee are authorized, pursuant to Penal Code Section 836.5, to arrest any person without a warrant when they have reasonable cause to believe that such person has committed a misdemeanor in their presence.

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

(Ord. No. 1-14, § I, 8-12-14)

8.24.090 - Violation—Public Nuisance.

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

(Ord. No. 1-14, § I, 8-12-14)

8.24.100 - Alternative Noise Prohibition.

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

(Ord. No. 1-14, § I, 8-12-14)

8.24.110 - Violation—Misdemeanor.

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

(Ord. No. 1-14, § I, 8-12-14)

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APPENDIX 5.1:

STUDY AREA PHOTOS

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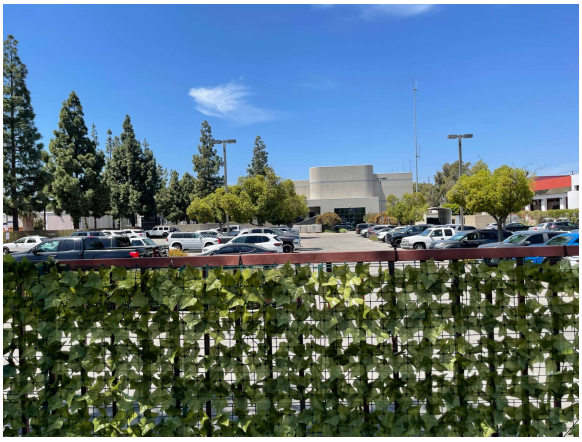
JN: 13101 Study Area Photos

L1_E
33, 48' 23.140000"117, 51' 34.000000"

L1_N
33, 48' 23.100000"117, 51' 34.080000"

L1_S
33, 48' 23.050000"117, 51' 34.050000"



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L2_E
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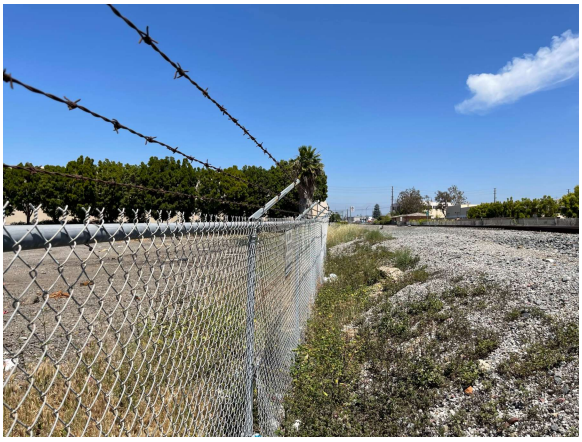

L2_N
33, 48' 25.430000"117, 51' 25.570000"

JN: 13101 Study Area Photos

L2_S
33, 48' 25.420000"117, 51' 25.590000"

L2_W
33, 48' 25.430000"117, 51' 25.590000"

L3_E
33, 48' 21.380000"117, 51' 26.770000"

L3_N
33, 48' 21.390000"117, 51' 26.750000"

L3_S
33, 48' 21.390000"117, 51' 26.750000"

L3_W
33, 48' 21.280000"117, 51' 26.830000"

JN: 13101 Study Area Photos

L4_E
33, 48' 23.360000"117, 51' 25.700000"

L4_N
33, 48' 23.370000"117, 51' 25.700000"

L4_S
33, 48' 23.370000"117, 51' 25.700000"

L4_W
33, 48' 23.340000"117, 51' 25.780000"

L5_E
33, 48' 8.090000"117, 51' 30.760000"

L5_N
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JN: 13101 Study Area Photos

L5_S
33, 48' 8.060000"117, 51' 30.780000"

L5_W
33, 48' 8.170000"117, 51' 30.780000"

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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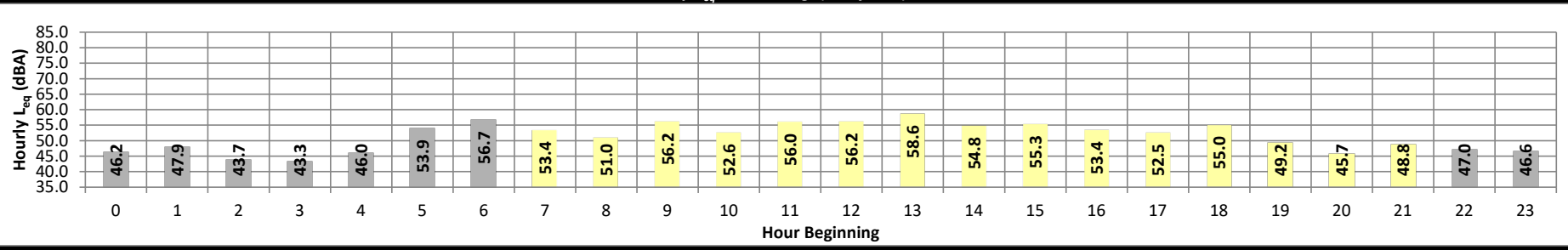
24-Hour Noise Level Measurement Summary

Date: Monday, April 18, 2022 *Location:* L1 - Located northwest of the Project site near Department of *Meter:* Piccolo II *JN:* 13101

Project: 534 Struck Avenue *Source:* Public Works at 637 West Struck Avenue. *Analyst:* A. Khan

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	46.2	54.1	42.4	53.6	52.7	50.5	49.1	46.5	44.7	42.9	42.7	42.5	46.2	10.0	56.2
	1	47.9	55.0	41.5	54.4	53.6	52.2	51.4	49.3	45.3	42.6	41.9	41.6	47.9	10.0	57.9
	2	43.7	48.5	41.0	48.2	47.8	47.1	46.5	44.1	42.9	41.5	41.3	41.1	43.7	10.0	53.7
	3	43.3	49.1	41.1	48.8	48.2	46.5	45.4	43.5	42.5	41.5	41.4	41.2	43.3	10.0	53.3
	4	46.0	54.3	42.0	53.8	53.3	51.6	49.9	45.6	44.0	42.4	42.2	42.1	46.0	10.0	56.0
	5	53.9	64.2	46.8	63.5	62.5	59.9	58.6	53.9	50.0	47.4	47.2	46.9	53.9	10.0	63.9
	6	56.7	66.2	49.2	65.7	64.9	62.5	61.4	56.4	53.2	50.3	49.9	49.3	56.7	10.0	66.7
Day	7	53.4	62.5	47.6	61.9	61.2	59.1	57.4	52.9	50.8	48.4	48.1	47.8	53.4	0.0	53.4
	8	51.0	58.7	46.2	58.1	57.4	55.6	54.3	51.4	49.3	47.1	46.7	46.3	51.0	0.0	51.0
	9	56.2	66.1	48.1	65.6	64.9	62.8	60.9	55.9	52.1	49.3	48.8	48.2	56.2	0.0	56.2
	10	52.6	60.8	46.5	60.3	59.6	57.9	56.6	53.1	50.4	47.4	46.9	46.6	52.6	0.0	52.6
	11	56.0	66.8	48.7	66.2	65.4	63.2	60.6	54.5	51.9	49.7	49.2	48.8	56.0	0.0	56.0
	12	56.2	66.4	48.9	65.6	64.2	61.1	59.9	56.6	53.6	49.8	49.4	49.0	56.2	0.0	56.2
	13	58.6	70.1	47.9	69.8	69.3	67.2	64.8	53.9	51.1	48.7	48.4	48.1	58.6	0.0	58.6
	14	54.8	64.4	47.2	63.7	62.7	61.0	59.1	54.7	52.4	48.2	47.8	47.3	54.8	0.0	54.8
	15	55.3	65.6	47.8	64.9	63.8	61.2	59.3	55.5	51.8	48.6	48.3	47.9	55.3	0.0	55.3
	16	53.4	61.6	47.6	60.8	60.2	58.2	57.3	54.3	50.7	48.3	48.0	47.7	53.4	0.0	53.4
	17	52.5	61.0	46.7	60.5	60.1	58.3	57.1	52.6	49.8	47.4	47.2	46.9	52.5	0.0	52.5
	18	55.0	67.8	45.8	66.2	65.0	62.2	60.1	51.6	49.2	46.6	46.3	45.9	55.0	0.0	55.0
	19	49.2	57.7	44.4	57.0	55.7	53.2	52.0	49.9	47.4	45.2	44.9	44.6	49.2	5.0	54.2
	20	45.7	51.2	43.1	50.8	50.1	48.7	47.9	46.2	45.0	43.7	43.5	43.2	45.7	5.0	50.7
	21	48.8	56.1	42.9	55.8	55.5	54.7	53.5	49.5	45.7	43.5	43.2	43.0	48.8	5.0	53.8
Night	22	47.0	52.1	43.9	51.7	51.2	50.0	49.3	47.6	46.2	44.4	44.2	44.0	47.0	10.0	57.0
	23	46.6	61.3	40.9	60.1	58.1	47.9	45.5	43.0	42.2	41.4	41.2	41.0	46.6	10.0	56.6

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	45.7	51.2	42.9	50.8	50.1	48.7	47.9	46.2	45.0	43.5	43.2	43.0
	Max	58.6	70.1	48.9	69.8	69.3	67.2	64.8	56.6	53.6	49.8	49.4	49.0
Energy Average		54.3	Average:		61.8	61.0	59.0	57.4	52.8	50.1	47.5	47.1	46.8
Night	Min	43.3	48.5	40.9	48.2	47.8	46.5	45.4	43.0	42.2	41.4	41.2	41.0
	Max	56.7	66.2	49.2	65.7	64.9	62.5	61.4	56.4	53.2	50.3	49.9	49.3
Energy Average		50.5	Average:		55.5	54.7	52.0	50.8	47.8	45.7	43.8	43.6	43.3

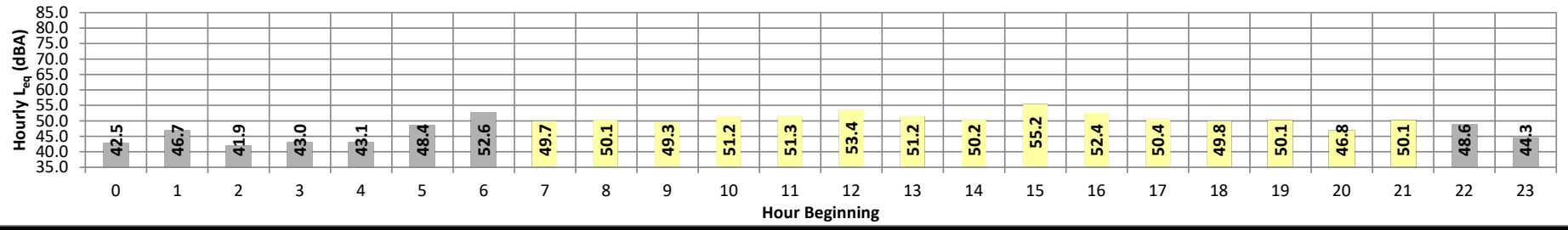
24-Hour	L_{eq} (dBA) Daytime (7am-10pm)	Nighttime (10pm-7am)
53.2	**54.3**	**50.5**

24-Hour Noise Level Measurement Summary

Date: Monday, April 18, 2022 | *Location:* L2 - Located northeast of the Project site near future | *Meter:* Piccolo II | *JN:* 13101

Project: 534 Struck Avenue | *Source:* residential development north of West Struck Avenue. | *Analyst:* A. Khan

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	*Hour*	*L_{eq}*	*L_{max}*	*L_{min}*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*	*L_{eq}*	*Adj.*	*Adj. L_{eq}*
Night	0	42.5	69.7	41.5	69.3	68.6	65.5	62.7	54.8	44.7	42.0	41.8	41.6	42.5	10.0	52.5
	1	46.7	64.0	50.2	62.6	60.9	58.6	57.7	56.2	54.5	51.7	51.2	50.4	46.7	10.0	56.7
	2	41.9	71.0	50.7	70.7	70.4	69.6	67.7	60.8	57.9	51.9	51.3	51.0	41.9	10.0	51.9
	3	43.0	45.9	41.4	45.6	45.4	44.7	44.4	43.4	42.7	41.9	41.7	41.6	43.0	10.0	53.0
	4	43.1	45.2	42.0	44.9	44.7	44.3	44.0	43.3	42.9	42.4	42.3	42.1	43.1	10.0	53.1
	5	48.4	60.4	47.3	60.0	59.5	57.4	56.3	49.2	48.3	47.7	47.6	47.4	48.4	10.0	58.4
	6	52.6	62.9	48.6	62.5	61.6	59.2	57.2	50.1	49.5	49.0	48.9	48.7	52.6	10.0	62.6
Day	7	49.7	67.5	48.4	67.0	65.9	62.1	59.9	50.6	49.4	48.8	48.7	48.5	49.7	0.0	49.7
	8	50.1	62.9	46.5	62.5	61.8	60.4	59.0	50.9	48.7	47.1	46.9	46.6	50.1	0.0	50.1
	9	49.3	59.4	46.5	58.9	58.6	57.5	56.8	49.6	48.1	47.0	46.8	46.6	49.3	0.0	49.3
	10	51.2	58.0	47.5	57.4	56.8	55.5	54.5	52.0	49.6	48.0	47.8	47.6	51.2	0.0	51.2
	11	51.3	56.7	48.8	56.0	55.3	54.2	53.5	51.9	50.6	49.3	49.1	48.9	51.3	0.0	51.3
	12	53.4	59.8	48.6	59.3	58.8	57.8	57.2	54.5	51.5	49.3	49.0	48.7	53.4	0.0	53.4
	13	51.2	57.3	47.9	56.7	56.0	54.7	54.1	52.1	50.0	48.4	48.3	48.0	51.2	0.0	51.2
	14	50.2	58.1	46.7	57.5	56.9	55.4	54.9	49.2	48.2	47.3	47.1	46.8	50.2	0.0	50.2
	15	55.2	66.2	48.3	65.2	63.8	61.4	60.4	54.2	50.6	48.9	48.7	48.4	55.2	0.0	55.2
	16	52.4	60.7	47.7	60.2	59.6	57.9	57.2	52.0	49.9	48.3	48.1	47.8	52.4	0.0	52.4
	17	50.4	72.1	47.5	71.6	70.7	67.0	62.8	52.9	49.7	48.1	47.9	47.6	50.4	0.0	50.4
	18	49.8	55.3	46.4	54.7	54.1	53.2	52.6	50.7	48.8	46.9	46.7	46.5	49.8	0.0	49.8
	19	50.1	58.4	45.3	58.1	57.5	56.1	55.1	49.3	47.3	45.7	45.6	45.4	50.1	5.0	55.1
	20	46.8	50.5	44.5	50.2	49.9	49.2	48.8	47.4	46.1	45.0	44.9	44.7	46.8	5.0	51.8
	21	50.1	56.2	44.1	55.9	55.7	55.3	55.0	50.8	46.2	44.6	44.5	44.2	50.1	5.0	55.1
Night	22	48.6	52.6	45.9	52.4	52.1	51.4	51.0	49.2	47.9	46.4	46.2	46.0	48.6	10.0	58.6
	23	44.3	48.4	42.5	48.0	47.4	46.6	46.1	44.7	43.8	43.0	42.8	42.6	44.3	10.0	54.3

Timeframe	*Hour*	*L_{eq}*	*L_{max}*	*L_{min}*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	46.8	50.5	44.1	50.2	49.9	49.2	48.8	47.4	46.1	44.6	44.5	44.2
	Max	55.2	72.1	48.8	71.6	70.7	67.0	62.8	54.5	51.5	49.3	49.1	48.9
Energy Average		51.2	Average:		59.4	58.8	57.2	56.1	51.2	49.0	47.5	47.3	47.1
Night	Min	41.9	45.2	41.4	44.9	44.7	44.3	44.0	43.3	42.7	41.9	41.7	41.6
	Max	52.6	71.0	50.7	70.7	70.4	69.6	67.7	60.8	57.9	51.9	51.3	51.0
Energy Average		47.2	Average:		57.3	56.7	55.2	54.1	50.2	48.0	46.2	46.0	45.7

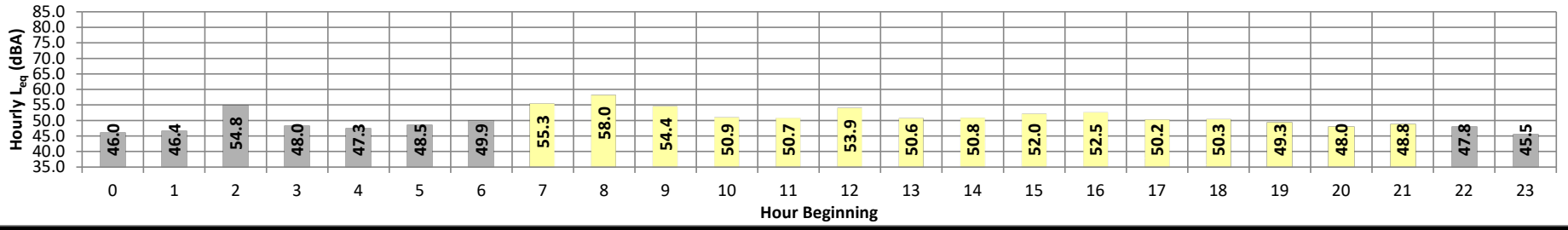
24-Hour	*L_{eq} (dBA) Daytime (7am-10pm)*	*Nighttime (10pm-7am)*
50.1	**51.2**	**47.2**

24-Hour Noise Level Measurement Summary

Date: Monday, April 18, 2022 *Location:* L3 - Located northeast of the Project site near Mary's Kitchen *Meter:* Piccolo II *JN:* 13101

Project: 534 Struck Avenue *Source:* at 517 West Struck Avenue. *Analyst:* A. Khan

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	*Hour*	*L_{eq}*	*L_{max}*	*L_{min}*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*	*L_{eq}*	*Adj.*	*Adj. L_{eq}*
Night	0	46.0	74.2	45.2	74.1	73.7	70.7	68.2	61.4	50.2	45.6	45.5	45.3	46.0	10.0	56.0
	1	46.4	67.5	45.7	67.1	66.3	64.4	63.4	59.8	57.0	46.2	46.0	45.8	46.4	10.0	56.4
	2	54.8	75.2	57.5	75.0	74.8	73.7	72.3	68.0	64.8	58.8	58.4	57.9	54.8	10.0	64.8
	3	48.0	49.5	47.0	49.2	49.0	48.8	48.7	48.4	47.9	47.3	47.2	47.1	48.0	10.0	58.0
	4	47.3	49.9	45.8	49.6	49.3	48.7	48.4	47.6	47.2	46.3	46.1	45.9	47.3	10.0	57.3
	5	48.5	66.6	47.2	66.4	65.6	62.8	61.5	49.8	48.4	47.7	47.6	47.4	48.5	10.0	58.5
	6	49.9	69.2	48.2	68.7	67.7	65.0	63.4	52.5	49.7	48.8	48.6	48.4	49.9	10.0	59.9
Day	7	55.3	72.9	48.2	72.5	71.4	67.4	63.2	51.7	49.7	48.8	48.6	48.3	55.3	0.0	55.3
	8	58.0	69.7	47.7	69.3	68.7	66.8	64.9	51.6	49.5	48.2	48.1	47.8	58.0	0.0	58.0
	9	54.4	64.2	48.6	63.9	63.5	62.1	61.1	51.2	49.9	49.1	48.9	48.7	54.4	0.0	54.4
	10	50.9	55.4	48.3	55.0	54.6	53.9	53.3	51.6	50.1	48.9	48.7	48.4	50.9	0.0	50.9
	11	50.7	54.9	48.7	54.5	54.0	53.0	52.4	51.1	50.2	49.1	49.0	48.8	50.7	0.0	50.7
	12	53.9	59.2	49.2	58.7	58.2	57.4	56.9	55.1	52.9	50.3	49.9	49.4	53.9	0.0	53.9
	13	50.6	55.2	48.2	54.7	54.2	53.3	52.8	51.1	49.9	48.8	48.6	48.3	50.6	0.0	50.6
	14	50.8	63.4	47.8	63.2	62.4	61.0	60.4	51.6	50.1	48.5	48.3	48.0	50.8	0.0	50.8
	15	52.0	69.2	48.9	68.7	67.7	65.7	64.4	54.4	52.2	50.0	49.6	49.1	52.0	0.0	52.0
	16	52.5	65.0	48.4	64.5	63.9	62.6	62.2	53.5	51.1	49.1	48.8	48.6	52.5	0.0	52.5
	17	50.2	76.7	47.7	76.4	75.4	71.1	67.5	56.7	49.7	48.2	48.0	47.8	50.2	0.0	50.2
	18	50.3	55.5	47.5	54.9	54.2	53.0	52.4	51.0	49.7	48.1	47.9	47.7	50.3	0.0	50.3
	19	49.3	65.8	47.1	65.2	64.0	61.6	61.0	50.4	48.7	47.6	47.4	47.2	49.3	5.0	54.3
	20	48.0	52.7	46.5	52.1	51.3	49.7	49.1	48.1	47.6	47.0	46.8	46.6	48.0	5.0	53.0
	21	48.8	53.7	46.1	53.4	53.0	52.3	51.9	49.5	47.4	46.5	46.4	46.2	48.8	5.0	53.8
Night	22	47.8	51.0	46.1	50.6	50.3	49.7	49.4	48.4	47.5	46.6	46.4	46.2	47.8	10.0	57.8
	23	45.5	46.7	44.9	46.4	46.2	45.9	45.8	45.6	45.4	45.1	45.1	45.0	45.5	10.0	55.5

Timeframe	*Hour*	*L_{eq}*	*L_{max}*	*L_{min}*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	48.0	52.7	46.1	52.1	51.3	49.7	49.1	48.1	47.4	46.5	46.4	46.2
	Max	58.0	76.7	49.2	76.4	75.4	71.1	67.5	56.7	52.9	50.3	49.9	49.4
Energy Average		52.6	Average:		61.8	61.1	59.4	58.2	51.9	49.9	48.5	48.3	48.1
Night	Min	45.5	46.7	44.9	46.4	46.2	45.9	45.8	45.6	45.4	45.1	45.1	45.0
	Max	54.8	75.2	57.5	75.0	74.8	73.7	72.3	68.0	64.8	58.8	58.4	57.9
Energy Average		49.3	Average:		60.8	60.3	58.9	57.9	53.5	50.9	48.0	47.9	47.7

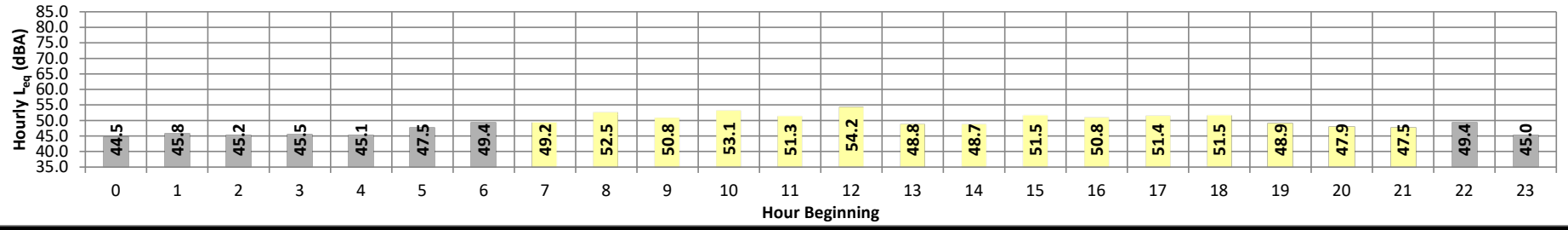
L_{eq} (dBA)	*Daytime (7am-10pm)*	*Nighttime (10pm-7am)*
24-Hour		
51.7	**52.6**	**49.3**

24-Hour Noise Level Measurement Summary

Date: Monday, April 18, 2022 *Location:* L4 - Located northeast of the Project site near Citrus Grove *Meter:* Piccolo II *JN:* 13101

Project: 534 Struck Avenue *Source:* Apartments at 1120 North Lemon Street. *Analyst:* A. Khan

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	44.5	79.3	43.5	78.8	78.2	76.7	75.0	69.5	48.0	43.9	43.8	43.6	44.5	10.0	54.5
	1	45.8	74.5	45.8	74.3	74.1	72.4	71.3	68.1	64.9	48.6	47.0	46.0	45.8	10.0	55.8
	2	45.2	83.3	66.5	83.1	82.8	81.7	80.5	75.9	73.8	68.2	67.8	66.8	45.2	10.0	55.2
	3	45.5	46.9	44.5	46.7	46.6	46.4	46.2	45.8	45.4	44.9	44.8	44.7	45.5	10.0	55.5
	4	45.1	46.3	44.2	46.1	46.0	45.7	45.6	45.2	45.0	44.6	44.5	44.3	45.1	10.0	55.1
	5	47.5	74.8	46.5	74.5	73.8	72.0	69.9	48.8	47.4	46.9	46.8	46.6	47.5	10.0	57.5
	6	49.4	76.2	48.1	75.6	74.6	72.6	71.0	50.4	49.1	48.6	48.5	48.3	49.4	10.0	59.4
Day	7	49.2	81.4	47.9	80.6	79.4	73.2	69.8	50.6	49.0	48.4	48.2	48.0	49.2	0.0	49.2
	8	52.5	77.3	47.4	77.1	76.1	74.2	73.1	54.0	50.7	48.3	48.0	47.6	52.5	0.0	52.5
	9	50.8	73.4	47.0	72.7	72.1	70.8	69.8	51.2	48.9	47.6	47.4	47.2	50.8	0.0	50.8
	10	53.1	61.8	47.3	61.1	60.3	58.1	56.9	53.8	50.4	48.0	47.7	47.4	53.1	0.0	53.1
	11	51.3	57.5	47.6	57.1	56.5	55.2	54.4	52.1	50.0	48.1	47.9	47.7	51.3	0.0	51.3
	12	54.2	63.0	47.5	62.6	62.1	61.2	60.1	55.8	51.3	48.3	48.0	47.7	54.2	0.0	54.2
	13	48.8	61.1	46.8	60.6	59.8	58.1	57.0	53.7	49.2	47.3	47.1	46.9	48.8	0.0	48.8
	14	48.7	70.3	46.3	70.0	69.2	68.6	68.4	49.8	48.0	46.8	46.7	46.4	48.7	0.0	48.7
	15	51.5	78.2	47.5	77.7	76.9	72.4	70.8	53.7	49.9	48.1	47.9	47.6	51.5	0.0	51.5
	16	50.8	71.8	47.4	71.2	70.8	69.5	68.8	52.4	49.5	47.9	47.7	47.5	50.8	0.0	50.8
	17	51.4	82.3	47.8	81.7	80.7	76.6	74.4	59.5	50.8	48.5	48.2	47.9	51.4	0.0	51.4
	18	51.5	56.8	47.0	56.4	56.1	55.5	55.0	52.8	49.9	47.7	47.5	47.2	51.5	0.0	51.5
	19	48.9	72.3	45.0	71.7	70.7	69.0	67.7	50.7	47.5	45.4	45.3	45.1	48.9	5.0	53.9
	20	47.9	51.2	45.9	50.8	50.6	50.0	49.7	48.7	47.5	46.4	46.2	46.0	47.9	5.0	52.9
	21	47.5	57.6	45.4	57.3	57.1	56.7	56.4	53.2	47.2	46.0	45.8	45.6	47.5	5.0	52.5
Night	22	49.4	53.6	46.0	53.3	53.1	52.4	51.9	50.5	48.6	46.5	46.3	46.1	49.4	10.0	59.4
	23	45.0	47.8	43.9	47.3	46.9	46.0	45.8	45.2	44.9	44.3	44.2	44.1	45.0	10.0	55.0

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	47.5	51.2	45.0	50.8	50.6	50.0	49.7	48.7	47.2	45.4	45.3	45.1
	Max	54.2	82.3	47.9	81.7	80.7	76.6	74.4	59.5	51.3	48.5	48.2	48.0
Energy Average		51.0	Average:		67.3	66.6	64.6	63.5	52.8	49.3	47.5	47.3	47.1
Night	Min	44.5	46.3	43.5	46.1	46.0	45.7	45.6	45.2	44.9	43.9	43.8	43.6
	Max	49.4	83.3	66.5	83.1	82.8	81.7	80.5	75.9	73.8	68.2	67.8	66.8
Energy Average		46.8	Average:		64.4	64.0	62.9	61.9	55.5	51.9	48.5	48.2	47.8

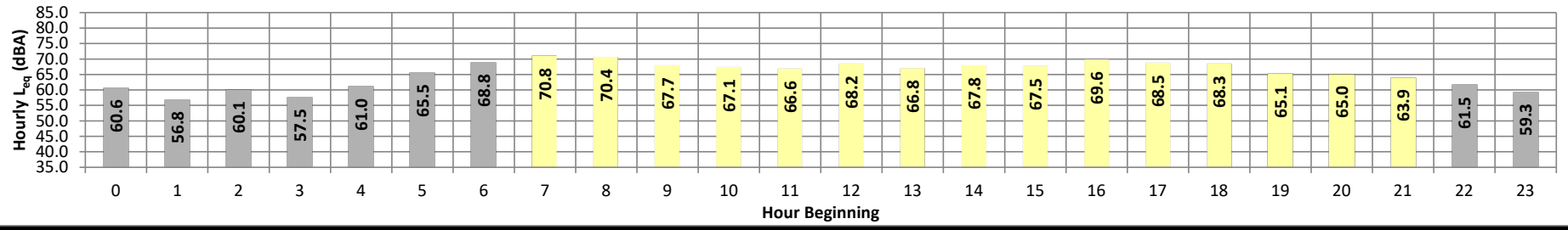
L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
49.8	**51.0**	**46.8**

24-Hour Noise Level Measurement Summary

Date: Monday, April 18, 2022 *Location:* L5 - Located south of the Project site near Top Dog Inn at 606 *Meter:* Piccolo II *JN:* 13101

Project: 534 Struck Avenue *Source:* West Collins Avenue. *Analyst:* A. Khan

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	60.6	72.2	45.0	72.0	71.3	68.4	66.3	57.5	51.0	45.6	45.3	45.1	60.6	10.0	70.6
	1	56.8	69.0	45.8	68.5	67.5	64.0	61.4	54.2	50.3	46.3	46.1	45.9	56.8	10.0	66.8
	2	60.1	68.3	56.1	68.0	67.4	65.3	64.0	59.8	57.9	56.4	56.3	56.1	60.1	10.0	70.1
	3	57.5	69.2	47.6	68.9	68.0	65.1	62.9	54.3	49.7	48.1	47.9	47.7	57.5	10.0	67.5
	4	61.0	71.7	48.8	71.3	70.5	68.3	66.7	59.8	54.1	49.4	49.2	48.9	61.0	10.0	71.0
	5	65.5	74.2	53.0	73.8	73.2	71.5	70.5	66.3	61.8	54.6	53.9	53.1	65.5	10.0	75.5
	6	68.8	77.0	56.7	76.5	75.8	74.2	73.3	70.1	66.1	58.8	57.8	56.9	68.8	10.0	78.8
Day	7	70.8	78.9	59.0	78.4	77.8	76.2	75.0	71.9	68.7	61.4	60.3	59.2	70.8	0.0	70.8
	8	70.4	78.3	58.2	77.7	77.0	75.3	74.5	71.6	68.7	61.2	59.6	58.5	70.4	0.0	70.4
	9	67.7	76.5	54.8	76.1	75.3	73.1	71.9	68.8	65.1	57.8	56.3	55.0	67.7	0.0	67.7
	10	67.1	76.2	54.6	75.5	74.6	72.3	71.2	68.2	64.6	57.4	56.1	54.8	67.1	0.0	67.1
	11	66.6	74.5	54.9	74.1	73.5	71.9	70.8	67.8	64.4	57.5	56.2	55.1	66.6	0.0	66.6
	12	68.2	79.2	55.6	78.7	77.7	74.6	72.2	67.9	64.5	58.1	56.9	55.8	68.2	0.0	68.2
	13	66.8	75.3	54.9	74.9	74.2	72.4	71.0	67.7	64.4	57.7	56.4	55.2	66.8	0.0	66.8
	14	67.8	76.7	54.6	76.4	75.7	74.0	72.7	68.4	64.9	57.5	56.1	54.9	67.8	0.0	67.8
	15	67.5	76.9	55.1	76.3	75.4	72.7	71.4	68.4	65.1	57.9	56.7	55.3	67.5	0.0	67.5
	16	69.6	80.9	56.2	80.3	79.2	75.7	73.3	69.3	66.1	59.1	57.7	56.4	69.6	0.0	69.6
	17	68.5	76.4	56.4	76.0	75.5	73.9	72.7	69.7	66.5	59.5	57.9	56.6	68.5	0.0	68.5
	18	68.3	79.4	52.4	78.8	77.9	74.6	72.7	68.3	63.7	55.2	53.9	52.7	68.3	0.0	68.3
	19	65.1	73.7	50.9	73.4	72.6	71.2	70.3	66.2	61.1	53.0	51.9	51.1	65.1	5.0	70.1
	20	65.0	75.2	49.6	74.9	74.1	72.0	70.5	65.1	58.9	51.3	50.5	49.8	65.0	5.0	70.0
	21	63.9	74.0	49.2	73.5	72.6	70.5	69.1	64.3	58.8	50.8	50.0	49.4	63.9	5.0	68.9
Night	22	61.5	71.9	47.9	71.5	70.8	68.8	67.2	61.1	54.9	49.0	48.4	48.0	61.5	10.0	71.5
	23	59.3	70.8	45.2	70.4	69.6	67.2	65.2	56.7	49.2	45.7	45.5	45.3	59.3	10.0	69.3

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	63.9	73.7	49.2	73.4	72.6	70.5	69.1	64.3	58.8	50.8	50.0	49.4
	Max	70.8	80.9	59.0	80.3	79.2	76.2	75.0	71.9	68.7	61.4	60.3	59.2
Energy Average		68.0	Average:		76.3	75.5	73.4	71.9	68.2	64.4	57.0	55.8	54.7
Night	Min	56.8	68.3	45.0	68.0	67.4	64.0	61.4	54.2	49.2	45.6	45.3	45.1
	Max	68.8	77.0	56.7	76.5	75.8	74.2	73.3	70.1	66.1	58.8	57.8	56.9
Energy Average		63.0	Average:		71.2	70.5	68.1	66.4	60.0	55.0	50.4	50.0	49.7

L_{eq} (dBA)	Daytime (7am-10pm)	Nighttime (10pm-7am)
24-Hour		
66.7	**68.0**	**63.0**

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APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE LEVEL CALCULATIONS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E
Road Name: Main St.
Road Segment: n/o Struck Av.
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,522 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,459 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-0.07	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-11.65	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-16.31	0.82	-1.20	-5.43	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:	66.0	64.3	62.5	57.6	65.7	66.2
Medium Trucks:	65.7	64.3	58.4	57.6	65.5	65.7
Heavy Trucks:	66.3	64.8	59.7	58.5	66.3	66.5
Vehicle Noise:	70.8	69.2	65.3	62.7	70.6	71.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	55	118	255	550
CNEL:	58	125	269	579

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P
Road Name: Main St.
Road Segment: n/o Struck Av.
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,533 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,460 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.48%
Medium Trucks:	81.6%	5.3%	13.1%	6.35%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-0.07	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-11.65	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-16.31	0.82	-1.20	-5.43	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:	66.0	64.3	62.5	57.6	65.7	66.2
Medium Trucks:	65.7	64.3	58.4	57.6	65.5	65.7
Heavy Trucks:	66.3	64.8	59.7	58.5	66.3	66.5
Vehicle Noise:	70.8	69.2	65.3	62.7	70.6	71.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	55	118	255	550
CNEL:	58	125	269	579

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC
Road Name: Main St.
Road Segment: n/o Struck Av.
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,205 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,523 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	0.11	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-11.47	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-16.13	0.82	-1.20	-5.43	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:	66.2	64.5	62.7	57.7	65.9	66.4
Medium Trucks:	65.9	64.5	58.6	57.8	65.7	65.9
Heavy Trucks:	66.5	65.0	59.9	58.7	66.5	66.7
Vehicle Noise:	71.0	69.4	65.5	62.8	70.8	71.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	57	122	263	566
CNEL:	60	128	276	596

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P
Road Name: Main St.
Road Segment: n/o Struck Av.
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,216 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,524 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.48%
Medium Trucks:	81.6%	5.3%	13.1%	6.35%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	0.12	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-11.47	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-16.13	0.82	-1.20	-5.43	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:	66.2	64.5	62.7	57.7	65.9	66.4
Medium Trucks:	65.9	64.5	58.6	57.8	65.7	65.9
Heavy Trucks:	66.5	65.0	59.9	58.7	66.5	66.7
Vehicle Noise:	71.0	69.4	65.5	62.8	70.8	71.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	57	122	263	566
CNEL:	60	128	276	596

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E | Project Name: 534 Struck
Road Name: Main St. | Job Number: 13101
Road Segment: s/o Struck Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,156 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,707 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	0.61	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-10.97	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-15.63	0.82	-1.20	-5.43	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:	66.7	65.0	63.2	58.2	66.4	66.9
Medium Trucks:	66.4	65.0	59.1	58.2	66.2	66.4
Heavy Trucks:	67.0	65.5	60.4	59.2	67.0	67.2
Vehicle Noise:	71.5	69.9	66.0	63.3	71.3	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	61	132	283	610
CNEL:	64	138	298	643

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P | Project Name: 534 Struck
Road Name: Main St. | Job Number: 13101
Road Segment: s/o Struck Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,167 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,708 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.48%
Medium Trucks:	81.6%	5.3%	13.1%	6.35%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	0.61	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-10.97	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-15.63	0.82	-1.20	-5.43	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:	66.7	65.0	63.2	58.2	66.4	66.9
Medium Trucks:	66.4	65.0	59.1	58.2	66.2	66.4
Heavy Trucks:	67.0	65.5	60.4	59.2	67.0	67.2
Vehicle Noise:	71.5	69.9	66.0	63.3	71.3	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	61	132	283	610
CNEL:	64	138	298	643

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC | Project Name: 534 Struck
Road Name: Main St. | Job Number: 13101
Road Segment: s/o Struck Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,026 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,788 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	0.81	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-10.77	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-15.43	0.82	-1.20	-5.43	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:	66.9	65.2	63.4	58.4	66.6	67.1
Medium Trucks:	66.6	65.2	59.3	58.5	66.4	66.6
Heavy Trucks:	67.2	65.7	60.6	59.4	67.2	67.4
Vehicle Noise:	71.7	70.1	66.2	63.5	71.5	71.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	63	136	292	630
CNEL:	66	143	308	663

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P | Project Name: 534 Struck
Road Name: Main St. | Job Number: 13101
Road Segment: s/o Struck Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,037 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,789 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.35%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	0.81	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-10.77	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-15.43	0.82	-1.20	-5.43	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:	66.9	65.2	63.4	58.4	66.6	67.1
Medium Trucks:	66.6	65.2	59.3	58.5	66.4	66.6
Heavy Trucks:	67.2	65.7	60.6	59.4	67.2	67.4
Vehicle Noise:	71.7	70.1	66.2	63.5	71.5	71.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	63	136	292	630
CNEL:	66	143	308	663

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E | Project Name: 534 Struck
Road Name: Batavia St. | Job Number: 13101
Road Segment: n/o Katella Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,119 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,139 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-1.15	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-12.73	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.39	0.82	-1.20	-5.43	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:	65.0	63.2	61.4	56.5	64.6	65.1
Medium Trucks:	64.6	63.2	57.4	56.5	64.4	64.7
Heavy Trucks:	65.2	63.7	58.6	57.4	65.2	65.5
Vehicle Noise:	69.7	68.2	64.3	61.6	69.5	69.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	47	100	216	466
CNEL:	49	106	228	491

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P | Project Name: 534 Struck
Road Name: Batavia St. | Job Number: 13101
Road Segment: n/o Katella Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,149 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,142 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.42%
Medium Trucks:	81.6%	5.3%	13.1%	6.35%
Heavy Trucks:	79.9%	6.2%	14.0%	2.23%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-1.14	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-12.72	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.27	0.82	-1.20	-5.43	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:	65.0	63.2	61.4	56.5	64.6	65.1
Medium Trucks:	64.6	63.2	57.4	56.5	64.5	64.7
Heavy Trucks:	65.3	63.8	58.7	57.5	65.3	65.6
Vehicle Noise:	69.8	68.2	64.3	61.6	69.6	69.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	47	101	218	470
CNEL:	49	107	230	494

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC | Project Name: 534 Struck
Road Name: Batavia St. | Job Number: 13101
Road Segment: n/o Katella Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,174 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,238 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-0.78	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-12.37	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.02	0.82	-1.20	-5.43	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:	65.3	63.6	61.8	56.8	65.0	65.5
Medium Trucks:	65.0	63.6	57.7	56.9	64.8	65.0
Heavy Trucks:	65.6	64.1	59.0	57.8	65.6	65.8
Vehicle Noise:	70.1	68.5	64.6	61.9	69.9	70.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	49	106	229	493
CNEL:	52	112	241	519

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P | Project Name: 534 Struck
Road Name: Batavia St. | Job Number: 13101
Road Segment: n/o Katella Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,205 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,241 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.42%
Medium Trucks:	81.6%	5.3%	13.1%	6.35%
Heavy Trucks:	79.9%	6.2%	14.0%	2.23%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-0.78	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-12.36	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-16.91	0.82	-1.20	-5.43	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:	65.3	63.6	61.8	56.8	65.0	65.5
Medium Trucks:	65.0	63.6	57.7	56.9	64.8	65.0
Heavy Trucks:	65.7	64.2	59.1	57.9	65.7	65.9
Vehicle Noise:	70.1	68.6	64.7	62.0	70.0	70.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	50	107	230	496
CNEL:	52	113	243	522

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E | Project Name: 534 Struck
Road Name: Batavia St. | Job Number: 13101
Road Segment: s/o Katella Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	9,676 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	910 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-2.13	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-13.71	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-18.37	0.82	-1.20	-5.43	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:	64.0	62.2	60.5	55.5	63.6	64.2
Medium Trucks:	63.6	62.2	56.4	55.5	63.5	63.7
Heavy Trucks:	64.2	62.7	57.6	56.4	64.2	64.5
Vehicle Noise:	68.7	67.2	63.3	60.6	68.6	68.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	40	86	186	401
CNEL:	42	91	196	422

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P | Project Name: 534 Struck
Road Name: Batavia St. | Job Number: 13101
Road Segment: s/o Katella Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	9,975 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	938 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	90.05%
Medium Trucks:	81.6%	5.3%	13.1%	6.42%
Heavy Trucks:	79.9%	6.2%	14.0%	3.53%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-2.06	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-13.53	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-16.12	0.82	-1.20	-5.43	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:	64.0	62.3	60.5	55.6	63.7	64.2
Medium Trucks:	63.8	62.4	56.6	55.7	63.6	63.9
Heavy Trucks:	66.5	65.0	59.9	58.7	66.5	66.7
Vehicle Noise:	69.7	68.2	64.1	61.7	69.6	69.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	47	101	218	470
CNEL:	49	106	229	493

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC | Project Name: 534 Struck
Road Name: Batavia St. | Job Number: 13101
Road Segment: s/o Katella Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,417 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	979 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-1.80	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-13.39	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-18.04	0.82	-1.20	-5.43	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:	64.3	62.6	60.8	55.8	63.9	64.5
Medium Trucks:	64.0	62.5	56.7	55.8	63.8	64.0
Heavy Trucks:	64.6	63.1	58.0	56.7	64.6	64.8
Vehicle Noise:	69.1	67.5	63.6	60.9	68.9	69.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	42	91	196	421
CNEL:	44	96	206	444

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P | Project Name: 534 Struck
Road Name: Batavia St. | Job Number: 13101
Road Segment: s/o Katella Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,716 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,007 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	90.15%
Medium Trucks:	81.6%	5.3%	13.1%	6.41%
Heavy Trucks:	79.9%	6.2%	14.0%	3.44%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-1.74	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-13.22	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-15.93	0.82	-1.20	-5.43	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:	64.4	62.6	60.8	55.9	64.0	64.5
Medium Trucks:	64.1	62.7	56.9	56.0	64.0	64.2
Heavy Trucks:	66.7	65.2	60.1	58.9	66.7	66.9
Vehicle Noise:	70.0	68.4	64.3	61.9	69.8	70.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	49	105	227	489
CNEL:	51	111	238	513

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E | Project Name: 534 Struck
Road Name: Batavia St. | Job Number: 13101
Road Segment: s/o Struck Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,892 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,024 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-1.61	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-13.19	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.85	0.82	-1.20	-5.43	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:	64.5	62.7	61.0	56.0	64.1	64.7
Medium Trucks:	64.1	62.7	56.9	56.0	64.0	64.2
Heavy Trucks:	64.8	63.3	58.2	56.9	64.8	65.0
Vehicle Noise:	69.2	67.7	63.8	61.1	69.1	69.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	43	94	202	434
CNEL:	46	98	212	457

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P | Project Name: 534 Struck
Road Name: Batavia St. | Job Number: 13101
Road Segment: s/o Struck Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,923 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,027 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.41%
Medium Trucks:	81.6%	5.3%	13.1%	6.35%
Heavy Trucks:	79.9%	6.2%	14.0%	2.24%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-1.60	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-13.18	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.72	0.82	-1.20	-5.43	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:	64.5	62.8	61.0	56.0	64.2	64.7
Medium Trucks:	64.2	62.7	56.9	56.0	64.0	64.2
Heavy Trucks:	64.9	63.4	58.3	57.1	64.9	65.1
Vehicle Noise:	69.3	67.7	63.8	61.2	69.1	69.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	44	94	203	438
CNEL:	46	99	214	461

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC | Project Name: 534 Struck
Road Name: Batavia St. | Job Number: 13101
Road Segment: s/o Struck Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,648 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,095 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-1.32	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-12.90	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.56	0.82	-1.20	-5.43	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	63.0	61.3	56.3	64.4	65.0
Medium Trucks:	64.4	63.0	57.2	56.3	64.3	64.5
Heavy Trucks:	65.1	63.6	58.5	57.2	65.1	65.3
Vehicle Noise:	69.5	68.0	64.1	61.4	69.4	69.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	45	98	211	454
CNEL:	48	103	222	478

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P | Project Name: 534 Struck
Road Name: Batavia St. | Job Number: 13101
Road Segment: s/o Struck Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,679 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	1,098 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	50 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 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:	75.5%	12.5%	12.0%	91.42%
Medium Trucks:	81.6%	5.3%	13.1%	6.35%
Heavy Trucks:	79.9%	6.2%	14.0%	2.23%

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:	43.589
Medium Trucks:	43.386
Heavy Trucks:	43.405

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-1.31	0.79	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-12.89	0.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-17.43	0.82	-1.20	-5.43	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	63.0	61.3	56.3	64.4	65.0
Medium Trucks:	64.4	63.0	57.2	56.3	64.3	64.5
Heavy Trucks:	65.2	63.7	58.6	57.4	65.2	65.4
Vehicle Noise:	69.6	68.0	64.1	61.5	69.4	69.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	46	99	212	458
CNEL:	48	104	224	482

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E | Project Name: 534 Struck
Road Name: Katella Av. | Job Number: 13101
Road Segment: w/o Main St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,088 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	2,264 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	1.84	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-9.74	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-14.40	-0.83	-1.20	-5.29	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:	66.3	64.6	62.8	57.8	65.9	66.5
Medium Trucks:	65.9	64.5	58.7	57.8	65.8	66.0
Heavy Trucks:	66.6	65.1	60.0	58.7	66.6	66.8
Vehicle Noise:	71.0	69.5	65.6	62.9	70.9	71.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	77	165	356	767
CNEL:	81	174	375	807

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P | Project Name: 534 Struck
Road Name: Katella Av. | Job Number: 13101
Road Segment: w/o Main St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,268 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	2,281 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.06%
Medium Trucks:	81.6%	5.3%	13.1%	6.38%
Heavy Trucks:	79.9%	6.2%	14.0%	2.56%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	1.85	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-9.70	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-13.66	-0.83	-1.20	-5.29	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:	66.3	64.6	62.8	57.8	66.0	66.5
Medium Trucks:	66.0	64.6	58.7	57.9	65.8	66.1
Heavy Trucks:	67.3	65.8	60.7	59.5	67.3	67.5
Vehicle Noise:	71.3	69.8	65.8	63.2	71.2	71.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	80	173	373	804
CNEL:	85	182	392	845

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC | Project Name: 534 Struck
Road Name: Katella Av. | Job Number: 13101
Road Segment: w/o Main St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,269 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	2,375 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	2.04	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-9.54	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-14.20	-0.83	-1.20	-5.29	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:	66.5	64.8	63.0	58.0	66.2	66.7
Medium Trucks:	66.1	64.7	58.9	58.0	66.0	66.2
Heavy Trucks:	66.8	65.3	60.2	58.9	66.8	67.0
Vehicle Noise:	71.2	69.7	65.8	63.1	71.1	71.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	79	171	367	792
CNEL:	83	180	387	833

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P | Project Name: 534 Struck
Road Name: Katella Av. | Job Number: 13101
Road Segment: w/o Main St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,449 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	2,392 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.08%
Medium Trucks:	81.6%	5.3%	13.1%	6.38%
Heavy Trucks:	79.9%	6.2%	14.0%	2.54%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	2.06	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-9.49	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-13.49	-0.83	-1.20	-5.29	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:	66.5	64.8	63.0	58.0	66.2	66.7
Medium Trucks:	66.2	64.8	59.0	58.1	66.0	66.3
Heavy Trucks:	67.5	66.0	60.9	59.6	67.5	67.7
Vehicle Noise:	71.5	70.0	66.0	63.4	71.4	71.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	83	178	384	828
CNEL:	87	188	404	871

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E | Project Name: 534 Struck
Road Name: Katella Av. | Job Number: 13101
Road Segment: e/o Main St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,483 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	2,677 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	2.56	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-9.02	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-13.68	-0.83	-1.20	-5.29	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:	67.0	65.3	63.5	58.5	66.7	67.2
Medium Trucks:	66.7	65.3	59.4	58.6	66.5	66.7
Heavy Trucks:	67.3	65.8	60.7	59.5	67.3	67.5
Vehicle Noise:	71.8	70.2	66.3	63.6	71.6	71.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	86	185	398	857
CNEL:	90	194	419	902

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P | Project Name: 534 Struck
Road Name: Katella Av. | Job Number: 13101
Road Segment: e/o Main St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,663 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	2,694 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.12%
Medium Trucks:	81.6%	5.3%	13.1%	6.38%
Heavy Trucks:	79.9%	6.2%	14.0%	2.50%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	2.57	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-8.98	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-13.04	-0.83	-1.20	-5.29	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:	67.0	65.3	63.5	58.6	66.7	67.2
Medium Trucks:	66.7	65.3	59.5	58.6	66.5	66.8
Heavy Trucks:	67.9	66.4	61.3	60.1	67.9	68.2
Vehicle Noise:	72.0	70.5	66.5	63.9	71.9	72.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	89	192	414	892
CNEL:	94	202	436	939

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC | Project Name: 534 Struck
Road Name: Katella Av. | Job Number: 13101
Road Segment: e/o Main St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,870 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	2,808 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	2.77	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-8.81	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-13.47	-0.83	-1.20	-5.29	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:	67.2	65.5	63.7	58.8	66.9	67.4
Medium Trucks:	66.9	65.5	59.6	58.8	66.7	66.9
Heavy Trucks:	67.5	66.0	60.9	59.7	67.5	67.7
Vehicle Noise:	72.0	70.4	66.5	63.9	71.8	72.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	88	191	411	885
CNEL:	93	201	432	931

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P | Project Name: 534 Struck
Road Name: Katella Av. | Job Number: 13101
Road Segment: e/o Main St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,050 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	2,825 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.14%
Medium Trucks:	81.6%	5.3%	13.1%	6.37%
Heavy Trucks:	79.9%	6.2%	14.0%	2.48%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	2.78	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-8.77	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-12.86	-0.83	-1.20	-5.29	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:	67.2	65.5	63.7	58.8	66.9	67.4
Medium Trucks:	66.9	65.5	59.7	58.8	66.8	67.0
Heavy Trucks:	68.1	66.6	61.5	60.3	68.1	68.3
Vehicle Noise:	72.2	70.7	66.7	64.1	72.1	72.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	92	198	427	919
CNEL:	97	208	449	967

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E | Project Name: 534 Struck
Road Name: Katella Av. | Job Number: 13101
Road Segment: e/o Batavia Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,672 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	2,977 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	3.02	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-8.56	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-13.22	-0.83	-1.20	-5.29	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:	67.5	65.7	64.0	59.0	67.1	67.7
Medium Trucks:	67.1	65.7	59.9	59.0	67.0	67.2
Heavy Trucks:	67.7	66.2	61.1	59.9	67.7	68.0
Vehicle Noise:	72.2	70.7	66.8	64.1	72.1	72.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	92	198	427	920
CNEL:	97	209	450	969

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P | Project Name: 534 Struck
Road Name: Katella Av. | Job Number: 13101
Road Segment: e/o Batavia Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,760 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	2,985 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.36%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.29%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	3.03	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-8.54	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-12.99	-0.83	-1.20	-5.29	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:	67.5	65.7	64.0	59.0	67.1	67.7
Medium Trucks:	67.1	65.7	59.9	59.0	67.0	67.2
Heavy Trucks:	68.0	66.5	61.4	60.1	68.0	68.2
Vehicle Noise:	72.3	70.8	66.9	64.2	72.2	72.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	93	201	433	933
CNEL:	98	212	456	982

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC | Project Name: 534 Struck
Road Name: Katella Av. | Job Number: 13101
Road Segment: e/o Batavia Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,328 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	3,133 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	3.25	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-8.33	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-12.99	-0.83	-1.20	-5.29	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:	67.7	66.0	64.2	59.2	67.4	67.9
Medium Trucks:	67.3	65.9	60.1	59.2	67.2	67.4
Heavy Trucks:	68.0	66.5	61.4	60.1	68.0	68.2
Vehicle Noise:	72.5	70.9	67.0	64.3	72.3	72.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	95	205	442	952
CNEL:	100	216	465	1,002

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P | Project Name: 534 Struck
Road Name: Katella Av. | Job Number: 13101
Road Segment: e/o Batavia Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,416 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	3,141 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.36%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.28%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	3.25	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-8.32	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-12.78	-0.83	-1.20	-5.29	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:	67.7	66.0	64.2	59.2	67.4	67.9
Medium Trucks:	67.4	66.0	60.1	59.2	67.2	67.4
Heavy Trucks:	68.2	66.7	61.6	60.4	68.2	68.4
Vehicle Noise:	72.5	71.0	67.1	64.4	72.4	72.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	96	208	448	965
CNEL:	102	219	471	1,015

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E
Road Name: Katella Av.
Road Segment: w/o SR-57 SB Ramps
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,377 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	3,419 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	3.63	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-7.95	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-12.61	-0.83	-1.20	-5.29	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:	68.1	66.3	64.6	59.6	67.7	68.3
Medium Trucks:	67.7	66.3	60.5	59.6	67.6	67.8
Heavy Trucks:	68.3	66.8	61.7	60.5	68.3	68.6
Vehicle Noise:	72.8	71.3	67.4	64.7	72.7	73.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	101	217	468	1,009
CNEL:	106	229	493	1,062

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P
Road Name: Katella Av.
Road Segment: w/o SR-57 SB Ramps
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,388 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	3,420 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.35%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	3.63	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-7.95	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-12.61	-0.83	-1.20	-5.29	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:	68.1	66.3	64.6	59.6	67.7	68.3
Medium Trucks:	67.7	66.3	60.5	59.6	67.6	67.8
Heavy Trucks:	68.3	66.8	61.7	60.5	68.3	68.6
Vehicle Noise:	72.8	71.3	67.4	64.7	72.7	73.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	101	217	468	1,009
CNEL:	106	229	493	1,062

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC
Road Name: Katella Av.
Road Segment: w/o SR-57 SB Ramps
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,027 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	3,574 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	3.82	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-7.76	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-12.42	-0.83	-1.20	-5.29	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:	68.3	66.5	64.8	59.8	67.9	68.5
Medium Trucks:	67.9	66.5	60.7	59.8	67.8	68.0
Heavy Trucks:	68.5	67.0	61.9	60.7	68.5	68.8
Vehicle Noise:	73.0	71.5	67.6	64.9	72.9	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	104	224	482	1,039
CNEL:	109	236	508	1,094

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P
Road Name: Katella Av.
Road Segment: w/o SR-57 SB Ramps
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,038 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	3,576 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.35%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	3.82	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-7.76	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-12.42	-0.83	-1.20	-5.29	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:	68.3	66.5	64.8	59.8	67.9	68.5
Medium Trucks:	67.9	66.5	60.7	59.8	67.8	68.0
Heavy Trucks:	68.5	67.0	61.9	60.7	68.5	68.8
Vehicle Noise:	73.0	71.5	67.6	64.9	72.9	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	104	224	482	1,040
CNEL:	109	236	508	1,094

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E
Road Name: Katella Av.
Road Segment: e/o SR-57 NB Ramps
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,065 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	3,296 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	3.47	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-8.11	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-12.77	-0.83	-1.20	-5.29	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:	67.9	66.2	64.4	59.5	67.6	68.1
Medium Trucks:	67.6	66.2	60.3	59.5	67.4	67.6
Heavy Trucks:	68.2	66.7	61.6	60.4	68.2	68.4
Vehicle Noise:	72.7	71.1	67.2	64.5	72.5	72.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	98	212	457	985
CNEL:	104	223	481	1,037

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P
Road Name: Katella Av.
Road Segment: e/o SR-57 NB Ramps
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,289 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	3,317 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.20%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.44%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	3.48	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-8.08	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-12.25	-0.83	-1.20	-5.29	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:	67.9	66.2	64.4	59.5	67.6	68.1
Medium Trucks:	67.6	66.2	60.4	59.5	67.4	67.7
Heavy Trucks:	68.7	67.2	62.1	60.9	68.7	69.0
Vehicle Noise:	72.9	71.3	67.4	64.8	72.7	73.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	102	219	472	1,018
CNEL:	107	231	497	1,071

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC
Road Name: Katella Av.
Road Segment: e/o SR-57 NB Ramps
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,009 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	3,479 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	3.70	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-7.88	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-12.54	-0.83	-1.20	-5.29	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:	68.2	66.4	64.6	59.7	67.8	68.3
Medium Trucks:	67.8	66.4	60.6	59.7	67.6	67.9
Heavy Trucks:	68.4	66.9	61.8	60.6	68.4	68.7
Vehicle Noise:	72.9	71.4	67.5	64.8	72.7	73.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	102	220	474	1,021
CNEL:	107	232	499	1,075

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P
Road Name: Katella Av.
Road Segment: e/o SR-57 NB Ramps
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,234 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	3,500 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	74 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 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:	75.5%	12.5%	12.0%	91.21%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.42%

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:	56.080
Medium Trucks:	55.922
Heavy Trucks:	55.938

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	3.72	-0.85	-1.20	-4.71	0.000	0.000
Medium Trucks:	77.72	-7.85	-0.83	-1.20	-4.88	0.000	0.000
Heavy Trucks:	82.99	-12.04	-0.83	-1.20	-5.29	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:	68.2	66.4	64.7	59.7	67.8	68.4
Medium Trucks:	67.8	66.4	60.6	59.7	67.7	67.9
Heavy Trucks:	68.9	67.4	62.3	61.1	68.9	69.2
Vehicle Noise:	73.1	71.6	67.6	65.0	72.9	73.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	105	227	489	1,053
CNEL:	111	239	514	1,108

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E
Road Name: Struck Av.
Road Segment: w/o Main St.
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,142 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	483 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-4.87	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	77.72	-16.45	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	82.99	-21.11	2.69	-1.20	-5.69	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:	63.1	61.3	59.6	54.6	62.7	63.3
Medium Trucks:	62.8	61.3	55.5	54.6	62.6	62.8
Heavy Trucks:	63.4	61.9	56.8	55.5	63.4	63.6
Vehicle Noise:	67.8	66.3	62.4	59.7	67.7	68.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	23	50	107	231
CNEL:	24	52	113	243

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P
Road Name: Struck Av.
Road Segment: w/o Main St.
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,186 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	487 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 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:	75.5%	12.5%	12.0%	91.54%
Medium Trucks:	81.6%	5.3%	13.1%	6.30%
Heavy Trucks:	79.9%	6.2%	14.0%	2.16%

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:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-4.83	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	77.72	-16.45	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	82.99	-21.11	2.69	-1.20	-5.69	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:	63.1	61.4	59.6	54.6	62.8	63.3
Medium Trucks:	62.8	61.3	55.5	54.6	62.6	62.8
Heavy Trucks:	63.4	61.9	56.8	55.5	63.4	63.6
Vehicle Noise:	67.9	66.3	62.4	59.7	67.7	68.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	23	50	108	232
CNEL:	24	53	113	244

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC
Road Name: Struck Av.
Road Segment: w/o Main St.
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,668 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	533 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-4.45	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	77.72	-16.03	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	82.99	-20.69	2.69	-1.20	-5.69	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:	63.5	61.8	60.0	55.0	63.2	63.7
Medium Trucks:	63.2	61.8	55.9	55.1	63.0	63.2
Heavy Trucks:	63.8	62.3	57.2	56.0	63.8	64.0
Vehicle Noise:	68.3	66.7	62.8	60.1	68.1	68.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	25	53	114	247
CNEL:	26	56	121	260

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P
Road Name: Struck Av.
Road Segment: w/o Main St.
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,712 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	537 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 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:	75.5%	12.5%	12.0%	91.54%
Medium Trucks:	81.6%	5.3%	13.1%	6.31%
Heavy Trucks:	79.9%	6.2%	14.0%	2.16%

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:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-4.41	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	77.72	-16.03	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	82.99	-20.69	2.69	-1.20	-5.69	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:	63.5	61.8	60.0	55.1	63.2	63.7
Medium Trucks:	63.2	61.8	55.9	55.1	63.0	63.2
Heavy Trucks:	63.8	62.3	57.2	56.0	63.8	64.0
Vehicle Noise:	68.3	66.7	62.8	60.2	68.1	68.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	25	53	115	247
CNEL:	26	56	121	260

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E
Road Name: Struck Av.
Road Segment: e/o Main St.
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,525 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	143 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-10.15	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	77.72	-21.73	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	82.99	-26.39	2.69	-1.20	-5.69	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:	57.8	56.1	54.3	49.3	57.5	58.0
Medium Trucks:	57.5	56.1	50.2	49.4	57.3	57.5
Heavy Trucks:	58.1	56.6	51.5	50.3	58.1	58.3
Vehicle Noise:	62.6	61.0	57.1	54.4	62.4	62.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	10	22	48	103
CNEL:	11	23	50	108

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P
Road Name: Struck Av.
Road Segment: e/o Main St.
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,591 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	150 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 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:	75.5%	12.5%	12.0%	91.82%
Medium Trucks:	81.6%	5.3%	13.1%	6.09%
Heavy Trucks:	79.9%	6.2%	14.0%	2.08%

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:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-9.95	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	77.72	-21.73	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	82.99	-26.39	2.69	-1.20	-5.69	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:	58.0	56.3	54.5	49.5	57.7	58.2
Medium Trucks:	57.5	56.1	50.2	49.4	57.3	57.5
Heavy Trucks:	58.1	56.6	51.5	50.3	58.1	58.3
Vehicle Noise:	62.6	61.1	57.2	54.5	62.5	62.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	10	22	48	104
CNEL:	11	24	51	109

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC
Road Name: Struck Av.
Road Segment: e/o Main St.
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,823 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	171 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-9.37	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	77.72	-20.95	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	82.99	-25.61	2.69	-1.20	-5.69	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:	58.6	56.8	55.0	50.1	58.2	58.8
Medium Trucks:	58.3	56.8	51.0	50.1	58.1	58.3
Heavy Trucks:	58.9	57.4	52.3	51.0	58.9	59.1
Vehicle Noise:	63.3	61.8	57.9	55.2	63.2	63.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	12	25	54	116
CNEL:	12	26	57	122

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P
Road Name: Struck Av.
Road Segment: e/o Main St.
Project Name: 534 Struck
Job Number: 13101

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,889 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	178 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 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:	75.5%	12.5%	12.0%	91.77%
Medium Trucks:	81.6%	5.3%	13.1%	6.13%
Heavy Trucks:	79.9%	6.2%	14.0%	2.10%

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:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-9.21	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	77.72	-20.95	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	82.99	-25.61	2.69	-1.20	-5.69	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:	58.7	57.0	55.2	50.3	58.4	58.9
Medium Trucks:	58.3	56.8	51.0	50.1	58.1	58.3
Heavy Trucks:	58.9	57.4	52.3	51.0	58.9	59.1
Vehicle Noise:	63.4	61.8	58.0	55.3	63.2	63.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	12	25	54	117
CNEL:	12	26	57	123

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E | Project Name: 534 Struck
Road Name: Struck Av. | Job Number: 13101
Road Segment: e/o Batavia Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,477 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	139 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-10.29	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	77.72	-21.87	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	82.99	-26.53	2.69	-1.20	-5.69	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:	57.7	55.9	54.1	49.2	57.3	57.8
Medium Trucks:	57.3	55.9	50.1	49.2	57.2	57.4
Heavy Trucks:	58.0	56.5	51.3	50.1	58.0	58.2
Vehicle Noise:	62.4	60.9	57.0	54.3	62.3	62.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	10	22	47	101
CNEL:	11	23	49	106

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P | Project Name: 534 Struck
Road Name: Struck Av. | Job Number: 13101
Road Segment: e/o Batavia Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,873 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	176 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 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:	75.5%	12.5%	12.0%	83.88%
Medium Trucks:	81.6%	5.3%	13.1%	6.42%
Heavy Trucks:	79.9%	6.2%	14.0%	9.70%

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:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-9.63	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	77.72	-20.79	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	82.99	-19.00	2.69	-1.20	-5.69	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:	58.3	56.6	54.8	49.8	58.0	58.5
Medium Trucks:	58.4	57.0	51.2	50.3	58.3	58.5
Heavy Trucks:	65.5	64.0	58.9	57.7	65.5	65.7
Vehicle Noise:	66.9	65.4	60.8	59.0	66.8	67.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	20	44	94	203
CNEL:	21	46	98	212

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC | Project Name: 534 Struck
Road Name: Struck Av. | Job Number: 13101
Road Segment: e/o Batavia Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,875 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	176 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 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:	75.5%	12.5%	12.0%	91.47%
Medium Trucks:	81.6%	5.3%	13.1%	6.36%
Heavy Trucks:	79.9%	6.2%	14.0%	2.17%

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:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-9.25	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	77.72	-20.83	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	82.99	-25.49	2.69	-1.20	-5.69	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:	58.7	56.9	55.2	50.2	58.3	58.9
Medium Trucks:	58.4	57.0	51.1	50.3	58.2	58.4
Heavy Trucks:	59.0	57.5	52.4	51.2	59.0	59.2
Vehicle Noise:	63.5	61.9	58.0	55.3	63.3	63.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	12	25	55	118
CNEL:	12	27	58	124

Friday, October 21, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P | Project Name: 534 Struck
Road Name: Struck Av. | Job Number: 13101
Road Segment: e/o Batavia Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,271 vehicles
Peak Hour Percentage:	9.40%
Peak Hour Volume:	213 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	33.0 feet
Centerline Dist. to Observer:	33.0 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:	75.5%	12.5%	12.0%	85.21%
Medium Trucks:	81.6%	5.3%	13.1%	6.41%
Heavy Trucks:	79.9%	6.2%	14.0%	8.38%

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:	32.833
Medium Trucks:	32.562
Heavy Trucks:	32.589

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-8.73	2.64	-1.20	-4.52	0.000	0.000
Medium Trucks:	77.72	-19.96	2.69	-1.20	-4.86	0.000	0.000
Heavy Trucks:	82.99	-18.80	2.69	-1.20	-5.69	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:	59.2	57.5	55.7	50.7	58.9	59.4
Medium Trucks:	59.2	57.8	52.0	51.1	59.1	59.3
Heavy Trucks:	65.7	64.2	59.1	57.9	65.7	65.9
Vehicle Noise:	67.3	65.8	61.3	59.3	67.2	67.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	22	46	100	216
CNEL:	23	49	105	225

Friday, October 21, 2022

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APPENDIX 9.1:

CADNAA OPERATIONAL NOISE MODEL INPUTS

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13101 - 534 Struck Ave.

CadnaA Noise Prediction Model: 13101-04.cna
Date: 23.10.22
Analyst: B. Lawson

Calculation Configuration

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

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	52.3	52.2	58.8	55.0	50.0	0.0				5.00	a	6072857.41	2240757.59	5.00
RECEIVERS		R2	46.7	46.6	53.2	55.0	50.0	0.0				5.00	a	6073285.73	2240919.33	5.00
RECEIVERS		R3	51.7	51.6	58.3	55.0	50.0	0.0				5.00	a	6073312.99	2240705.79	5.00
RECEIVERS		R4	47.3	47.2	53.9	55.0	50.0	0.0				5.00	a	6073512.27	2240711.54	5.00
RECEIVERS		R5	42.9	42.8	49.5	55.0	50.0	0.0				5.00	a	6072900.12	2239309.94	5.00
RECEIVERS		R6	40.6	39.6	46.2	55.0	50.0	0.0				5.00	a	6072750.68	2239983.95	5.00

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)		(ft)	(ft)	(ft)
POINTSOURCE		AC01	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	6073030.03	2240550.23	50.00
POINTSOURCE		AC02	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	6073093.90	2240549.08	50.00
POINTSOURCE		AC03	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	5.00	g	6072836.13	2239962.82	50.00
POINTSOURCE		TRASH01	89.0	89.0	89.0	Lw	89		150.00	0.00	90.00	5.00	a	6072930.80	2240538.82	5.00
POINTSOURCE		PARK01	87.8	87.8	87.8	Lw	87.8					5.00	a	6072848.68	2240617.52	5.00
POINTSOURCE		PARK02	87.8	87.8	87.8	Lw	87.8					5.00	a	6072848.68	2240582.16	5.00
POINTSOURCE		PARK03	87.8	87.8	87.8	Lw	87.8					5.00	a	6072849.25	2240547.37	5.00
POINTSOURCE		PARK04	87.8	87.8	87.8	Lw	87.8					5.00	a	6072950.76	2240614.10	5.00
POINTSOURCE		PARK05	87.8	87.8	87.8	Lw	87.8					5.00	a	6072999.81	2240614.10	5.00
POINTSOURCE		PARK06	87.8	87.8	87.8	Lw	87.8					5.00	a	6073056.83	2240614.10	5.00
POINTSOURCE		PARK07	87.8	87.8	87.8	Lw	87.8					5.00	a	6073112.15	2240612.39	5.00
POINTSOURCE		PARK08	87.8	87.8	87.8	Lw	87.8					5.00	a	6073155.50	2240599.27	5.00

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)		(ft)	(ft)	(ft)
POINTSOURCE		PARK09	87.8	87.8	87.8	Lw	87.8					5.00	a	6073189.14	2240582.73	5.00

Line Source(s)

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Operating Time			Moving Pt. Src				Height	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	Number			Speed		
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	Day	Evening	Night	(mph)	(ft)	
LINESOURCE		TRUCK01	93.2	93.2	93.2	77.2	77.2	77.2	Lw	93.2									8	a
LINESOURCE		TRUCK02	93.2	93.2	93.2	79.0	79.0	79.0	Lw	93.2									8	a

Name	Height				Coordinates			
	Begin		End		x	y	z	Ground
	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
LINESOURCE	8.00	a			6072902.86	2240526.43	8.00	0.00
					6072904.52	2240658.08	8.00	0.00
LINESOURCE	8.00	a			6073219.96	2240535.02	8.00	0.00
					6073221.83	2240621.66	8.00	0.00

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li			Operating Time			Height	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	(ft)	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)		
AREASOURCE		DOCK01	103.4	103.4	103.4	59.0	59.0	59.0	Lw	103.4					8	a

Name	Height				Coordinates			
	Begin		End		x	y	z	Ground
	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
AREASOURCE	8.00	a			6072815.60	2240527.98	8.00	0.00
					6073008.66	2240524.55	8.00	0.00
					6072999.81	2239997.04	8.00	0.00
					6073099.04	2239994.19	8.00	0.00
					6073108.11	2240536.55	8.00	0.00
					6073370.71	2240532.96	8.00	0.00
					6073366.50	2240497.52	8.00	0.00
					6073351.78	2239919.99	8.00	0.00
					6073238.19	2239921.76	8.00	0.00
					6073235.86	2239866.37	8.00	0.00
					6072861.73	2239873.39	8.00	0.00
					6072862.36	2239920.05	8.00	0.00
					6072864.65	2240009.59	8.00	0.00
					6072810.47	2240010.16	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)
BARRIERPLANNED		0						8.00	a			6072921.93	2240526.09	8.00	0.00
												6073008.66	2240524.55	8.00	0.00
BARRIERPLANNED		0						8.00	a			6073108.11	2240536.55	8.00	0.00
												6073197.88	2240535.32	8.00	0.00
BARRIERPLANNED		0						8.00	a			6073239.21	2240534.76	8.00	0.00
												6073370.71	2240532.96	8.00	0.00
BARRIERPLANNED		0						8.00	a			6072812.71	2240528.67	8.00	0.00
												6072879.86	2240526.84	8.00	0.00

Building(s)

Name	M.	ID	RB	Residents	Absorption	Height		Coordinates			
						Begin		x	y	z	Ground
						(ft)		(ft)	(ft)	(ft)	(ft)
BUILDING		BUILDING00001	x	0		45.00	a	6073009.50	2240574.75	45.00	0.00
								6073108.73	2240573.61	45.00	0.00
								6073099.04	2239994.19	45.00	0.00
								6072999.81	2239997.04	45.00	0.00
BUILDING		BUILDING00002	x	0		45.00	a	6072810.47	2240010.16	45.00	0.00
								6072864.65	2240009.59	45.00	0.00
								6072862.36	2239920.05	45.00	0.00
								6072808.76	2239921.19	45.00	0.00
BUILDING		BUILDING00003	x	0		15.00	a	6072702.46	2240176.86	15.00	0.00
								6072802.62	2240174.39	15.00	0.00
								6072801.38	2240125.54	15.00	0.00
								6072702.46	2240124.92	15.00	0.00
BUILDING		BUILDING00004	x	0		15.00	a	6072696.28	2240113.79	15.00	0.00
								6072801.38	2240115.65	15.00	0.00
								6072801.38	2239906.67	15.00	0.00

Name	M.	ID	RB	Residents	Absorption	Height	Coordinates			
						Begin	x	y	z	Ground
						(ft)	(ft)	(ft)	(ft)	(ft)
							6072745.74	2239907.90	15.00	0.00
							6072743.88	2239968.50	15.00	0.00
							6072777.27	2239968.50	15.00	0.00
							6072777.89	2240036.51	15.00	0.00
							6072694.42	2240036.51	15.00	0.00

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APPENDIX 10.1:

CADNAA CONSTRUCTION NOISE MODEL INPUTS

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13101 - 534 Struck Ave.

CadnaA Noise Prediction Model: 13101-04_Construction.cna
Date: 23.10.22
Analyst: B. Lawson

Calculation Configuration

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

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	73.8	73.8	80.4	80.0	0.0	0.0				5.00	a	6072857.41	2240757.59	5.00
RECEIVERS		R2	66.2	66.2	72.9	80.0	0.0	0.0				5.00	a	6073285.73	2240919.33	5.00
RECEIVERS		R3	78.7	78.7	85.4	80.0	0.0	0.0				5.00	a	6073312.99	2240705.79	5.00
RECEIVERS		R4	70.3	70.3	76.9	80.0	0.0	0.0				5.00	a	6073512.27	2240711.54	5.00
RECEIVERS		R5	59.0	59.0	65.6	80.0	0.0	0.0				5.00	a	6072900.12	2239309.94	5.00
RECEIVERS		R6	57.1	57.1	63.8	80.0	0.0	0.0				5.00	a	6072750.68	2239983.95	5.00

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)		(ft)	(ft)	(ft)
CONSTRUCTION		CONS01	115.0	115.0	115.0	Lw	115					8.00	a	6073360.24	2240661.10	8.00
CONSTRUCTION		CONS03	115.0	115.0	115.0	Lw	115					8.00	a	6072857.10	2240646.89	8.00
CONSTRUCTION		CONS04	115.0	115.0	115.0	Lw	115					8.00	a	6072873.19	2239955.06	8.00

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li			Operating Time			Height	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	(ft)	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)		
SITEBOUNDARY		CONSTRUCTION	115.0	115.0	115.0	69.0	69.0	69.0	Lw	115					0	a

Name	Height				Coordinates			
	Begin		End		x	y	z	Ground
	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
SITEBOUNDARY	0.00	a			6072813.36	2240659.79	0.00	0.00
					6073148.26	2240653.51	0.00	0.00
					6073157.59	2240652.23	0.00	0.00
					6073166.57	2240649.40	0.00	0.00
					6073174.95	2240645.10	0.00	0.00
					6073182.49	2240639.46	0.00	0.00
					6073188.98	2240632.64	0.00	0.00
					6073197.52	2240627.52	0.00	0.00
					6073206.78	2240623.90	0.00	0.00
					6073216.52	2240621.86	0.00	0.00
					6073226.47	2240621.47	0.00	0.00
					6073236.34	2240622.75	0.00	0.00
					6073245.86	2240625.64	0.00	0.00
					6073254.77	2240630.07	0.00	0.00
					6073262.82	2240635.93	0.00	0.00
					6073269.78	2240643.04	0.00	0.00
					6073275.46	2240651.21	0.00	0.00
					6073279.71	2240660.21	0.00	0.00
					6073282.40	2240669.79	0.00	0.00
					6073283.47	2240679.68	0.00	0.00
					6073390.72	2240677.55	0.00	0.00
					6073380.77	2240617.80	0.00	0.00
					6073366.50	2240497.52	0.00	0.00
					6073359.26	2240316.02	0.00	0.00
					6073355.86	2240136.14	0.00	0.00
					6073350.72	2239864.22	0.00	0.00
					6072809.47	2239874.37	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		BUILDING00003	x	0		15.00	a	6072702.46	2240176.86	15.00	0.00
								6072802.62	2240174.39	15.00	0.00
								6072801.38	2240125.54	15.00	0.00
								6072702.46	2240124.92	15.00	0.00
BUILDING		BUILDING00004	x	0		15.00	a	6072696.28	2240113.79	15.00	0.00
								6072801.38	2240115.65	15.00	0.00
								6072801.38	2239906.67	15.00	0.00
								6072745.74	2239907.90	15.00	0.00
								6072743.88	2239968.50	15.00	0.00
								6072777.27	2239968.50	15.00	0.00
								6072777.89	2240036.51	15.00	0.00
								6072694.42	2240036.51	15.00	0.00