Appendix G

Noise Report

Thatcher Yard Residential

NOISE IMPACT ANALYSIS

CITY OF LOS ANGELES

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
L_{min}	Minimum level measured over the time interval
mph	Miles per hour
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PPV	Peak Particle Velocity
Project	Thatcher Yard Residential
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
VdB	Vibration Decibels

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EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise attenuation measures for the proposed Thatcher Yard Residential development ("Project"). The Project site is located at 3233 S. Thatcher Avenue in the City of Los Angeles. The Project proposes the construction of 68 affordable senior housing dwelling units and 30 affordable family housing dwelling units. This study has been prepared consistent with applicable City of Los Angeles noise standards and significance criteria, consistent with guidance provided in Appendix G of the California Environmental Quality Act (CEQA). (1)

OFF-SITE TRAFFIC NOISE ANALYSIS

Traffic generated by the proposed Project will influence the traffic noise levels in surrounding off-site areas. To quantify the off-site traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on roadway segments surrounding the Project site were estimated based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in the *Technical Memorandum - Thatcher Yard Residential Project* prepared by Linscott, Law & Greenspan, Engineers. (2) To assess the off-site noise level impacts associated with the proposed Project, noise contour boundaries were developed for Existing and Future conditions for both the with and without Project traffic conditions. The off-site traffic noise analysis shows that the Project noise level contributions will be *less than significant* at adjacent noise-sensitive land uses under all traffic scenarios.

ON-SITE TRANSPORTATION NOISE ANALYSIS

An on-site exterior transportation noise analysis has been completed to determine the potential noise exposure and to identify potential necessary noise attenuation measures for the proposed Thatcher Yard Residential Project. It is expected that the Project will not be exposed to a primary source of transportation noise impacts. The Project will, however, experience some background traffic noise impacts from adjacent local streets and the Los Angeles International Airport (LAX). However, due to the distance and intervening structures from these noise sources, transportation noise will not make a significant contribution to the noise environment at the Project site requiring detailed analysis.

The Project site is located roughly 2.6 miles north of LAX. Based on the future LAX noise level contour boundaries prepared by ESA for the Los Angeles World Airports and the Los Angeles County GIS Portal Airport Land Use Compatibility Contours as of January 2019, the Project site is located outside of the 65 dBA CNEL contour boundary of LAX. As indicated by the City of Los Angeles General Plan Noise Element, residential uses with exterior noise levels between 55 to 70 dBA CNEL are considered *conditionally acceptable*. Moreover, existing noise level measurements in the Project study area indicate that the existing ambient noise levels range from 58.0 to 67.5 dBA CNEL. Therefore, the Project residential uses are considered *conditionally acceptable*, and interior noise Project Design Features are provided to satisfy the State of California Building Code and City of Los Angeles 45 dBA CNEL interior noise level standards. As such, the Project site would

not be exposed to excessive noise levels from airport operations, and therefore, impacts are considered *less than significant*.

INTERIOR NOISE PROJECT DESIGN FEATURES

To satisfy the City of Los Angeles 45 dBA CNEL interior noise standards the Project shall provide the following or equivalent noise attenuation measures, consistent with the City of Los Angeles Building Code, Section 91.1207.11.2 45 dBA CNEL interior noise level standard:

- Windows & Glass Doors: All windows and glass doors shall be well fitted, well weather-stripped assemblies and shall have a minimum sound transmission class (STC) rating of 27.
- Exterior Doors (Non-Glass): All exterior doors shall be well weather-stripped and have minimum STC ratings of 27. Well-sealed perimeter gaps around the doors are essential to achieve the optimal STC rating. (3)
- Walls: At any penetrations of exterior walls by pipes, ducts, or conduits, the space between the wall and pipes, ducts, or conduits shall be caulked or filled with mortar to form an airtight seal.
- Roof: Roof sheathing of wood construction shall be per manufacturer's specification or caulked plywood of at least one-half inch thick. Ceilings shall be per manufacturer's specification or well-sealed gypsum board of at least one-half inch thick. Insulation with at least a rating of R-19 shall be used in the attic space.
- Ventilation: Arrangements for any habitable room shall be such that any exterior door or window can be kept closed when the room is in use and still receive circulated air. A forced air circulation system (e.g. air conditioning) or active ventilation system (e.g. fresh air supply) shall be provided which satisfies the requirements of the Uniform Building Code.

With the interior Project Design Features provided by the Project, interior noise levels in residential units are expected to meet the City of Los Angeles 45 dBA CNEL interior noise level standards for residential development.

OPERATIONAL NOISE ANALYSIS

The Project-related operational noise sources are expected to include mechanical ventilation equipment, trash enclosure activity, a pad-mounted transformer, and playground/park activity. Using reference noise levels to represent the potential noise sources within the Thatcher Yard Residential site, this analysis estimates the Project-related operational (stationary-source) noise levels at the noise-sensitive receiver locations. The proposed Project's residential land uses are considered noise-sensitive receivers. Consistent with the existing residential land use in the study area, the Project is not expected to produce any substantial off-site operational noise source activity from its residential uses.

The noise analysis shows that the Project-related operational noise levels will satisfy the City of Los Angeles exterior noise level standards at nearby off-site receiver locations, and therefore, will not generate noise levels which exceed the existing ambient conditions by 5 dBA L_{eq} during the daytime and nighttime hours, respectively. As such, the operational noise level impacts associated with the proposed Project activities, such as the mechanical ventilation equipment,

trash enclosure activity, a pad-mounted transformer, and playground/park activity, will be *less than significant*.

CONSTRUCTION NOISE ANALYSIS

Project construction is expected to create temporary and intermittent high-level noise conditions at receivers surrounding the Project site when certain activities occur at the closest point to the nearby receiver locations from the center of Project construction activity. Using sample reference noise levels to represent the planned construction activities of the Thatcher Yard Residential site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. The results of the construction noise analysis show that the unmitigated construction noise levels will satisfy the City of Los Angeles Municipal Code 75 dBA L_{eq} exterior construction noise level standard at the nearby sensitive receiver locations and will, therefore, result in a *less than significant* impact.

CONSTRUCTION VIBRATION ANALYSIS

Based on the reference vibration levels provided by the Federal Transit Administration, a large bulldozer represents the peak source of vibration with a reference velocity of 0.089 in/sec peak-particle-velocity (PPV) at 25 feet. At distances ranging from 29 to 81 feet from primary Project construction activities, construction vibration velocity levels are expected to range from 0.015 to 0.071 in/sec PPV. Based on the Caltrans older residential building damage threshold of 0.3 in/sec PPV, the proposed Project construction activities would result in vibration levels which are anticipated to remain below the threshold for building damage, and therefore, represents a *less than significant* impact.

SUMMARY OF SIGNIFICANCE FINDINGS

The results of this Thatcher Yard Residential Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report. Table ES-1 shows the findings of significance for each potential noise and/or vibration impact with Project Design Features.

TABLE ES-1: SUMMARY OF SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-Site Traffic Noise	7	*Less Than Significant*	-
On-Site Traffic Noise	8	*Less Than Significant*	-
Operational Noise	10	*Less Than Significant*	-
Construction Noise	11	*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 Thatcher Yard Residential ("Project"). This noise study describes the proposed Project, provides information regarding noise fundamentals, outlines the local regulatory setting, provides the study methods and procedures for traffic noise analysis, and evaluates the future exterior noise environment. In addition, this study includes an analysis of the potential Project-related long-term operational noise and short-term construction noise and vibration impacts.

1.1 SITE LOCATION

The proposed Thatcher Yard Residential Project is located at 3233 S. Thatcher Avenue in the City of Los Angeles, as shown on Exhibit 1-A. Existing land uses in the Project study area include residential uses to the north, south, east, and west.

1.2 PROJECT DESCRIPTION

The Project proposes the construction of 68 affordable senior housing dwelling units and 30 affordable family housing dwelling units, as shown on Exhibit 1-B.

Project-related stationary-source (operational) noise sources are expected to include: mechanical ventilation equipment, trash enclosure activity, a pad-mounted transformer, and playground/park activity. The proposed residential land uses are considered noise-sensitive receiving land uses and are not expected to include any specific type of operational noise levels beyond the typical noise sources associated with existing residential land use in the Project study area.

EXHIBIT 1-A: LOCATION MAP

EXHIBIT 1-B: SITE PLAN

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2 FUNDAMENTALS

Noise has been 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. (4) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 100 feet, which can cause serious discomfort. (5) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most commonly used figure is the equivalent level (L_{eq}). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period 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 Day-Night Average Noise Level (LDN) and the Community Noise Equivalent Level (CNEL), representing a composite 24- hour noise level is utilized. The LDN and CNEL are weighted averages of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The LDN time of day corrections include the addition of 10 decibels to dBA L_{eq} sound levels at night between 10:00 p.m. and 7:00 a.m. The CNEL 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., in addition to the corrections for the LDN. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. LDN and CNEL do not represent the actual sound level heard at any time, but rather represent the total sound exposure. The City of Los Angeles relies on the 24-hour LDN level to assess land use compatibility with transportation related noise sources, however, this analysis uses the CNEL noise level to apply the more conservative evening hour corrections to the 24-hour noise levels.

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.

2.3.2 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.

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.

2.3.4 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 resident. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The FHWA does not consider the planting of vegetation to be a noise abatement measure.

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 be high enough and long enough to block the path of the noise source. (6)

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. (7)

2.7 COMMUNITY RESPONSE TO NOISE

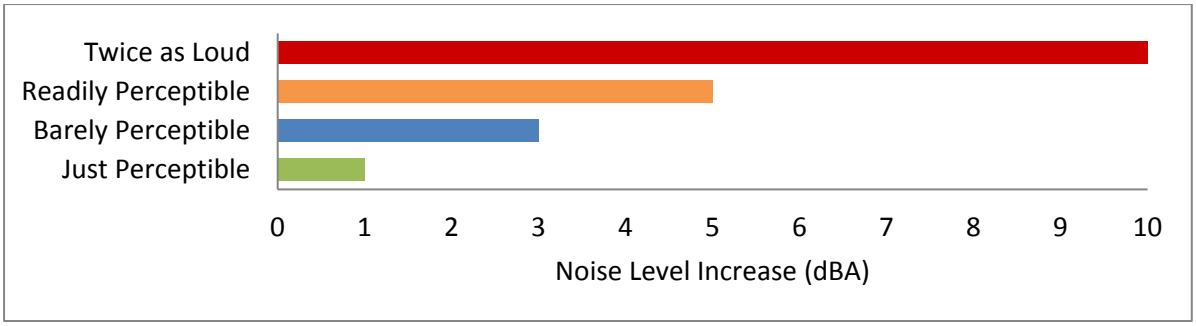
Community responses to noise may range from registering a complaint by telephone or letter, to initiating court action, depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

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

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Another twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (8) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (8)

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. An increase or decrease of 1 dBA cannot be perceived except in carefully controlled laboratory experiments, a change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (6)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



2.8 EXPOSURE TO HIGH NOISE LEVELS

The Occupational Safety and Health Administration (OSHA) sets legal limits on noise exposure in the workplace. The permissible exposure limit (PEL) for a worker over an eight-hour day is 90 dBA. The OSHA standard uses a 5 dBA exchange rate. This means that when the noise level is increased by 5 dBA, the amount of time a person can be exposed to a certain noise level to receive the same dose is cut in half. The National Institute for Occupational Safety and Health (NIOSH) has recommended that all worker exposures to noise should be controlled below a level equivalent to 85 dBA for eight hours to minimize occupational noise induced hearing loss. NIOSH also recommends a 3 dBA exchange rate so that every increase by 3 dBA doubles the amount of the noise and halves the recommended amount of exposure time. (9)

OSHA has implemented requirements to protect all workers in general industry (e.g. the manufacturing and the service sectors) for employers to implement a Hearing Conservation Program where workers are exposed to a time weighted average noise level of 85 dBA or higher over an eight-hour work shift. Hearing Conservation Programs require employers to measure noise levels, provide free annual hearing exams and free hearing protection, provide training, and conduct evaluations of the adequacy of the hearing protectors in use unless changes to tools, equipment and schedules are made so that they are less noisy and worker exposure to noise is less than the 85 dBA. This noise study does not evaluate the noise exposure of workers within a project or construction site based on CEQA requirements, and instead, evaluates Project-related operational and construction noise levels at the nearby sensitive receiver locations in the Project study area. Further, periodic exposure to high noise levels in short duration, such as Project construction, is typically considered an annoyance and not impactful to human health. It would take several years of exposure to high noise levels to result in hearing impairment. (10)

2.9 VIBRATION

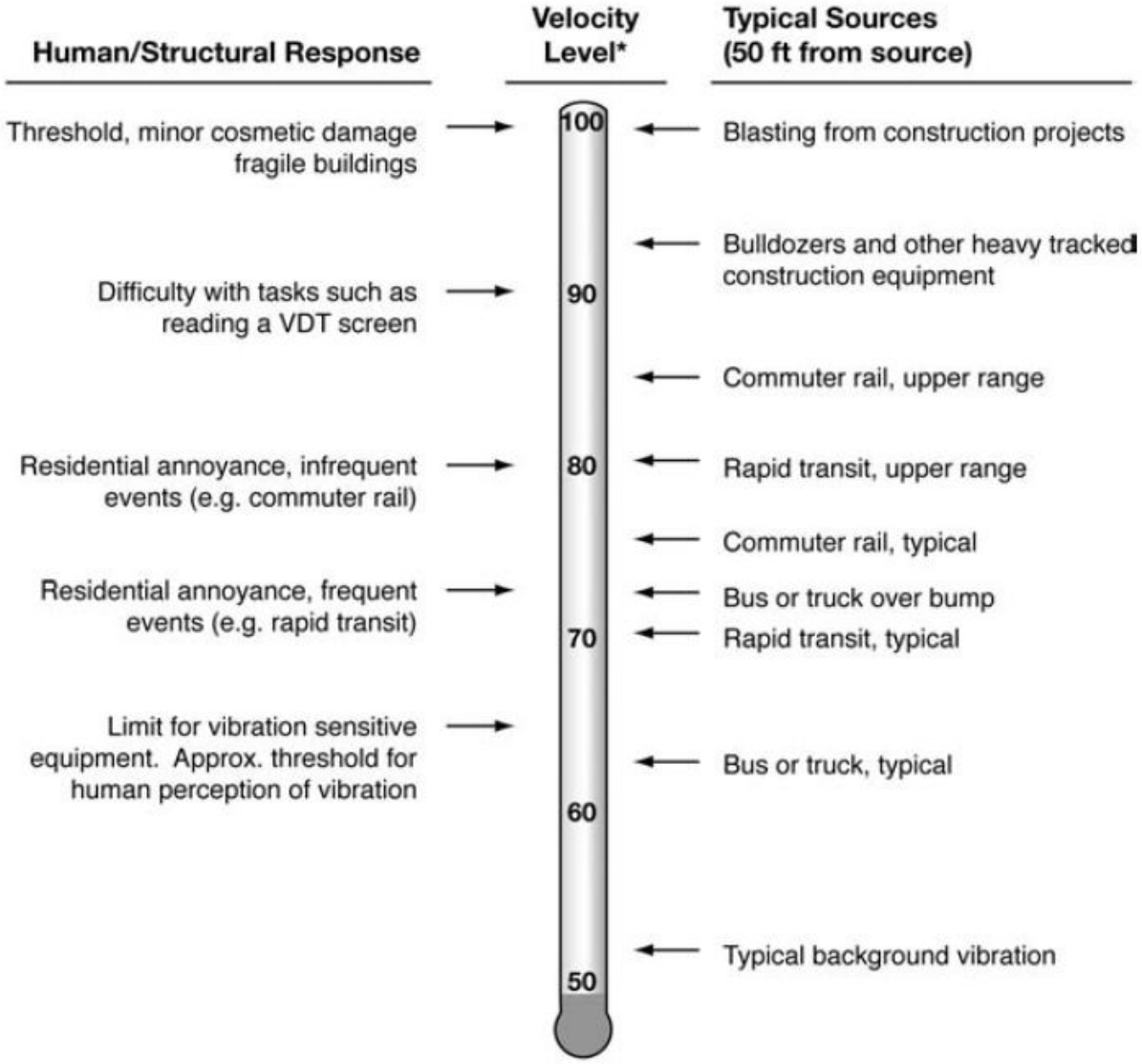
Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment* (11), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions.

As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

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

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 Impact and Vibration Assessment.

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3 REGULATORY SETTING

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

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research. (12) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including the potential environmental noise impacts.

3.2 STATE OF CALIFORNIA BUILDING CODE

The State of California's noise insulation standards are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2, and the California Building Code. These noise standards are applied to new construction in California for controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are developed near major transportation noise sources, and where such noise sources create an exterior noise level of 60 dBA CNEL or higher. Acoustical studies that accompany building plans for noise-sensitive land uses must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new residential buildings, schools, and hospitals, the acceptable interior noise limit for new construction is 45 dBA CNEL.

3.3 CITY OF LOS ANGELES GENERAL PLAN NOISE ELEMENT

The City of Los Angeles has adopted a Noise Element of the General Plan to identify goals, objectives, and policies for managing noise issues within the City. (13) The following goal and objectives are identified in the General Plan Noise Element:

Goal	*A city where noise does not reduce the quality of urban life.*
Objective 1	*Reduce airport and harbor related noise impacts.*

Objective 2 *Reduce or eliminate nonairport related intrusive noise, especially relative to noise sensitive uses.*

Objective 3 *Reduce or eliminate noise impacts associated with proposed development of land and changes in land use.*

Exhibit I of the City of Los Angeles General Plan Noise Element identifies *Guidelines for Noise Compatible Land Use* to evaluate the potential impacts of transportation-related noise. Multi-family residential land use, such as the Project, is considered *conditionally acceptable* with unmitigated exterior noise levels of less than 65 dBA CNEL. For *conditionally acceptable* exterior noise levels, n*ew construction or development only after a detailed analysis of noise mitigation is made and needed noise insulation features are included in project design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning normally will suffice.* (13)

3.4 CITY OF LOS ANGELES OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Thatcher Yard Residential Project, stationary-source (operational) noise such as the expected mechanical ventilation equipment, trash enclosure activity, a pad-mounted transformer, and playground/park activity are typically evaluated against standards established under a jurisdiction's Municipal Code or General Plan.

The City of Los Angeles Municipal Code, Chapter XI *Noise Regulation,* has set exterior noise limits to control community noise impacts from non-transportation noise sources (such as air-conditioning units, refrigeration, heating, pumping, and filtering equipment). Section 112.02 indicates that stationary noise sources shall not operate in such a manner as to cause the noise level at any sensitive use to exceed the existing ambient noise level by 5 dBA. (14) The City of Los Angeles Municipal Code, Chapter XI, is provided in Appendix 3.1.

3.5 CITY OF LOS ANGELES CONSTRUCTION NOISE STANDARDS

Section 112.05 of the City's Municipal Code identifies exterior noise level limits for construction equipment *in any residential zone or within 500 feet thereof*, as follows: (14)

- *75dB(A) for construction, industrial, and agricultural machinery including crawler-tractors, dozers, rotary drills and augers, loaders, power shovels, cranes, derricks, motor graders, paving machines, off-highway trucks, ditchers, trenchers, compactors, scrapers, wagons, pavement breakers, compressors and pneumatic or other powered equipment.*

Therefore, for the purpose of this noise study, the City of Los Angeles Municipal Code 75 dBA L_{eq} threshold is used to determine potential Project-related construction noise level impacts at nearby sensitive receiver locations.

3.6 CONSTRUCTION VIBRATION STANDARDS

The City of Los Angeles General Plan and Municipal Code do not identify specific vibration level standards. Therefore, applicable vibration standards identified by the California Department of Transportation ("Caltrans") *Transportation and Construction Vibration Guidance Manual* are used in this noise study. (4) The Caltrans vibration manual establishes thresholds for determining potential vibration impacts resulting in building damage. For older residential structures, Caltrans identifies a building damage threshold of 0.3 in/sec PPV which is used in this analysis to evaluate potential Project-related construction vibration impacts at the adjacent receiver locations.

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4 SIGNIFICANCE CRITERIA

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

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

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

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

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

4.1 CEQA GUIDELINES NOT FURTHER ANALYZED

The Project site is located roughly 2.6 miles north of LAX. Based on the future LAX noise level contour boundaries prepared by ESA for the Los Angeles World Airports and the Los Angeles County GIS Portal Airport Land Use Compatibility Contours as of January 2019, the Project site is located outside of the 65 dBA CNEL contour boundary of LAX. As indicated by the City of Los Angeles General Plan Noise Element, residential uses with exterior noise levels between 55 to 70 dBA CNEL are considered *conditionally acceptable*. Moreover, existing noise level measurements in the Project study area indicate that the existing ambient noise levels range from 58.0 to 67.5 dBA CNEL. Therefore, the Project residential uses are considered *conditionally acceptable*, and interior noise Project Design Features are provided to satisfy the State of California Building Code and City of Los Angeles 45 dBA CNEL interior noise level standards. As such, the Project site would not be exposed to excessive noise levels from airport operations, and therefore, impacts are considered *less than significant,* and no further noise analysis is conducted in relation to Guideline C.

4.2 SIGNIFICANCE CRITERIA

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 4-1 shows the significance criteria summary matrix.

OFF-SITE OPERATIONAL TRAFFIC NOISE

- When the noise levels at existing and future noise-sensitive land uses (e.g. residential, etc.):
  - are less than 60 dBA CNEL and the Project creates a *readily perceptible* 5 dBA CNEL or greater Project-related noise level increase; or
  - range from 60 to 65 dBA CNEL and the Project creates a *barely perceptible* 3 dBA CNEL or greater Project-related noise level increase; or
  - already exceed 65 dBA CNEL, and the Project creates a community noise level impact of greater than 1.5 dBA CNEL (FICON, 1992).

ON-SITE TRANSPORTATION NOISE

- If the on-site exterior noise levels exceed the *conditionally acceptable* 65 dBA CNEL and the interior noise levels exceed 45 dBA CNEL at the residential uses located within the Project site (City of Los Angeles General Plan Noise Element and Building Code, Section 91.1207.11.2).

OPERATIONAL STATIONARY-SOURCE NOISE

- If Project-related operational (stationary source) noise levels exceed the exterior ambient noise levels at adjacent sensitive receiver locations by 5 dBA L_{eq} (City of Los Angeles Municipal Code, Section 112.02).

CONSTRUCTION NOISE AND VIBRATION

- If Project-related construction activities generate noise levels which exceed the exterior noise level standard of 75 dBA L_{eq} at adjacent sensitive receiver locations (City of Los Angeles Municipal Code, Section 112.05).
- If short-term Project generated construction vibration levels exceed Caltrans building damage vibration standard of 0.3 in/sec PPV at sensitive receiver locations (Caltrans Transportation and Construction Vibration Guidance Manual, Table 19).

TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site Traffic Noise[1]	Noise-Sensitive[1]	if ambient is < 60 dBA CNEL	≥ 5 dBA CNEL Project increase	
		if ambient is 60 - 65 dBA CNEL	≥ 3 dBA CNEL Project increase	
		if ambient is > 65 dBA CNEL	≥ 1.5 dBA CNEL Project increase	
On-Site Traffic Noise[2]	Residential	Exterior Noise Level Standards	65 dBA CNEL	
		Interior Noise Level Standards	45 dBA CNEL	
Operational Noise[3]	Noise-Sensitive	Exterior Noise Level Standards	Existing Ambient Noise Level plus 5 dBA L_{eq}	
Construction Noise & Vibration	Noise-Sensitive	Exterior Noise Level Standards[4]	75 dBA L_{eq}	n/a
		Vibration Level Threshold[5]	0.3 in/sec PPV	n/a

[1] Source: FICON, 1992.
[2] Sources: City of Los Angeles General Plan Noise Element, and Building Code, Section 91.1207.11.2 Allowable Interior Noise Levels.
[3] Source: City of Los Angeles Municipal Code, Section 112.02 (Appendix 3.1).
[4] Source: City of Los Angeles Municipal Code, Section 112.05 (Appendix 3.1).
[5] Source: Caltrans, Transportation & Construction Vibration Guidance Manual, September 2013.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.; "n/a" = No construction activity is permitted during the nighttime hours.

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, six 24-hour noise level measurements were taken at sensitive receiver 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 Tuesday, January 8th, 2019. Appendix 5.1 provides a series of study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (15)

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 any 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*. (4) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (11)

Based on recommendations of Caltrans and the FTA, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. (11) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby

sensitive receiver locations allows for a comparison of the before and after Project noise levels and is necessary to assess potential noise impacts due to the Project's contribution to the ambient noise levels.

5.3 NOISE MEASUREMENT RESULTS

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

- Location L1 represents the noise levels on Princeton Drive near the northern boundary of the Project site and existing single-family residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 59.9 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 56.7 dBA L_{eq} with an average nighttime noise level of 52.3 dBA L_{eq}.
- Location L2 represents the noise levels on Thatcher Avenue near the eastern boundary of the Project site and Mirabella Apartment Homes. The noise level measurements collected show an overall 24-hour exterior noise level of 58.1 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 56.2 dBA L_{eq} with an average nighttime noise level of 49.6 dBA L_{eq}.
- Location L3 represents the noise levels on Thatcher Avenue near the eastern boundary of the Project site and Mirabella Apartment Homes. The 24-hour CNEL indicates that the overall exterior noise level is 58.0 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 56.3 dBA L_{eq} with an average nighttime noise level of 49.3 dBA L_{eq}.
- Location L4 represents the noise levels on Thatcher Avenue near the southern boundary of the Project site and Harbor Crossing Lane. The noise level measurements collected show an overall 24-hour exterior noise level of 59.3 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 57.2 dBA L_{eq} with an average nighttime noise level of 51.0 dBA L_{eq}.
- Location L5 represents the noise levels on Oxford Avenue near the southwestern boundary of the Project site and existing single-family residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 58.5 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 54.2 dBA L_{eq} with an average nighttime noise level of 51.3 dBA L_{eq}.
- Location L6 represents the noise levels on Oxford Avenue near the western boundary of the Project site and existing single-family residential homes. The 24-hour CNEL indicates that the overall exterior noise level is 67.5 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 59.3 dBA L_{eq} with an average nighttime noise level of 60.9 dBA L_{eq}.

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

The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with the arterial roadway network. This includes auto and heavy truck activity near the noise level measurement locations. The 24-hour existing noise level measurements shown on Table 5-1 present the worst-case existing unmitigated ambient noise conditions.

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

Location[1]	Distance to Project Boundary (Feet)	Description	Energy Average Noise Level (dBA L_{eq})[2]		CNEL
			Daytime	Nighttime	
L1	48'	Located on Princeton Drive near the northern boundary of the Project site and existing single-family residential homes.	56.7	52.3	59.9
L2	0'	Located on Thatcher Avenue near the eastern boundary of the Project site and Mirabella Apartment Homes.	56.2	49.6	58.1
L3	0'	Located on Thatcher Avenue near the eastern boundary of the Project site and Mirabella Apartment Homes.	56.3	49.3	58.0
L4	50'	Located on Thatcher Avenue near the southern boundary of the Project site and Harbor Crossing Lane.	57.2	51.0	59.3
L5	50'	Located on Oxford Avenue near the southwestern boundary of the Project site and existing single-family residential homes.	54.2	51.3	58.5
L6	0'	Located on Oxford Avenue near the western boundary of the Project site and existing single-family residential homes.	59.3	60.9	67.5

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

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

6 METHODS AND PROCEDURES

The following section outlines the methods and procedures used to model and analyze the future traffic noise environment.

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The estimated roadway noise impacts from vehicular traffic were calculated using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (16) 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. (17) 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.

6.2 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 study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of Los Angeles General Plan Mobility Element. For this analysis, soft site conditions are used to analyze the traffic noise impacts within the Project study area. Soft site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. Caltrans' research has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model as used in this off-site traffic noise analysis. (18)

The Existing and Future average daily traffic volumes used for this study are presented on Table 6-2 and were provided by the *Technical Memorandum - Thatcher Yard Residential Project*. (2) Table 6-3 presents the time of day vehicle splits by vehicle type, and Table 6-4 presents the total traffic flow distributions (vehicle mixes) used in this analysis. The vehicle mix provides the hourly distribution percentages of automobile, medium trucks and heavy trucks for input into the FHWA Model based on roadway types.

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Distance From Centerline to Nearest Adjacent Land Use (Feet)[2]	Vehicle Speed (mph)[3]
1	Lincoln Bl.	n/o W. Washington Bl.	68'	40
2	Lincoln Bl.	s/o W. Washington Bl.	68'	40
3	Lincoln Bl.	n/o Jefferson Wy.	68'	40
4	Lincoln Bl.	s/o Jefferson Wy.	68'	40
5	Lincoln Bl.	n/o Maxella Av.	68'	40
6	Lincoln Bl.	s/o Maxella Av.	68'	40
7	Lincoln Bl.	s/o Marina Expy.	68'	40
8	W. Washington Bl.	w/o Lincoln Bl.	55'	35
9	W. Washington Bl.	e/o Lincoln Bl.	55'	35
10	Jefferson Wy.	w/o Lincoln Bl.	30'	25
11	Maxella Av.	e/o Lincoln Bl.	50'	40
12	Marina Expy.	e/o Lincoln Bl.	52'	40

[1] Distance to adjacent land use is based upon the right-of-way distances for each functional roadway classification provided in the City of Los Angeles General Plan Mobility Element.
[2] Posted speed limits.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic (1,000's)[1]			
			Existing		Future	
			Without Project	With Project	Without Project	With Project
1	Lincoln Bl.	n/o W. Washington Bl.	31.7	31.8	33.7	33.7
2	Lincoln Bl.	s/o W. Washington Bl.	40.8	40.9	43.3	43.4
3	Lincoln Bl.	n/o Jefferson Wy.	41.6	41.7	44.2	44.3
4	Lincoln Bl.	s/o Jefferson Wy.	41.6	41.7	44.1	44.2
5	Lincoln Bl.	n/o Maxella Av.	38.5	38.6	40.9	41.0
6	Lincoln Bl.	s/o Maxella Av.	44.2	44.3	46.9	47.0
7	Lincoln Bl.	s/o Marina Expy.	34.4	34.5	36.5	36.6
8	W. Washington Bl.	w/o Lincoln Bl.	23.7	23.7	25.1	25.2
9	W. Washington Bl.	e/o Lincoln Bl.	22.7	22.7	24.1	24.1
10	Jefferson Wy.	w/o Lincoln Bl.	2.0	2.2	2.1	2.3
11	Maxella Av.	e/o Lincoln Bl.	11.2	11.3	11.9	11.9
12	Marina Expy.	e/o Lincoln Bl.	22.3	22.3	23.6	23.7

[1] Source: Technical Memorandum - Thatcher Yard Residential Project, Linscott, Law & Greenspan, Engineers.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

Time Period	Vehicle Type		
	Autos	Medium Trucks	Heavy Trucks
Daytime (7:00 a.m. - 7:00 p.m.)	77.50%	84.80%	86.50%
Evening (7:00 p.m. - 10:00 p.m.)	12.90%	4.90%	2.70%
Nighttime (10:00 p.m. - 7:00 p.m.)	9.60%	10.30%	10.80%
Total:	100.00%	100.00%	100.00%

Source: Typical southern California vehicle mix.

TABLE 6-4: DISTRIBUTION OF TRAFFIC FLOW BY VEHICLE TYPE (VEHICLE MIX)

Roadway	Total % Traffic Flow			Total
	Autos	Medium Trucks	Heavy Trucks	
All Roadways	97.42%	1.84%	0.74%	100.00%

Source: Typical southern California vehicle mix.

6.3 CONSTRUCTION VIBRATION ASSESSMENT

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

However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 6-5. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate potential vibration impacts with the following vibration assessment methods defined by the FTA. To describe potential vibration impacts the FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 6-5: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

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

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, September 2018.

7 OFF-SITE TRANSPORTATION NOISE IMPACTS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed based on the *Technical Memorandum - Thatcher Yard Residential Project*. (2) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

- Existing Without / With Project Conditions: This scenario refers to the existing present-day noise conditions, without and with the proposed Project.
- Future Without / With Project: This scenario refers to the background future noise conditions without and with the proposed Project, and includes all cumulative projects identified in the Traffic Impact Analysis.

7.1 TRAFFIC NOISE CONTOURS

To quantify the Project's operational traffic noise impacts on the surrounding areas, the changes in traffic noise levels on the study area roadway segments conveying Project traffic were calculated based on the changes in the average daily traffic volumes. 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 affect ambient noise levels. In addition, since the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contribution from any surrounding stationary noise sources within the Project study area. Tables 7-1 to 7-4 present a summary of the exterior traffic noise levels for the study area roadway segments analyzed from the without Project to the with Project conditions in each of the two timeframes: Existing and Future conditions. Appendix 7.1 includes a summary of the traffic noise level contours for each of the traffic scenarios.

TABLE 7-1: EXISTING WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	CNEL at Nearest Adjacent Land Use (dBA)	Distance to Contour from Centerline (Feet)[1]		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Lincoln Bl.	n/o W. Washington Bl.	63.5	RW	116	250
2	Lincoln Bl.	s/o W. Washington Bl.	64.6	RW	137	295
3	Lincoln Bl.	n/o Jefferson Wy.	64.7	RW	139	299
4	Lincoln Bl.	s/o Jefferson Wy.	64.7	RW	139	299
5	Lincoln Bl.	n/o Maxella Av.	64.3	RW	132	284
6	Lincoln Bl.	s/o Maxella Av.	64.9	RW	145	311
7	Lincoln Bl.	s/o Marina Expy.	63.8	RW	122	264
8	W. Washington Bl.	w/o Lincoln Bl.	61.9	RW	75	162
9	W. Washington Bl.	e/o Lincoln Bl.	61.8	RW	73	157
10	Jefferson Wy.	w/o Lincoln Bl.	51.1	RW	RW	RW
11	Maxella Av.	e/o Lincoln Bl.	60.7	RW	56	122
12	Marina Expy.	e/o Lincoln Bl.	63.7	RW	94	202

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

TABLE 7-2: EXISTING WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	CNEL at Nearest Adjacent Land Use (dBA)	Distance to Contour from Centerline (Feet)[1]		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Lincoln Bl.	n/o W. Washington Bl.	63.5	RW	116	250
2	Lincoln Bl.	s/o W. Washington Bl.	64.6	RW	137	296
3	Lincoln Bl.	n/o Jefferson Wy.	64.7	RW	139	300
4	Lincoln Bl.	s/o Jefferson Wy.	64.7	RW	139	300
5	Lincoln Bl.	n/o Maxella Av.	64.3	RW	132	285
6	Lincoln Bl.	s/o Maxella Av.	64.9	RW	145	312
7	Lincoln Bl.	s/o Marina Expy.	63.9	RW	123	264
8	W. Washington Bl.	w/o Lincoln Bl.	61.9	RW	75	162
9	W. Washington Bl.	e/o Lincoln Bl.	61.8	RW	73	157
10	Jefferson Wy.	w/o Lincoln Bl.	51.6	RW	RW	RW
11	Maxella Av.	e/o Lincoln Bl.	60.7	RW	57	122
12	Marina Expy.	e/o Lincoln Bl.	63.7	RW	94	202

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

TABLE 7-3: FUTURE WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	CNEL at Nearest Adjacent Land Use (dBA)	Distance to Contour from Centerline (Feet)[1]		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Lincoln Bl.	n/o W. Washington Bl.	63.8	RW	121	260
2	Lincoln Bl.	s/o W. Washington Bl.	64.8	RW	143	307
3	Lincoln Bl.	n/o Jefferson Wy.	64.9	RW	145	311
4	Lincoln Bl.	s/o Jefferson Wy.	64.9	RW	144	311
5	Lincoln Bl.	n/o Maxella Av.	64.6	RW	137	296
6	Lincoln Bl.	s/o Maxella Av.	65.2	70	150	324
7	Lincoln Bl.	s/o Marina Expy.	64.1	RW	127	274
8	W. Washington Bl.	w/o Lincoln Bl.	62.2	RW	78	168
9	W. Washington Bl.	e/o Lincoln Bl.	62.0	RW	76	163
10	Jefferson Wy.	w/o Lincoln Bl.	51.4	RW	RW	RW
11	Maxella Av.	e/o Lincoln Bl.	60.9	RW	59	127
12	Marina Expy.	e/o Lincoln Bl.	64.0	RW	97	210

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

TABLE 7-4: FUTURE WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	CNEL at Nearest Adjacent Land Use (dBA)	Distance to Contour from Centerline (Feet)[1]		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Lincoln Bl.	n/o W. Washington Bl.	63.8	RW	121	260
2	Lincoln Bl.	s/o W. Washington Bl.	64.9	RW	143	308
3	Lincoln Bl.	n/o Jefferson Wy.	64.9	RW	145	312
4	Lincoln Bl.	s/o Jefferson Wy.	64.9	RW	145	311
5	Lincoln Bl.	n/o Maxella Av.	64.6	RW	138	296
6	Lincoln Bl.	s/o Maxella Av.	65.2	70	151	325
7	Lincoln Bl.	s/o Marina Expy.	64.1	RW	127	275
8	W. Washington Bl.	w/o Lincoln Bl.	62.2	RW	78	168
9	W. Washington Bl.	e/o Lincoln Bl.	62.0	RW	76	163
10	Jefferson Wy.	w/o Lincoln Bl.	51.7	RW	RW	RW
11	Maxella Av.	e/o Lincoln Bl.	60.9	RW	59	127
12	Marina Expy.	e/o Lincoln Bl.	64.0	RW	98	211

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

7.2 EXISTING PLUS PROJECT BUILDOUT CONDITION PROJECT TRAFFIC NOISE LEVELS

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project (E+P) has been included in this report for information purposes. However, the analysis of existing traffic noise levels plus traffic noise generated by the proposed Project (E+P) scenario will not actually occur since the Project would not be fully constructed and operational until Future Year conditions.

Table 7-5 presents a comparison of the Existing without and with Project conditions CNEL noise levels. Table 7-1 presents the Existing without Project conditions noise level contours that are expected to range from 51.1 to 64.9 dBA CNEL. Table 7-2 shows the Existing with Project conditions noise level contours that are expected to range from 51.6 to 64.9 dBA CNEL. As shown on Table 7-5 the Project is expected to generate an exterior noise level increase under Existing with Project conditions ranging from 0.0 to 0.5 dBA CNEL at the roadway segments identified herein.

TABLE 7-5: EXISTING CONDITION OFF-SITE PROJECT-RELATED TRAFFIC NOISE INCREASES

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)[1]		
			No Project	With Project	Project Addition
1	Lincoln Bl.	n/o W. Washington Bl.	63.5	63.5	0.0
2	Lincoln Bl.	s/o W. Washington Bl.	64.6	64.6	0.0
3	Lincoln Bl.	n/o Jefferson Wy.	64.7	64.7	0.0
4	Lincoln Bl.	s/o Jefferson Wy.	64.7	64.7	0.0
5	Lincoln Bl.	n/o Maxella Av.	64.3	64.3	0.0
6	Lincoln Bl.	s/o Maxella Av.	64.9	64.9	0.0
7	Lincoln Bl.	s/o Marina Expy.	63.8	63.9	0.1
8	W. Washington Bl.	w/o Lincoln Bl.	61.9	61.9	0.0
9	W. Washington Bl.	e/o Lincoln Bl.	61.8	61.8	0.0
10	Jefferson Wy.	w/o Lincoln Bl.	51.1	51.6	0.5
11	Maxella Av.	e/o Lincoln Bl.	60.7	60.7	0.0
12	Marina Expy.	e/o Lincoln Bl.	63.7	63.7	0.0

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.

7.3 FUTURE PROJECT TRAFFIC NOISE LEVELS

Table 7-6 presents a comparison of the Future without and with Project conditions CNEL noise levels. Table 7-3 presents the Future without Project conditions noise level contours that are expected to range from 51.4 to 65.2 dBA CNEL. Table 7-4 shows the Future with Project conditions noise level contours that are expected to range from 51.7 to 65.2 dBA CNEL. As shown on Table 7-6 the Project is expected to generate an exterior noise level increase of up to 0.3 dBA CNEL, and will satisfy the significance thresholds identified in Section 4 on all roadway segments adjacent to noise-sensitive receiver locations. Therefore, the off-site Project-related traffic noise level increases are considered *less than significant* under Future conditions at the roadway segments identified herein.

TABLE 7-6: FUTURE OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)[1]			Threshold Exceeded?[2]
			No Project	With Project	Project Addition	
1	Lincoln Bl.	n/o W. Washington Bl.	63.8	63.8	0.0	No
2	Lincoln Bl.	s/o W. Washington Bl.	64.8	64.9	0.1	No
3	Lincoln Bl.	n/o Jefferson Wy.	64.9	64.9	0.0	No
4	Lincoln Bl.	s/o Jefferson Wy.	64.9	64.9	0.0	No
5	Lincoln Bl.	n/o Maxella Av.	64.6	64.6	0.0	No
6	Lincoln Bl.	s/o Maxella Av.	65.2	65.2	0.0	No
7	Lincoln Bl.	s/o Marina Expy.	64.1	64.1	0.0	No
8	W. Washington Bl.	w/o Lincoln Bl.	62.2	62.2	0.0	No
9	W. Washington Bl.	e/o Lincoln Bl.	62.0	62.0	0.0	No
10	Jefferson Wy.	w/o Lincoln Bl.	51.4	51.7	0.3	No
11	Maxella Av.	e/o Lincoln Bl.	60.9	60.9	0.0	No
12	Marina Expy.	e/o Lincoln Bl.	64.0	64.0	0.0	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[2] Significance Criteria (Section 4).

8 ON-SITE TRANSPORTATION NOISE IMPACTS

An on-site exterior transportation noise analysis has been completed to determine the potential noise exposure and to identify potential necessary noise attenuation measures for the proposed Thatcher Yard Residential Project. It is expected that the Project will not be exposed to a primary source of transportation noise impacts. The Project will, however, experience some background traffic noise impacts from adjacent local streets and the Los Angeles International Airport (LAX). However, due to the distance and intervening structures from these noise sources, transportation noise will not make a significant contribution to the noise environment at the Project site requiring detailed analysis, as previously discussed in Section 4.1.

INTERIOR NOISE PROJECT DESIGN FEATURES

With the interior Project Design Features provided in the Executive Summary, interior noise levels in residential units are expected to meet the City of Los Angeles 45 dBA CNEL interior noise level standards for residential development.

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9 RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction impacts, the following receiver locations as shown on Exhibit 9-A were identified as representative locations for analysis. The City of Los Angeles General Plan Noise Element defines noise-sensitive uses as: *single-family and multi-unit dwellings, long-term care facilities (including convalescent and retirement facilities), dormitories, motels, hotels, transient lodgings and other residential uses; houses of worship; hospitals; libraries; schools; auditoriums; concert halls; outdoor theaters; nature and wildlife preserves, and parks*. 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, natural open space, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

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.

R1: Located approximately 69 feet northwest of the Project site, R1 represents existing residential homes on the north side of Princeton Drive. A 24-hour noise level measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the existing residential apartment building located approximately 73 feet northeast of the Project site on the east side of Thatcher Avenue. A 24-hour noise level measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents the existing residential apartment building located roughly 49 feet from the Project site boundary on the east side of Thatcher Avenue. The first-floor of this building is a parking garage, and as such, only second-floor receiver locations are analyzed in this noise study at R3. A 24-hour noise level measurement was taken near this location, L3, to describe the existing ambient noise environment.

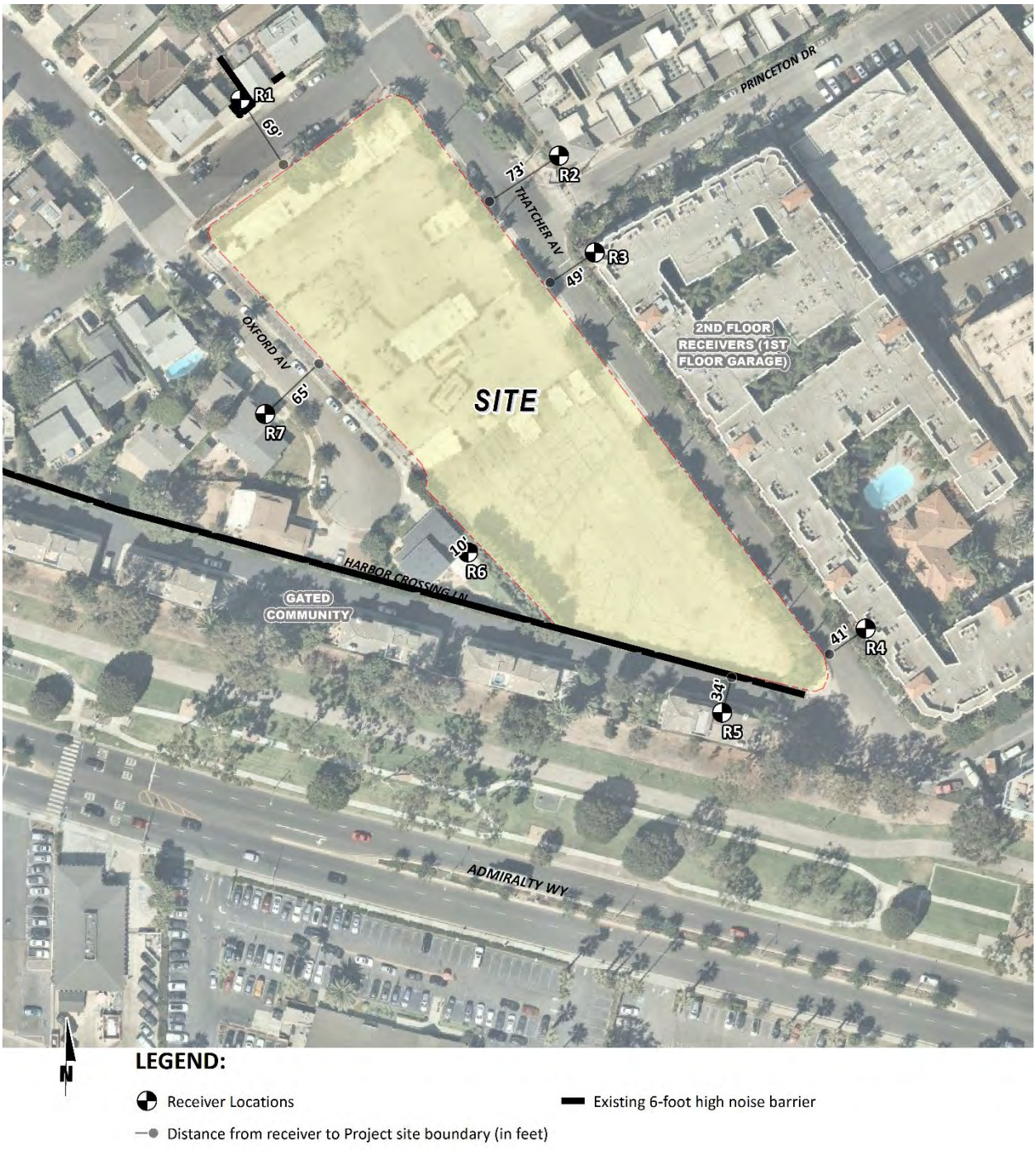
R4: Location R4 represents the existing residential apartment building located roughly 41 feet from the Project site boundary on the east side of Thatcher Avenue. The first-floor of this building is a parking garage, and as such, only second-floor receiver locations are analyzed in this noise study at R4. A 24-hour noise level measurement was taken near this location, L4, to describe the existing ambient noise environment.

R5: Location R5 represents existing residential homes within a gated community located approximately 34 feet south of the Project site on Harbor Crossing Lane. A 24-hour noise level measurement was taken near this location, L4, to describe the existing ambient noise environment.

R6: Location R6 represents the residential home and outdoor living area (backyard) located roughly 10 feet from the Project site boundary on the cul-de-sac of Oxford Avenue. A 24-hour noise level measurement was taken near this location, L5, to describe the existing ambient noise environment.

R7: Location R7 represents the existing residential homes located west of the Project site, at roughly 65 feet, on the west side of Oxford Avenue. A 24-hour noise level measurement was taken near this location, L5, to describe the existing ambient noise environment.

EXHIBIT 9-A: RECEIVER LOCATIONS



10 OPERATIONAL NOISE IMPACTS

This section analyzes the potential stationary-source operational noise impacts due to the Project's stationary noise sources on the off-site sensitive receiver locations identified in Section 9. Exhibit 10-A identifies the noise source locations used to assess the Project-related operational noise levels.

10.1 OPERATIONAL NOISE SOURCES

Project-related stationary-source (operational) noise sources are expected to include: mechanical ventilation equipment, trash enclosure activity, a pad-mounted transformer, and playground/park activity. Further, the proposed residential land uses are considered noise-sensitive receiving land uses and are not expected to include any specific type of operational noise levels beyond the typical noise sources associated with existing residential land use in the Project study area.

10.2 REFERENCE NOISE LEVELS

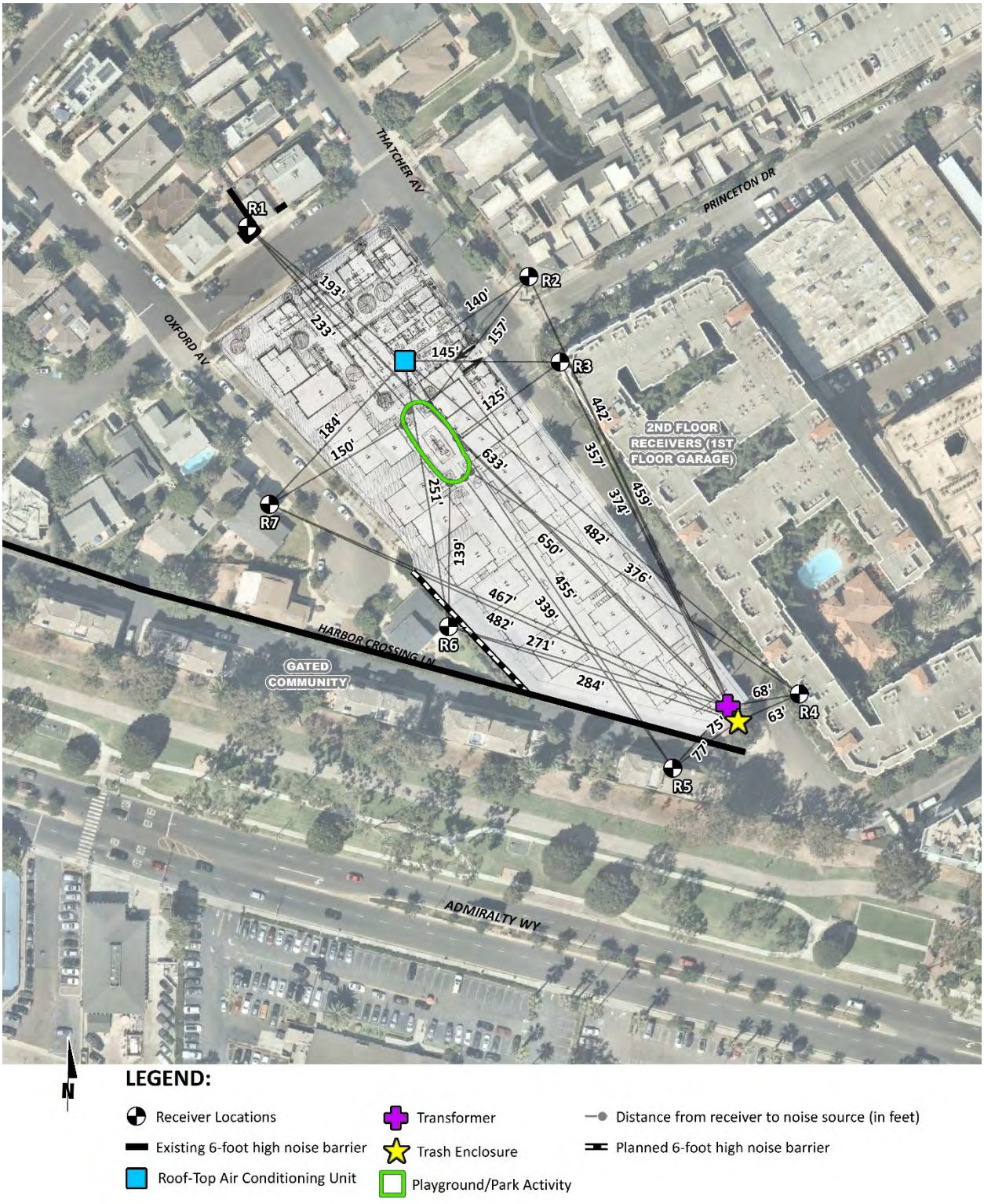
To estimate the Project operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. Table 10-1 presents a summary of the reference noise level measurements used in this analysis to describe the Project operational noise levels.

TABLE 10-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source	Duration (hh:mm:ss)	Dist. From Source (Feet)	Noise Source Height (Feet)	Reference Noise Level (dBA L_{eq})	
				@ Ref. Dist.	@ 50 Feet
Mechanical Ventilation Equipment[1]	96:00:00	5'	5'	77.2	57.2
Trash Enclosure Activity[2]	00:00:32	5'	5'	77.3	57.3
Pad-Mounted Transformer[3]	-	6'	5'	56.0	37.6
Playground/Park Activity[4]	00:15:00	5'	4'	63.4	43.4

[1] As measured by Urban Crossroads, Inc. on 7/27/2015 at the Santee Walmart located at 170 Town Center Parkway.
[2] As measured by Urban Crossroads, Inc. on 5/3/2018 at a commercial and office park trash enclosure on the northeast corner of Baker Street and Redhill Avenue in the City of Costa Mesa.
[3] Source: NEMA TR 1-2013 Transformers, Step Voltage Regulators and Reactors, Table 2 sound level for a 500 kVA transformer.
[4] As measured by Urban Crossroads, Inc. on 10/8/2014 at the Founder's Park in the community of Ladera Ranch.

EXHIBIT 10-A: OPERATIONAL NOISE SOURCE AND RECEIVER LOCATIONS



10.2.1 MECHANICAL VENTILATION EQUIPMENT

At the time this noise study was prepared, the specific model specifications of the mechanical equipment to be used at the Project site was unknown. Therefore, to present a conservative approach, a reference noise level measurement of a commercial-sized air conditioning unit (roof-top) is used to represent worst-case conditions. The reference noise levels measurements were taken at the Santee Walmart on July 27th, 2015. Located at 170 Town Center Parkway in the City of Santee, the noise level measurements describe mechanical roof-top air conditioning units on the roof of an existing Walmart store. The reference noise level represents a Lennox SCA120 series 10-ton model packaged air conditioning unit. Using the uniform reference distance of 50 feet, the noise level is 57.2 dBA L_{eq}. The operating conditions of the reference noise level measurement reflect peak summer cooling requirements with measured temperatures approaching 96 degrees Fahrenheit (°F) with average daytime temperatures of 82°F. The noise attenuation provided by a parapet wall is not reflected in this reference noise level measurement.

10.2.2 TRASH ENCLOSURE ACTIVITY

To describe the noise levels associated with a trash enclosure, Urban Crossroads collected a reference noise level measurement on May 3rd, 2018 at an existing commercial and office park trash enclosure within a parking lot on the northeast corner of Baker Street and Red Hill Avenue. The measured reference noise level at the uniform 50-foot reference distance is 57.3 dBA L_{eq} for the trash enclosure activity. The trash enclosure activity noise levels include two metal gates opening and closing, the metal gates scraping against a concrete floor, dumpster movement on metal wheels, trash dropping into the metal dumpster, and background parking lot vehicle movements. Noise associated with trash enclosure activities is expected to occur for 60 minutes per hour to represent worst-case conditions.

10.2.3 PAD-MOUNTED TRANSFORMER

To determine the noise level impacts associated with a pad-mounted transformer within the Project site, the National Electrical Manufacturers Association (NEMA) *Transformers, Step Voltage Regulators and Reactors*, Table 2 sound level for a 500 kVA transformer is used in this analysis. (19) The reference NEMA noise level represents the factory tested noise level of the transformer. At the time of this analysis, the exact model of the Project's transformer was unknown, however, the reference noise levels are anticipated to likely overstate the potential noise levels from a residential transformer. Using the uniform reference distance of 50 feet, the reference NEMA transformer noise level is 37.6 dBA L_{eq}. Noise associated with the transformer is expected during the typical daytime, and nighttime conditions for the entire hour (60 minutes).

10.2.4 PLAYGROUND/PARK ACTIVITY

To describe the potential noise level impacts associated with the Project's playground and park area activities, a reference noise level measurement was collected on Wednesday, October 8th, 2014 at the Founders Park in the unincorporated community of Ladera Ranch in the County of Orange. The reference noise level measurement includes playground activities, parents speaking

on cell phones, kids playing on swing sets, cheering, and clapping. Using a uniform reference distance of 50 feet, the noise level is 43.4 dBA L_{eq}.

10.3 OPERATIONAL NOISE LEVELS

Based upon the reference noise levels, it is possible to estimate the Project operational stationary-source noise levels at each of the nearby sensitive receiver locations. The operational noise level calculations shown on Table 10-2 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. With geometric spreading, sound levels attenuate (or decrease) at a rate of 6 dB for each doubling of distance from a point source. Table 10-2 indicates that the hourly noise levels associated with the mechanical ventilation equipment, trash enclosure activity, a pad-mounted transformer, and playground/park activity are expected to range from 32.8 to 55.3 dBA L_{eq} at the nearby sensitive receiver locations. This analysis includes the attenuation provided by intervening structures, including existing and planned noise barriers and the Project buildings. Appendix 10.1 includes the Project operational noise level calculations.

TABLE 10-2: OPERATIONAL NOISE LEVELS

Receiver Location[1]	Noise Source[2]				Unmitigated Total Project Operational Noise Levels (dBA L_{eq})[3]
	Mechanical Ventilation Equipment	Trash Enclosure Activity	Pad-Mounted Transformer	Playground/ Park Activity	
R1	40.6	17.1	0.0	24.4	40.7
R2	48.3	20.0	0.2	14.7	48.3
R3	32.3	21.9	2.0	16.6	32.8
R4	23.9	55.3	34.9	7.9	55.3
R5	32.9	48.5	28.5	21.7	48.7
R6	34.7	26.3	5.7	17.3	35.4
R7	37.4	21.9	1.1	16.3	37.6

[1] See Exhibit 10-A for the receiver and noise source locations.
[2] Reference noise sources as shown on Table 10-1.
[3] Calculations for each noise source are provided in Appendix 10.1.

10.4 PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

The City of Los Angeles Municipal Code has set exterior noise limits to control community noise impacts from non-transportation noise sources (such as air-conditioning units, refrigeration, heating, pumping, and filtering equipment). Section 112.02 indicates that stationary noise sources shall not operate in such a manner as to cause the noise level at any sensitive use to exceed the existing ambient noise level by 5 dBA. (14) Tables 10-3 and 10-4 show the Project-only operational noise levels, the closest ambient noise level measurement (see Section 5), and the adjusted operational noise level limits at each of the nearby sensitive receiver locations. Both the daytime and nighttime ambient noise levels are used to evaluate the potential Project-related operational noise levels, as shown on Tables 10-3 and 10-4, respectively.

Table 10-3 shows the daytime operational noise levels limits, per the City of Los Angeles Municipal Code, will range from 59.2 to 62.2 dBA L_{eq}, and the Project-only operational noise levels ranging from 32.8 to 55.3 dBA L_{eq} will satisfy the standards at each sensitive receiver location. Table 10-4 shows the nighttime operational noise levels limits, per the City of Los Angeles Municipal Code, will range from 54.3 to 57.3 dBA L_{eq}, and the Project-only operational noise levels ranging from 32.8 to 55.3 will satisfy the standards at each sensitive receiver location.

TABLE 10-3: DAYTIME OPERATIONAL NOISE LEVEL COMPLIANCE (DBA L_{EQ})

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Ambient Plus 5 dBA	Threshold[5]	Threshold Exceeded?[6]
R1	40.7	L1	56.7	+5	61.7	No
R2	48.3	L2	56.2	+5	61.2	No
R3	32.8	L3	56.3	+5	61.3	No
R4	55.3	L4	57.2	+5	62.2	No
R5	48.7	L4	57.2	+5	62.2	No
R6	35.4	L5	54.2	+5	59.2	No
R7	37.6	L5	54.2	+5	59.2	No

[1] See Exhibit 10-A for the sensitive receiver locations and noise source locations.
[2] Total Project operational noise levels as shown on Table 10-2.
[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] Ambient plus 5 dBA per the Municipal Code Section 112.02(a).
[6] Do the Project operational noise levels exceed the ambient plus 5 dBA threshold identified by the City of Los Angeles?

TABLE 10-4: NIGHTTIME OPERATIONAL NOISE LEVEL COMPLIANCE (DBA L_{EQ})

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Ambient Plus 5 dBA	Threshold[5]	Threshold Exceeded?[6]
R1	40.7	L1	52.3	+5	57.3	No
R2	48.3	L2	49.6	+5	54.6	No
R3	32.8	L3	49.3	+5	54.3	No
R4	55.3	L4	51.0	+5	56.0	No
R5	48.7	L4	51.0	+5	56.0	No
R6	35.4	L5	51.3	+5	56.3	No
R7	37.6	L5	51.3	+5	56.3	No

[1] See Exhibit 10-A for the sensitive receiver locations and noise source locations.
[2] Total Project operational noise levels as shown on Table 10-2.
[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] Ambient plus 5 dBA per the Municipal Code Section 112.02(a).
[6] Do the Project operational noise levels exceed the ambient plus 5 dBA threshold identified by the City of Los Angeles?

11 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 11-A shows the construction activity boundaries in relation to the nearby sensitive receiver locations.

11.1 CONSTRUCTION NOISE LEVELS

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

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

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 62 dBA to more than 80 dBA when measured at 50 feet. However, these noise levels diminish with distance from the construction site at a rate of 6 dBA per doubling of distance. For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver, and would be further reduced to 68 dBA at 200 feet from the source to the receiver. The construction stages used in this analysis are consistent with the data used to support the construction emissions in the *Thatcher Yard Residential Air Quality Impact Analysis* prepared by Urban Crossroads Inc. (20)

11.2 CONSTRUCTION REFERENCE NOISE LEVELS

To describe the Project construction noise levels, measurements were collected for similar activities at several construction sites. Table 11-1 provides a summary of the reference construction noise level measurements. Since the reference noise levels were collected at varying distances, all construction noise level measurements presented on Table 11-1 have been adjusted to describe a common reference distance of 50 feet.

TABLE 11-1: CONSTRUCTION REFERENCE NOISE LEVELS

ID	Noise Source	Reference Distance From Source (Feet)	Reference Noise Levels @ Reference Distance (dBA L_{eq})	Reference Noise Levels @ 50 Feet (dBA L_{eq})[6]
1	Truck Pass-Bys & Dozer Activity[1]	30'	63.6	59.2
2	Dozer Activity[1]	30'	68.6	64.2
3	Construction Vehicle Maintenance Activities[2]	30'	71.9	67.5
4	Foundation Trenching[2]	30'	72.6	68.2
6	Residential Framing[3]	30'	66.7	62.3
7	Concrete Paver Activities[4]	30'	70.0	65.6
8	Concrete Mixer Pour & Paving Activities[4]	30'	70.3	65.9
9	Forklift, Jackhammer, & Metal Truck Bed Loading[5]	50'	67.9	67.9

[1] As measured by Urban Crossroads, Inc. on 10/14/15 at a business park construction site located at the northwest corner of Barranca Parkway and Alton Parkway in the City of Irvine.
[2] As measured by Urban Crossroads, Inc. on 10/20/15 at a construction site located in Rancho Mission Viejo.
[3] As measured by Urban Crossroads, Inc. on 10/20/15 at a residential construction site located in Rancho Mission Viejo.
[4] Reference noise level measurements were collected from a nighttime concrete pour at an industrial construction site, located at 27334 San Bernardino Avenue in the City of Redlands, between 1:00 a.m. to 2:00 a.m. on 7/1/15.
[5] As measured by Urban Crossroads, Inc. on 9/9/16 during the demolition of an existing paved parking lot in Irvine.
[6] Reference noise levels are calculated at 50 feet using a drop off rate of 6 dBA per doubling of distance (point source).

11.3 CONSTRUCTION NOISE ANALYSIS

Tables 11-2 to 11-7 show the Project construction stages and the reference construction noise levels used for each stage. Table 11-8 provides a summary of the noise levels from each stage of construction at each of the sensitive receiver locations in the City of Los Angeles. Based on the reference construction noise levels, the Project-related construction noise levels when the highest reference noise level is operating at a single point nearest the sensitive receiver location will range from 53.6 to 72.9 dBA L_{eq} at the sensitive receiver locations in the City of Los Angeles. Exhibit 11-A shows the construction activity noise source location and the distance to each nearby sensitive receiver location.

TABLE 11-2: DEMOLITION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Forklift, Jackhammer, & Metal Truck Bed Activities	67.9
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	67.9

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	76'	-3.6	-5.0	59.3
R2	81'	-4.2	0.0	63.7
R3	62'	-1.9	0.0	66.0
R4	65'	-2.3	0.0	65.6
R5	51'	-0.2	-5.0	62.7
R6	29'	4.7	0.0	72.6
R7	79'	-4.0	0.0	63.9

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier/berm attenuation from existing barriers/berms/buildings in the Project study area.

TABLE 11-3: SITE PREPARATION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	64.2

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	76'	-3.6	-5.0	55.5
R2	81'	-4.2	0.0	60.0
R3	62'	-1.9	0.0	62.3
R4	65'	-2.3	0.0	61.9
R5	51'	-0.2	-5.0	59.0
R6	29'	4.7	0.0	68.9
R7	79'	-4.0	0.0	60.2

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier/berm attenuation from existing barriers/berms/buildings in the Project study area.

TABLE 11-4: GRADING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	64.2

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	76'	-3.6	-5.0	55.5
R2	81'	-4.2	0.0	60.0
R3	62'	-1.9	0.0	62.3
R4	65'	-2.3	0.0	61.9
R5	51'	-0.2	-5.0	59.0
R6	29'	4.7	0.0	68.9
R7	79'	-4.0	0.0	60.2

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier/berm attenuation from existing barriers/berms/buildings in the Project study area.

TABLE 11-5: BUILDING CONSTRUCTION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Construction Vehicle Maintenance Activities	67.5
Foundation Trenching	68.2
Residential Framing	62.3
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	68.2

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	76'	-3.6	-5.0	59.5
R2	81'	-4.2	0.0	64.0
R3	62'	-1.9	0.0	66.3
R4	65'	-2.3	0.0	65.9
R5	51'	-0.2	-5.0	63.0
R6	29'	4.7	0.0	72.9
R7	79'	-4.0	0.0	64.2

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier/berm attenuation from existing barriers/berms/buildings in the Project study area.

TABLE 11-6: PAVING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Concrete Paver Activities	65.6
Concrete Mixer Pour & Paving Activities	65.9
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	65.9

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	76'	-3.6	-5.0	57.2
R2	81'	-4.2	0.0	61.7
R3	62'	-1.9	0.0	64.0
R4	65'	-2.3	0.0	63.6
R5	51'	-0.2	-5.0	60.7
R6	29'	4.7	0.0	70.6
R7	79'	-4.0	0.0	61.9

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier/berm attenuation from existing barriers/berms/buildings in the Project study area.

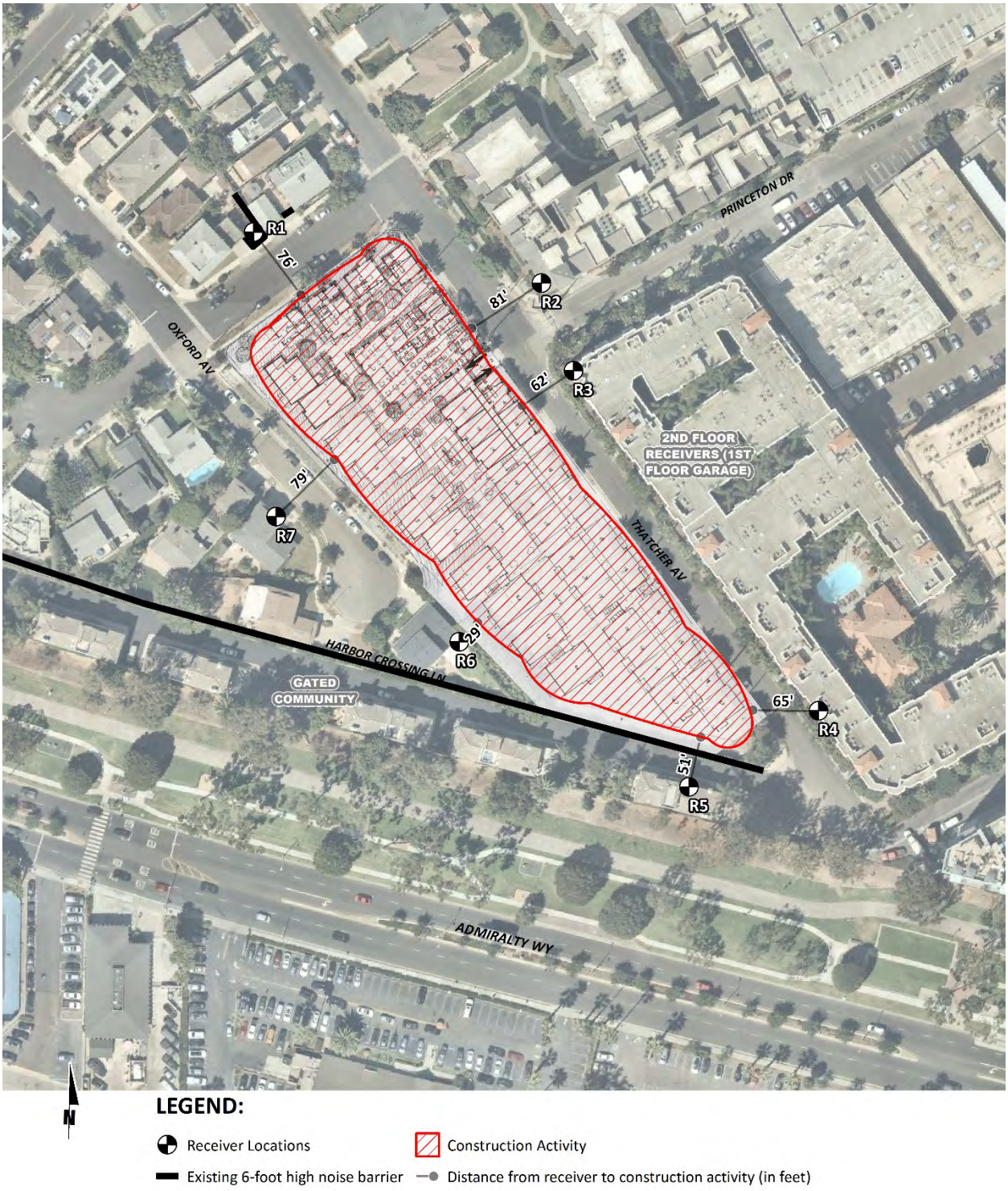
TABLE 11-7: ARCHITECTURAL COATING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Residential Framing	62.3
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	62.3

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	76'	-3.6	-5.0	53.6
R2	81'	-4.2	0.0	58.1
R3	62'	-1.9	0.0	60.4
R4	65'	-2.3	0.0	60.0
R5	51'	-0.2	-5.0	57.1
R6	29'	4.7	0.0	67.0
R7	79'	-4.0	0.0	58.3

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier/berm attenuation from existing barriers/berms/buildings in the Project study area.

EXHIBIT 11-A: CONSTRUCTION NOISE SOURCE AND RECEIVER LOCATIONS



11.4 CONSTRUCTION NOISE LEVELS OF SIGNIFICANCE

The construction noise analysis shows that the highest construction noise levels will occur when construction activities take place at the edge of the Project site boundaries. As shown on Table 11-8, the unmitigated construction noise levels are expected to range from 53.6 to 72.9 dBA L_{eq} at the sensitive receiver locations in the City of Los Angeles. To control noise impacts associated with the construction of the proposed Project, the City of Los Angeles Municipal Code has established an exterior noise level standard of 75 dBA L_{eq}.

TABLE 11-8: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY (DBA L_{EQ})

Receiver Location[1]	Construction Phase Hourly Noise Level (dBA Leq)						
	Demolition	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Highest Noise Levels[2]
R1	59.3	55.5	55.5	59.5	57.2	53.6	59.5
R2	63.7	60.0	60.0	64.0	61.7	58.1	64.0
R3	66.0	62.3	62.3	66.3	64.0	60.4	66.3
R4	65.6	61.9	61.9	65.9	63.6	60.0	65.9
R5	62.7	59.0	59.0	63.0	60.7	57.1	63.0
R6	72.6	68.9	68.9	72.9	70.6	67.0	72.9
R7	63.9	60.2	60.2	64.2	61.9	58.3	64.2

[1] Noise receiver locations are shown on Exhibit 11-A.
[2] Estimated construction noise levels during peak operating conditions.

Based on the Project-related construction noise levels approaching 72.9 dBA L_{eq}, the unmitigated noise levels satisfy the City of Los Angeles Municipal Code 75 dBA L_{eq} exterior noise level standard for construction. Therefore, Project construction noise levels represent a *less than significant* noise impact at adjacent sensitive receiver locations, as shown on Table 11-9.

TABLE 11-9: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL COMPLIANCE (DBA L_{EQ})

Receiver Location[1]	Highest Project Construction Noise Level[2]	Threshold[3]	Threshold Exceeded?[4]
R1	59.5	75	No
R2	64.0	75	No
R3	66.3	75	No
R4	65.9	75	No
R5	63.0	75	No
R6	72.9	75	No
R7	64.2	75	No

[1] See Exhibit 11-A for the sensitive receiver locations.
[2] Peak Project construction noise levels as shown on Table 11-8.
[3] Source: City of Los Angeles Municipal Code, Section 112.05.
[6] Do the peak Project construction noise levels exceed the threshold identified by the City of Los Angeles?

11.5 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. The proposed Project's construction activities most likely to cause vibration impacts are:

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

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration. Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site include grading. Using the vibration source level of construction equipment provided on Table 6-5 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 11-10 presents the expected Project related vibration levels at each of the sensitive receiver locations.

Based on the reference vibration levels provided by the Federal Transit Administration, a large bulldozer represents the peak source of vibration with a reference velocity of 0.089 in/sec peak-particle-velocity (PPV) at 25 feet. At distances ranging from 29 to 81 feet from primary Project construction activities, construction vibration velocity levels are expected to range from 0.015 to 0.071 in/sec PPV, as shown on Table 11-10. Based on the Caltrans older residential building damage threshold of 0.3 in/sec PPV, the proposed Project construction activities would result in vibration levels which are anticipated to remain below the threshold for building damage, and therefore, represents a *less than significant* impact.

TABLE 11-10: CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver[1]	Distance to Const. Activity (Feet)	Reference Vibration Levels @ 25' & Resulting Vibration at Receiver Locations (in/sec)[2]					Threshold Exceeded?[3]
		Small Bulldozer (0.003 in/sec)	Jack-Hammer (0.035)	Loaded Trucks (0.076)	Large Bulldozer (0.089)	Peak Vibration Levels	
R1	76'	0.001	0.007	0.014	0.017	0.017	No
R2	81'	0.001	0.006	0.013	0.015	0.015	No
R3	62'	0.001	0.009	0.019	0.023	0.023	No
R4	65'	0.001	0.008	0.018	0.021	0.021	No
R5	51'	0.001	0.012	0.026	0.031	0.031	No
R6	29'	0.002	0.028	0.061	0.071	0.071	No
R7	79'	0.001	0.006	0.014	0.016	0.016	No

[1] Receiver locations are shown on Exhibit 11-A.

[2] Based on the FTA's Vibration Source Levels of Construction Equipment previously shown on Table 6-5 at a reference distance of 25 feet. Calculated using the following equation per FTA guidance: PPVequip = PPVref x (25/D)^1.5

Where "PPVequip" = the vibration level at the receiver; "PPVref" = the reference vibration level at 25 feet; and "D" = the distance to each receiver location.

[3] Does the peak vibration exceed the maximum acceptable vibration threshold?

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12 REFERENCES

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2. **Linscott, Law & Greenspan, Engineers.** *Technical Memorandum - Thatcher Yard Residential Project.* January 2019.
3. **Harris, Cyril M.** *Noise Control in Buildings.* s.l. : McGraw-Hill, Inc., 1994.
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8. **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.
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10. **Center for Disease Control and Prevention.** About Hearing Loss. [Online] [Cited: 04 15, 2016.] http://www.cdc.gov/healthyschools/noise/signs.htm.
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13. **City of Los Angeles.** *General Plan Noise Element.* February 1999.
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18. **California Department of Transportation.** *Traffic Noise Attenuation as a Function of Ground and Vegetation Final Report.* June 1995. FHWA/CA/TL-95/23.
19. **National Electrical Manufacturers Association.** *TR 1-2013 - Transformers, Step Voltage Regulators and Reactors.* 2014.
20. **Urban Crossroads, Inc.** *Thatcher Yard Residential Air Quality Impact Analysis.* February 2019.

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13 CERTIFICATION

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

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EDUCATION

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

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

PROFESSIONAL REGISTRATIONS

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

PROFESSIONAL AFFILIATIONS

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

PROFESSIONAL CERTIFICATIONS

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

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APPENDIX 3.1:

CITY OF LOS ANGELES MUNICIPAL CODE

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Print

CHAPTER XI
NOISE REGULATION

(Added by Ord. No. 144,331, Eff. 3/2/73.)

Article

ARTICLE 1
GENERAL PROVISIONS

Section

SEC. 111.00. DECLARA TION OF POLICY .

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

SEC. 111.01. DEFINITIONS.

Unless the context otherwise clearly indicates, the words and phrases used in this chapter are defined as follows:

(a) "Ambient Noise " is the composite of noise from all sources near and far in a given environment, exclusive of occasional and transient intrusive noise sources and of the particular noise source or sources to be measured. Ambient noise shall be averaged over a period of at least 15 minutes at a location and time of day comparable to that during which the measurement is taken of the particular noise source being measured. (Amended by Ord. No. 156,363, Eff. 3/29/82.)

(b) "Commer cial Purpose " is the use, operation, or maintenance of any sound amplifying equipment for the purpose of advertising any business, goods, or services, or for the purpose of attracting the attention of the public to, advertising for, or soliciting patronage or customers to or for any performance, show, entertainment, exhibition, or event, or for the purpose of demonstrating such sound equipment. (Amended by Ord. No. 156,363, Eff. 3/29/82.)

(c) "Decibel" (dB) is a unit of level which denotes the ratio between two (2) quantities which are proportional to power; the number of decibels corresponding to the ratio of two (2) amounts of power is ten (10) times the logarithm to the base (10) of this ratio. (Amended by Ord. No. 156,363, Eff. 3/29/82.)

(d) "Emergency Work " is work made necessary to restore property to a safe condition following a public calamity or work required to protect persons or property from an imminent exposure to danger, or work by private or public utilities when restoring utility service. (Amended by Ord. No. 156,363, Eff. 3/29/82.)

(e) "Impulsive Sound " is sound of short duration, usually less than one second, with an abrupt onset and rapid decay. By way of example "impulsive sound" shall include, but shall not be limited to, explosions, musical base drum beats, or the discharge of firearms. (Amended by Ord. No. 156,363, Eff. 3/29/82.)

(f) "Motor Vehicle" includes, but shall not be limited to, automobiles, trucks, motorcycles, minibikes and go-carts. (Amended by Ord. No. 156,363, Eff. 3/29/82.)

(g) "Noncommer cial Purpose " is the use, operation, or maintenance of any sound equipment for other than a "commercial purpose". "Noncommercial purpose" shall mean and include, but shall not be limited to, philanthropic, political, patriotic, and charitable purposes. (Amended by Ord. No. 156,363, Eff. 3/29/82.)

(h) "Octave Band Noise Analyzer " is an instrument for measurement of sound levels in octave frequency bands which satisfies the pertinent requirements for Class II octave band analyzers of the American National Standard Specifications for Octave, Half-Octave, and Third-Octave Band Filters, S1.11-1966 or the most recent revision thereof. (Amended by Ord. No. 156,363, Eff. 3/29/82.)

(i) "Person " is a person, firm, association, co-partnership, joint venture, corporation, or any entity, private or public in nature. (Amended by Ord. No. 156,363, Eff. 3/29/82.)

(j) "Sound Amplifying Equipment " (Amended by Ord. No. 156,363, Eff. 3/29/82.) is any machine or device for the amplification of the human voice, music or any other sound, but shall not include:

1. Automobile radios, stereo players or television receivers when used and heard only by the occupants of the vehicle in which the same is installed.

2. Radio, stereo players, phonographs or television receivers used in any house or apartment within any residential zone or within 500 feet thereof.
3. Warning devices on emergency vehicles.

4. Horns or other warning devices authorized by law on any vehicle when used for traffic purposes.

(k) "Sound Level" (Noise level) in decibels (dB) is the sound measured with the "A" weighting and slow responses by a sound level meter; except for impulsive or rapidly varying sounds, the fast response shall be used. (Amended by Ord. No. 156,363, Eff. 3/29/82.)

(l) "Sound Level Meter" is an instrument including a microphone, an amplifier, an output meter, and "A" frequency weighting network for the measurement of sound levels which satisfies the pertinent requirements for Type S2A meters in American Standard Specifications for sound level meters in S1.4-1971 or the most recent revision thereof. (Amended by Ord. No. 156,363, Eff. 3/29/82.)

(m) "Sound Truck" is any motor vehicle, or any other vehicle regardless of motive power, whether in motion or stationary, which carries, is equipped with, or which has mounted thereon, or attached thereto, any sound amplifying equipment. (Amended by Ord. No. 156,363, Eff. 3/29/82.)

(n) Supplementary Definitions of Technical Terms. Definitions of technical terms not defined herein shall be obtained from American Standard Acoustical Terminology S1-1-1971 or the most recent revision thereof. (Amended by Ord. No. 156,363, Eff. 3/29/82.)

SEC. 111.02. SOUND LEVEL MEASUREMENT PROCEDURE AND CRITERIA.

(Title amended by Ord. No. 156,363, Eff. 3/29/82.)

(a) (Amended by Ord. No. 156,363, Eff. 3/29/82.) Any sound level measurement made pursuant to the provisions of this chapter shall be measured with a sound level meter using the "A" weighting and response as indicated in Section 111.01(k) of this article.

Except when impractical, the microphone shall be located four to five feet above the ground and ten feet or more from the nearest reflective surface. However, in those cases where another elevation is deemed appropriated, the latter shall be utilized.

Interior sound level measurements shall be made at a point at least four feet from the wall, ceiling, or floor nearest the noise source.

Calibration of the sound level meter, utilizing an acoustic calibrator shall be performed immediately prior to recording any sound level data. The ambient noise level and the level of a particular noise being measured shall be the numerical average of noise measurements taken at a given location during a given time period.

(b) (Amended by Ord. No. 156,363, Eff. 3/29/82.) Where the sound alleged to be offending is of a type or character set forth below, the following values shall be added to the sound level measurement of the offending noise:

1. Except for noise emanating from any electrical transformer or gas metering and pressure control equipment existing and installed prior to the effective date of the ordinance enacting this chapter, any steady tone with audible fundamental frequency or overtones have 200 Hz +5

2. Repeated impulsive noise +5

3. Noise occurring more than 5 but less than 15 minutes in any period of 60 consecutive minutes between the hours of 7:00 a.m. and 10:00 p.m. of any day -5

4. Noise occurring five minutes or less in any period of 60 consecutive minutes, between the hours of 7:00 a.m. and 10:00 p.m. of any day -5

(Amended by Ord. No. 161,574, Eff. 9/8/86.)

(c) For those cases where an objectionable noise is clearly audible, but where the level of ambient noise does not permit direct quantative sound level "A" measurements of the objectionable noise, sound measurements may be performed utilizing an octave band sound analyzer to determine sound level "A" limits as indicated in the Table I below. This table is used to convert the sound pressure level meter readings in dB for each band to SPL in dB(A) for each band.

TABLE I
OCTAVE BAND NOISE VALUES CORRESPONDING TO SOUND LEVEL "A" VALUES

Sound Level	Octave Band Sound Pressure Level, dB re .0002 dyne/cm^2 Octave Band Center Frequency in Hz								
"A"	31.5	63	125	250	500	1000	2000	4000	8000
35	58	50	42	35	32	29	26	23	20
40	61	54	46	40	37	34	31	28	25
45	64	58	51	45	42	39	36	33	30
50	67	61	55	50	47	44	41	38	35
55	70	64	60	55	52	49	46	43	40
60	73	68	64	60	57	54	51	48	45
65	76	72	68	65	62	59	56	53	50
70	79	76	73	70	67	64	61	58	55
75	84	81	78	75	72	69	66	63	60

(d) For those cases where a sound level measurement has been made pursuant to the provisions of this chapter and two or more provisions of this chapter apply, the provision establishing the lower or lowest noise level, respectively, shall be used. (Added by Ord. No. 156,363, Eff. 3/29/82.)

SEC. 111.03. MINIMUM AMBIENT NOISE LEVEL.

(Amended by Ord. No. 156,363, Eff. 3/29/82.)

Where the ambient noise level is less than the presumed ambient noise level designated in this section, the presumed ambient noise level in this section shall be deemed to be the minimum ambient noise level for purposes of this chapter.

TABLE II
SOUND LEVEL "A" DECIBELS

(In this chart, daytime levels are to be used from 7:00 a.m. to 10:00 p.m. and nighttime levels from 10:00 p.m. to 7:00 a.m.)

ZONE	PRESUMED AMBIENT NOISE LEVEL (dB(A))	
	DAY	NIGHT
A1, A2, RA, RE, RS, RD, RW1, RW2, R1, R2, R3, R4, and R5	50	40
P, PB, CR, C1, C1.5, C2, C4, C5, and CM	60	55
M1, MR1, and MR2	60	55
M2 and M3	65	65

At the boundary line between two zones, the presumed ambient noise level of the quieter zone shall be used.

SEC. 111.04. VIOLATIONS: ADDITIONAL REMEDIES, INJUNCTIONS.

As an additional remedy, the operation or maintenance of any device, instrument, vehicle, or machinery in violation of any provision of this chapter, which operation or maintenance causes discomfort or annoyance to reasonable persons or which endangers the comfort, repose, health, or peace of residents in the area, shall be deemed and is declared to be.a public nuisance and may be subject to abatement summarily by a restraining order or injunction issued by a court order of competent jurisdiction. (Amended by Ord. No. 156,363, Eff. 3/29/82.)

SEC. 111.05. ENFORCEMENT , CITATIONS.

(Added by Ord. No. 156,363, Eff. 3/29/82.)

(a) The Department of Building and Safety shall have the power and duty to enforce the following noise control provisions of this Code: Section 12.14A-6(h), Section 12.19A-4(b)(1), Section 112.02 and Section 112.04(c). (Amended by Ord. No. 172,086, Eff. 7/30/98.)

(b) The Police Department shall have the power and duty to enforce the following noise control provisions of this Code: Section 41.32, Section 41.40, Section 41.42, Section 41.44, Section 41.57, Section 63.51(m), Section 112.01, Section 112.04, Section 112.05, Section 112.06, Section 113.01, Section 114.01 through Section 114.05, inclusive, Section 115.02, and Section 116.01. (Amended by Ord. No. 161,574, Eff. 9/8/86.)

(c) Any Building Mechanical Inspector assigned to noise enforcement inspection shall have the power, authority and immunity of a public officer and employee, as set forth in the Penal Code of the State of California, Section 836.5, to make arrests without a warrant whenever such employee has reasonable cause to believe that the person to be arrested has committed a misdemeanor in his presence which is a violation of any provision set forth in Section 111.05(a) of this chapter. The provisions of said Penal Code section regarding issuance of a written promise to appear shall be applicable to arrests authorized herein.

ARTICLE 2
SPECIAL NOISE SOURCES

Section

SEC. 112.01. RADIOS, TELEVISION SETS, AND SIMILAR DEVICES.

(Amended by Ord. No. 156,363, Eff. 3/29/82.)

(a) It shall be unlawful for any person within any zone of the City to use or operate any radio, musical instrument, phonograph, television receiver, or other machine or device for the producing, reproducing or amplification of the human voice, music, or any other sound, in such a manner, as to disturb the peace, quiet, and comfort of neighbor occupants or any reasonable person residing or working in the area.

(b) Any noise level caused by such use or operation which is audible to the human ear at a distance in excess of 150 feet from the property line of the noise source, within any residential zone of the City or within 500 feet thereof, shall be a violation of the provisions of this section.

(c) Any noise level caused by such use or operation which exceeds the ambient noise level on the premises of any other occupied property, or if a condominium, apartment house, duplex, or attached business, within any adjoining unit, by more than five (5) decibels shall be a violation of the provisions of this section.

SEC. 112.02. AIR CONDITIONING, REFRIGERATION, HEATING, PUMPING, FILTERING EQUIPMENT .

(Amended by Ord. No. 156,363, Eff. 3/29/82.)

(a) It shall be unlawful for any person, within any zone of the city to operate any air conditioning, refrigeration or heating equipment for any residence or other structure or to operate any pumping, filtering or heating equipment for any pool or reservoir in such manner as to create any noise which would cause the noise level on the premises of any other occupied property or if a condominium, apartment house, duplex, or attached business, within any adjoining unit.to exceed the ambient noise level by more than five (5) decibels

(b) This section shall not be applicable to emergency work as defined in Section 111.01(c) of this chapter, or to periodic maintenance or testing of such equipment reasonably necessary to maintain such equipment in good working order.

SEC. 112.03. CONSTRUCTION NOISE.

Noise due to construction or repair work shall be regulated as provided by Section 41.40 of this Code. (Amended by Ord. No. 161,574, Eff. 9/8/86.)

SEC. 112.04. POWERED EQUIPMENT INTENDED FOR REPETITIVE USE IN RESIDENTIAL AREAS AND OTHER MACHINER Y, EQUIPMENT , AND DEVICES.

(Title and Section Amended by Ord. No. 161,574, Eff 9/8/86.)

(a) Between the hours of 10:00 p.m and. 7:00 a.m. of the following day, no person shall operate any lawn mower, backpack blower, lawn edger, riding tractor, or any other machinery, equipment, or other mechanical or electrical device, or any hand tool which creates a loud, raucous or impulsive sound, within any residential zone or within 500 feet of a residence.

(b) Except as to the equipment and operations specifically mentioned and related elsewhere in this Chapter or for emergency work as that term is defined in Section 111.01(d), and except as to aircraft, tow tractors, aircraft auxiliary power units, trains and motor vehicles in their respective operations governed by State or federal regulations, no person shall operate or cause to be operated any machinery, equipment, tools, or other mechanical or electrical device, or engage in any other activity in such manner as to create any noise which would cause the noise level on the premises of any other occupied property, or, if a condominium, apartment house, duplex, or attached business, within any adjoining unit, to exceed the ambient noise level by more than five (5) decibels.

(c) Notwithstanding the provisions of Subsection (a) above, no gas powered blower shall be used within 500 feet of a residence at anytime. Both the user of such a blower as well as the individual who contracted for the services of the user, if any, shall be subject to the requirements of and penalty provisions for this ordinance. Violation of the provisions of this subsection shall be punishable as an infraction in an amount not to exceed One Hundred Dollars ($100.00), notwithstanding the graduated fines set forth in LAMC § 11.00(m). (Amended by Ord. No. 171,890, Eff. 2/13/98.)

SEC. 112.05. MAXIMUM NOISE LEVEL OF POWERED EQUIPMENT OR POWERED HAND T OOLS.

(Amended by Ord. No. 161,574, Eff. 9/8/86.)

Between the hours of 7:00 a.m. and 10:00 p.m., in any residential zone of the City or within 500 feet thereof, no person shall operate or cause to be operated any powered equipment or powered hand tool that produces a maximum noise level exceeding the following noise limits at a distance of 50 feet therefrom:

(a) 75dB(A) for construction, industrial, and agricultural machinery including crawler-tractors, dozers, rotary drills and augers, loaders, power shovels, cranes, derricks, motor graders, paving machines, off-highway trucks, ditchers, trenchers, compactors, scrapers, wagons, pavement breakers, compressors and pneumatic or other powered equipment;

(b) 75dB(A) for powered equipment of 20 HP or less intended for infrequent use in residential areas, including chain saws, log chippers and powered hand tools;

(c) 65dB(A) for powered equipment intended for repetitive use in residential areas, including lawn mowers, backpack blowers, small lawn and garden tools and riding tractors;

The noise limits for particular equipment listed above in (a), (b) and (c) shall be deemed to be superseded and replaced by noise limits for such equipment from and after their establishment by final regulations adopted by the Federal Environmental Protection Agency and published in the Federal Register.

Said noise limitations shall not apply where compliance therewith is technically infeasible The burden of proving that compliance is technically infeasible shall be upon the person or persons charged with a violation of this section. Technical infeasibility shall mean that said noise limitations cannot be complied with despite the use of mufflers, shields, sound barriers and/or other noise reduction device or techniques during the operation of the equipment.

SEC. 112.06. PLACES OF PUBLIC ENTER TAINMENT .

It shall be unlawful for any person to operate, play, or to permit the operation or playing of any radio, television receiver, phonograph, musical instrument, sound amplifying equipment, or similar device which produces, reproduces, or amplifies sound in any place of public entertainment at a sound level greater than 95dB(A) at any point that is normally occupied by a customer, unless a conspicuous and legible sign is located outside such place, near each public entrance, stating:

"WARNING: SOUND LEVELS WITHIN MAY CAUSE HEARING IMPAIRMENT."

(Added by Ord. No. 156,363, Eff. 3/29/82.)

ARTICLE 3
SANITARY OPERATION

Section
113.01 Rubbish and Garbage Collection and Disposal.

SEC. 113.01. RUBBISH AND GARBAGE COLLECTION AND DISPOSAL.

(Amended by Ord. No. 161,574, Eff. 9/8/86.)

It shall be unlawful for any person engaged in the business of collecting or disposing of rubbish or garbage to operate any refuse disposal truck, parking lot sweeper, or vacuum truck, or to collect, load, pick up, transfer, unload, dump, discard, sweep, vacuum, or dispose of any rubbish or garbage, as such terms are defined in Section 66.00 of this Code, within 200 feet of any residential building between the hours of 9:00 p.m. and 6:00 a.m. of the following day, unless a permit therefore has been duly obtained beforehand from the Board of Police Commissioners.

The standards which shall be considered in determining whether a permit shall be granted are the following:

(a) Whether the work to be done is in the public interest, or

(b) Whether the applicant would suffer hardship, injustice or delay if the permit were not granted, or

(c) Whether fuel conservation would result if the permit were issued.

No permit shall be required to perform emergency work as defined in Sec. 111.01(c) of this chapter.

ARTICLE 4
VEHICLES

Section
114.01 Vehicle Repairs.
114.02 Motor Driven Vehicles.
114.03 Vehicles – Loading and Unloading.
114.04 Audible Signaling Devices.
114.05 Audible Advertising Devices – Commercial Food Vendors.
114.06 Vehicle Theft Alarm Systems.
114.07 Audible Status Indicator

SEC. 114.01. VEHICLE REP AIRS.

(Amended by Ord. No. 156,363, Eff. 3/29/82.)

It shall be unlawful for any person, within any residential property located within any residential zone of the City or within 500 feet thereof, to repair, rebuild, reconstruct or dismantle any motor vehicle between the hours of 8:00 p.m. of one day and 8:00 a.m. of the next day in such manner:

(a) That a reasonable person residing in the area is caused discomfort or annoyance;

(d) That such activity is audible to the human ear at a distance in excess of 150 feet from the property line of the noise source;

(c) As to create any noise which would cause the noise level on the premises of any occupied residential property, or if a condominium, apartment house or duplex, within any adjoining unit, to exceed the ambient noise level by more than five (5) decibels.

SEC. 114.02. MOT OR DRIVEN VEHICLES.

(Amended by Ord. No. 156,363, Eff. 3/29/82.)

(a) It shall be unlawful for any person to unreasonably operate any motor driven vehicle upon any property within the City or to unreasonably accelerate the engine of any vehicle, or unreasonably sound, blow or operate the horn or other warning device of such vehicle in such manner:

1. As to disturb the peace, quiet and comfort of any neighborhood or of any reasonable person residing in such area

2. That such activity is audible to the human ear at a distance in excess of 150 feet from the property line of the noise source;

3. As to create any noise which would cause the noise level on the premises of any occupied residential property, or if a condominium, apartment house or duplex, within any adjoining unit, to exceed the ambient noise level by more than five (5) decibels.

(b) This section shall not be applicable to any vehicle which is operated upon any public highway, street or right-of-way or to the operation of any off-highway vehicle to the extent it is regulated in the Vehicle Code.

SEC. 114.03. VEHICLES – LOADING AND UNLOADING.

(Amended by Ord. No. 166,514, Eff. 1/24/91.)

(a) It shall be unlawful for any person, between the hours of 10:00 p.m. and 7:00 a.m. of the following day, to load or unload any vehicle, or operate any dollies, carts, forklifts, or other wheeled equipment, which causes any impulsive sound, raucous or unnecessary noise within 200 feet of any residential building.

(b) Irrespective of the provisions of Subsection (a), loading or unloading of vehicles of the type of activity referred to in Subsection (a) may occur between the hours of 6:00 a.m. to 11:00 p.m. of the same day pursuant to a permit issued by the Department of Transportation in accordance with a business program as defined by said department. This permit program would be limited to the area bounded by Western Avenue, Santa Monica Freeway, Central Avenue, and the San Diego Freeway, within the limits of the City of Los Angeles. Such permits will not be issued to high-noise businesses such as trash pickup.

SEC. 114.04. AUDIBLE SIGNALING DEVICES.

(Added by Ord. No. 161,574, Eff. 9/8/86.)

It shall be unlawful for any person, within any residential zone of the City or within 500 feet thereof, to sound, blow, or operate any audible signaling device, including sequential airhorns or electronically operated vehicular loud speaker music devices, which can be heard for a distance greater than 200 feet for any purpose. Violation of this section shall constitute an infraction This section does not address horn or warning devices regulated in Article 1 of Chapter 5 of Division 12 of the Vehicle Code of the State of California, commencing at Section 27000. (Last sentence amended by Ord. No. 165.191, Eff. 10/23/89.)

SEC. 114.05. AUDIBLE ADVER TISING DEVICES – COMMERCIAL FOOD VENDORS.

(Added by Ord. No. 164,532, Eff. 4/20/89.)

Notwithstanding the provisions of Section 114.04, it shall be unlawful for any person, to sound, blow or operate any music, chimes or bells, or any similar sound device, amplified or otherwise, within 200 feet of any residential building between the hours of 9:00 p.m. and 7:00 a.m. the next day while operating a catering truck, as that term is defined in Section 80.73 of the Municipal Code.

SEC. 114.06. VEHICLE THEFT ALARM SYSTEMS.

(Former Sec. 1 14.05, Renumber ed by Ord. No. 164,532, Eff. 4/20/89.)

It shall be unlawful for any person to install, operate or use any vehicle theft alarm system that emits or causes the emission of an audible sound, which is not, or does not become, automatically and completely silenced within five minutes. The time period shall be calculated based upon the emission of the first audible sound and shall end five minutes thereafter notwithstanding any variation or stoppage in the emissions of audible sound. Violation of this section shall constitute an infraction.

SEC. 114.07. AUDIBLE ST ATUS INDICA TOR.

(Added by Ord. No. 169,785, Eff. 6/9/94.)

It shall be unlawful for any person to install, operate, use or maintain any vehicle theft alarm system which utilizes an audible status indicator emitting or causing the emission of an audible sound for a duration of more than one minute. The time period shall be calculated from the point in time of the emission of the first audible sound used in calculation and shall end one minute thereafter, notwithstanding any variation or temporary stoppage in the emission of audible sound.

As used in this section, an audible status indicator is a component of a vehicle theft alarm system which emits sound audible outside the vehicle for the purpose of warning that a vehicle theft alarm system is installed and armed or operational. The term "audible status indicator " shall include any device which emits a chirp, voice message or other sound when an approaching person is within a certain distance of the vehicle in which the device is installed.

In the event enforcement of a violation occurs under this section, no enforcement shall be taken under Section 80.75.l of the Municipal Code for the same violation.

Violation of any provision of this section shall constitute an infraction.

ARTICLE 5
AMPLIFIED SOUND

Section
115.01 Purpose.
115.02 Prohibition and Regulations.

SEC. 115.01. PURPOSE.

The Council enacts this legislation for the sole purpose of securing and promoting the public health, comfort, safety, and welfare of its citizenry. While recognizing that certain uses of sound amplifying equipment are protected by the constitutional rights of freedom of speech and assembly, the Council nevertheless feels obligated to reasonably regulate the use of sound amplifying equipment in order to protect the correlative constitutional rights of the citizens of this community to privacy and freedom from public nuisance of loud and unnecessary noise.

SEC. 115.02. PROHIBITION AND REGULA TIONS.

It shall be unlawful for any person, other than personnel of law enforcement or governmental agencies, or permittees duly authorized to use the same pursuant to Sec. 103.111 of this Code, to install, use, or operate within the City a loudspeaker or sound amplifying equipment in a fixed or movable position or mounted upon any sound truck for the purposes of giving instructions, directions, talks, addresses, lectures, or transmitting music to any persons or assemblages of persons in or upon any public street, alley, sidewalk, park or place, or other public property except when installed, used or operated in compliance with the following provisions:

(a) In all residential zones and within 500 feet thereof, no sound amplifying equipment shall be installed, operated or used for commercial purposes at any time.

(b) The operation or use of sound amplifying equipment for noncommercial purposes in all residential zones and within 500 feet thereof, except when used for regularly scheduled operative functions by any school or for the usual and customary purposes of any church, is prohibited between the hours of 4:30 p.m. and 9:00 a.m. of the following day.

(c) In all other zones, except such portions thereof as may be included within 500 feet of any residential zone, the operation or use of sound amplifying equipment for commercial purposes is prohibited between the hours of 9:00 p.m. and 8:00 a.m. of the following day.

(d) In all other zones, except such portions thereof as may be included within 500 feet of any residential zone, the operation or use of sound amplifying equipment for noncommercial purposes is prohibited between the hours of 10:00 p.m. and 7:00 a.m. of the following day.

(e) The only sounds permitted shall be either music, human speech, or both.

(f) Sound emanating from sound amplifying equipment shall be limited in volume, tone and intensity as follows:

1. The sound shall not be audible at a distance in excess of 200 feet from the sound equipment.

2. In no event shall the sound be loud and raucous or unreasonably jarring, disturbing, annoying or a nuisance to reasonable persons of normal sensitiveness within the area of audibility.

(g) Except as provided in (b) above, no sound amplifying equipment shall be operated upon any property adjacent to and within 200 feet of any hospital grounds or any school or church building while in use.

(h) (Amended by Ord. No. 145,691, Eff. 5/2/74.) The operation or use of any sound amplifying equipment installed, mounted, attached or carried in or by any sound truck is further prohibited:

1. Within the Central Traffic district at any time;

2. Upon Hollywood Boulevard between Vermont Avenue and La Brea at any time;

3. Upon Wilshire Boulevard at any time;

4. Upon Sunset Boulevard at any time;

5. Upon Vine Street at any time;

6. Upon any street between the hours of 4:30 p.m. and 9:00 a.m. of the following day;

7. Upon any street on any Sunday.

ARTICLE 6
GENERAL NOISE

Section
116.01 Loud, Unnecessary and Unusual Noise.

SEC. 116.01. LOUD, UNNECESSAR Y AND UNUSUAL NOISE.

Notwithstanding any other provisions of this chapter and in addition thereto, it shall be unlawful for any person to willfully make or continue, or cause to be made or continued, any loud, unnecessary, and unusual noise which disturbs the peace or quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area. The standard which may be considered in determining whether a violation of the provisions of this section exists may include, but not be limited to, the following:

(a) The level of noise;

(b) Whether the nature of the noise is usual or unusual;

(c) Whether the origin of the noise is natural or unnatural;

(d) The level and intensity of the background noise, if any;

(e) The proximity of the noise to residential sleeping facilities;

(f) The nature and zoning of the area within which the noise emanates;

(g) The density of the inhabitation of the area within which the noise emanates;

(h) The time of the day and night the noise occurs;

(i) The duration of the noise;

(j) Whether the noise is recurrent, intermittent, or constant; and

(k) Whether the noise is produced by a commercial or noncommercial activity.

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APPENDIX 5.1:

STUDY AREA PHOTOS

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JN:12185 Study Area Photos

L1 East
33, 59' 8.950000", 118, 26' 53.340000"

L1 North
33, 59' 8.980000", 118, 26' 53.370000"

L1 South
33, 59' 8.940000", 118, 26' 53.370000"

L1 West
33, 59' 8.830000", 118, 26' 53.370000"

L2 East
33, 59' 8.540000", 118, 26' 51.500000"

L2 North
33, 59' 8.570000", 118, 26' 51.530000"

L2 South
33, 59' 8.500000", 118, 26' 51.500000"

L2 West
33, 59' 8.570000", 118, 26' 51.560000"

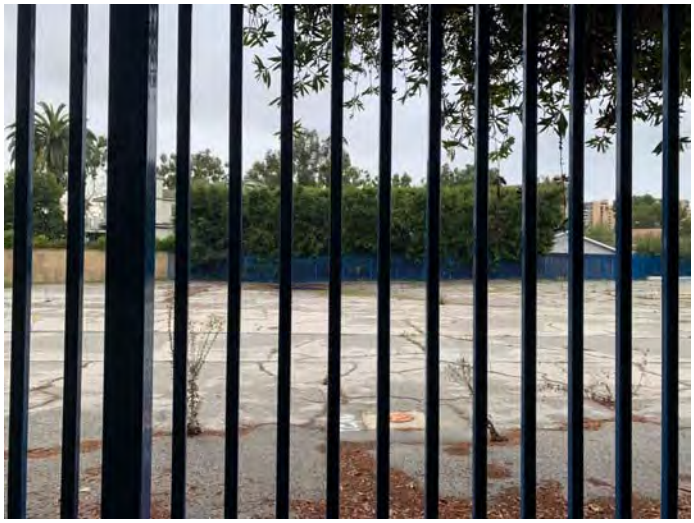
L3 East
33, 59' 5.760000", 118, 26' 49.170000"

L3 North
33, 59' 5.730000", 118, 26' 49.000000"

L3 South
33, 59' 5.710000", 118, 26' 49.000000"

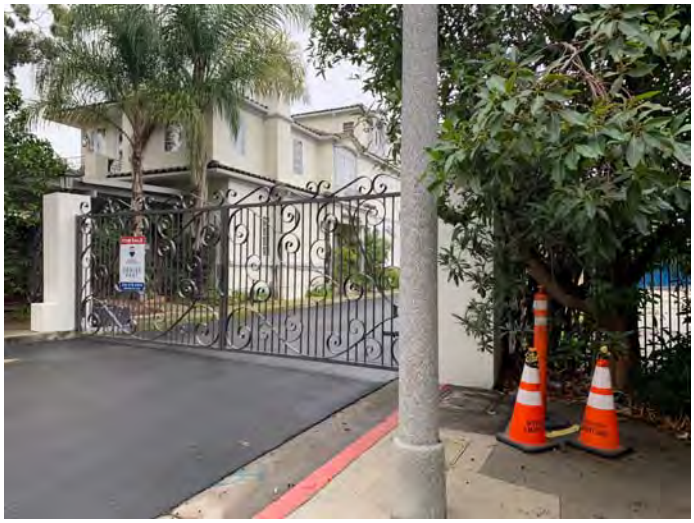
L3 Southeast
33, 59' 5.700000", 118, 26' 49.060000"

JN:12185 Study Area Photos



L3 West
33, 59' 5.800000", 118, 26' 48.920000"

L4 East
33, 59' 4.440000", 118, 26' 47.220000"



L4 North
33, 59' 4.400000", 118, 26' 47.460000"

L4 Northeast
33, 59' 4.420000", 118, 26' 47.220000"

L4 South
33, 59' 4.520000", 118, 26' 47.160000"

L4 West
33, 59' 4.410000", 118, 26' 47.380000"

JN:12185 Study Area Photos

L5 East
33, 59' 6.540000", 118, 26' 53.200000"

L5 North
33, 59' 6.570000", 118, 26' 53.200000"

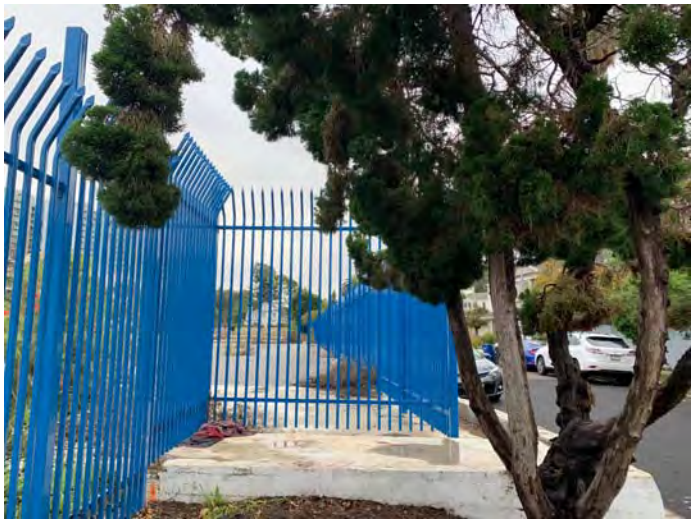
L5 South
33, 59' 6.550000", 118, 26' 53.200000"

L5 West
33, 59' 6.570000", 118, 26' 53.230000"

L6 East
33, 59' 7.910000", 118, 26' 54.030000"

L6 North
33, 59' 7.920000", 118, 26' 54.110000"

JN:12185 Study Area Photos



L6 South
33, 59' 7.880000", 118, 26' 54.000000"

L6 West
33, 59' 7.900000", 118, 26' 54.110000"

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APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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24-Hour Noise Level Measurement Summary

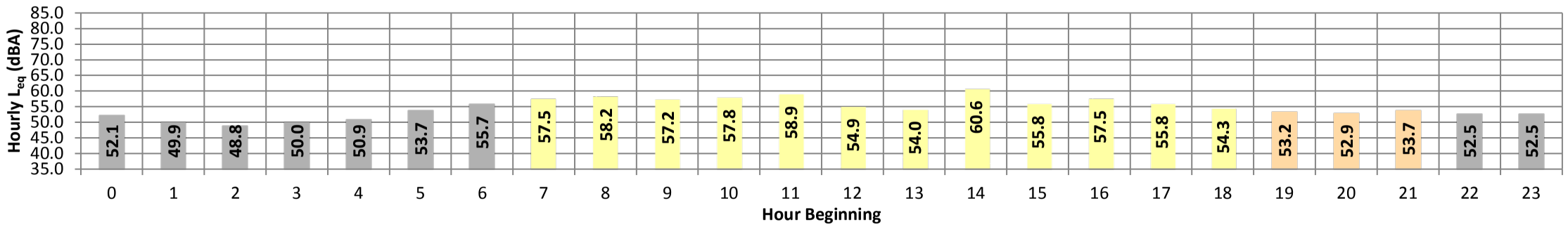
Date: Tuesday, January 08, 2019
Project: 3233 Thatcher Avenue Venice

Location: L1 - Located on Princeton Drive near the northern boundary of the Project site and existing single-family residential homes.

Meter: Piccolo I

JN: 12185
Analyst: R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	52.1	63.4	47.6	58.0	57.0	55.0	54.0	52.0	50.0	48.0	48.0	48.0	52.1	10.0	62.1
	1	49.9	61.8	46.8	56.0	54.0	53.0	52.0	49.0	48.0	48.0	47.0	47.0	49.9	10.0	59.9
	2	48.8	63.1	46.5	55.0	52.0	50.0	49.0	48.0	48.0	47.0	47.0	47.0	48.8	10.0	58.8
	3	50.0	67.8	46.9	59.0	53.0	51.0	50.0	49.0	48.0	47.0	47.0	47.0	50.0	10.0	60.0
	4	50.9	67.5	47.4	58.0	55.0	52.0	51.0	50.0	49.0	48.0	48.0	47.0	50.9	10.0	60.9
	5	53.7	71.0	48.7	62.0	60.0	57.0	55.0	53.0	52.0	50.0	50.0	49.0	53.7	10.0	63.7
	6	55.7	67.7	50.8	63.0	61.0	58.0	57.0	55.0	54.0	52.0	52.0	51.0	55.7	10.0	65.7
Day	7	57.5	71.7	53.8	64.0	62.0	60.0	59.0	57.0	56.0	55.0	54.0	54.0	57.5	0.0	57.5
	8	58.2	75.2	52.7	66.0	64.0	62.0	60.0	57.0	56.0	54.0	54.0	53.0	58.2	0.0	58.2
	9	57.2	73.4	50.8	65.0	63.0	61.0	59.0	57.0	55.0	53.0	52.0	51.0	57.2	0.0	57.2
	10	57.8	75.5	50.2	63.0	62.0	60.0	60.0	59.0	55.0	51.0	51.0	51.0	57.8	0.0	57.8
	11	58.9	82.8	49.6	65.0	63.0	61.0	60.0	59.0	57.0	51.0	51.0	50.0	58.9	0.0	58.9
	12	54.9	76.7	49.6	63.0	62.0	59.0	57.0	53.0	52.0	50.0	50.0	50.0	54.9	0.0	54.9
	13	54.0	68.4	49.9	60.0	58.0	57.0	56.0	54.0	52.0	51.0	51.0	50.0	54.0	0.0	54.0
	14	60.6	84.4	51.0	69.0	66.0	62.0	59.0	56.0	54.0	52.0	51.0	51.0	60.6	0.0	60.6
	15	55.8	71.3	51.5	64.0	62.0	59.0	58.0	55.0	54.0	52.0	52.0	52.0	55.8	0.0	55.8
	16	57.5	80.6	51.2	66.0	64.0	60.0	59.0	56.0	54.0	52.0	52.0	51.0	57.5	0.0	57.5
	17	55.8	71.7	51.0	63.0	61.0	59.0	58.0	55.0	54.0	52.0	52.0	51.0	55.8	0.0	55.8
	18	54.3	72.2	49.5	61.0	59.0	57.0	56.0	54.0	52.0	51.0	50.0	50.0	54.3	0.0	54.3
Evening	19	53.2	68.8	49.0	61.0	60.0	56.0	55.0	52.0	51.0	50.0	50.0	49.0	53.2	5.0	58.2
	20	52.9	65.8	48.9	58.0	56.0	55.0	54.0	53.0	51.0	50.0	50.0	49.0	52.9	5.0	57.9
	21	53.7	69.0	48.8	63.0	60.0	56.0	55.0	52.0	51.0	50.0	49.0	49.0	53.7	5.0	58.7
Night	22	52.5	63.9	49.0	59.0	58.0	55.0	54.0	52.0	51.0	50.0	49.0	49.0	52.5	10.0	62.5
	23	52.5	64.7	48.4	58.0	57.0	56.0	55.0	52.0	51.0	49.0	49.0	49.0	52.5	10.0	62.5

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	54.0	68.4	49.5	60.0	58.0	57.0	56.0	53.0	52.0	50.0	50.0	50.0
	Max	60.6	84.4	53.8	69.0	66.0	62.0	60.0	59.0	57.0	55.0	54.0	54.0
Energy Average		57.3	Average:		64.1	62.2	59.8	58.4	56.0	54.3	52.0	51.7	51.2
Evening	Min	52.9	65.8	48.8	58.0	56.0	55.0	54.0	52.0	51.0	50.0	49.0	49.0
	Max	53.7	69.0	49.0	63.0	60.0	56.0	55.0	53.0	51.0	50.0	50.0	49.0
Energy Average		53.3	Average:		60.7	58.7	55.7	54.7	52.3	51.0	50.0	49.7	49.0
Night	Min	48.8	61.8	46.5	55.0	52.0	50.0	49.0	48.0	48.0	47.0	47.0	47.0
	Max	55.7	71.0	50.8	63.0	61.0	58.0	57.0	55.0	54.0	52.0	52.0	51.0
Energy Average		52.3	Average:		58.7	56.3	54.1	53.0	51.1	50.1	48.8	48.6	48.2

L_{eq} (dBA)

24-Hour	*Daytime*	*Nighttime*
55.5	**56.7**	**52.3**

24-Hour CNEL (dBA)

59.9

24-Hour Noise Level Measurement Summary

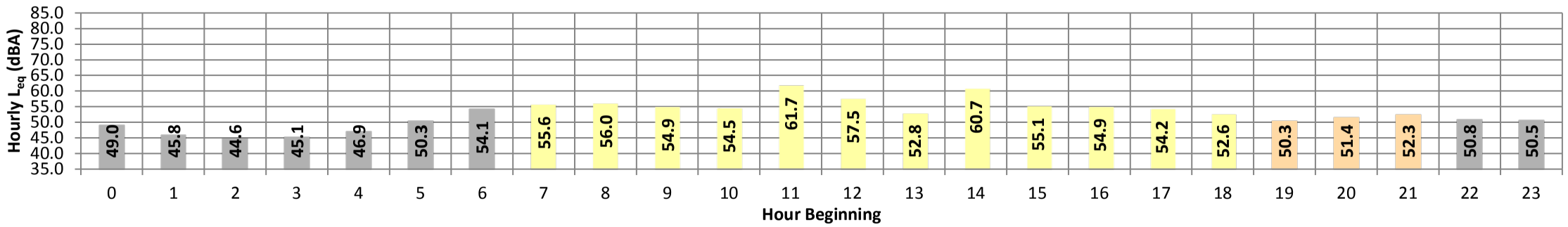
Date: Tuesday, January 08, 2019
Project: 3233 Thatcher Avenue Venice

Location: L2 - Located on Thatcher Avenue near the eastern boundary of the Project site and Mirabella Apartment Homes.

Meter: Piccolo I

JN: 12185
Analyst: R. Saber

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	49.0	62.0	42.4	57.0	55.0	53.0	52.0	49.0	46.0	44.0	43.0	42.0	49.0	10.0	59.0
	1	45.8	60.4	41.1	53.0	52.0	49.0	48.0	45.0	43.0	42.0	42.0	41.0	45.8	10.0	55.8
	2	44.6	60.9	39.4	52.0	50.0	47.0	46.0	44.0	43.0	41.0	41.0	40.0	44.6	10.0	54.6
	3	45.1	61.4	41.0	54.0	51.0	48.0	46.0	44.0	43.0	41.0	41.0	41.0	45.1	10.0	55.1
	4	46.9	65.2	42.3	54.0	53.0	50.0	49.0	46.0	45.0	43.0	43.0	42.0	46.9	10.0	56.9
	5	50.3	63.5	43.3	58.0	56.0	54.0	52.0	50.0	49.0	46.0	46.0	44.0	50.3	10.0	60.3
	6	54.1	71.4	47.7	62.0	61.0	58.0	56.0	54.0	52.0	49.0	49.0	48.0	54.1	10.0	64.1
Day	7	55.6	67.6	50.3	63.0	62.0	59.0	58.0	55.0	54.0	52.0	52.0	51.0	55.6	0.0	55.6
	8	56.0	71.5	49.2	64.0	63.0	61.0	59.0	55.0	53.0	51.0	51.0	50.0	56.0	0.0	56.0
	9	54.9	74.8	46.9	65.0	62.0	58.0	57.0	54.0	52.0	49.0	49.0	48.0	54.9	0.0	54.9
	10	54.5	69.9	45.7	62.0	60.0	58.0	57.0	55.0	52.0	48.0	48.0	46.0	54.5	0.0	54.5
	11	61.7	92.9	45.2	67.0	65.0	63.0	63.0	58.0	54.0	48.0	47.0	46.0	61.7	0.0	61.7
	12	57.5	81.8	42.3	68.0	66.0	62.0	59.0	53.0	51.0	48.0	47.0	44.0	57.5	0.0	57.5
	13	52.8	65.9	46.8	60.0	58.0	56.0	55.0	53.0	51.0	49.0	48.0	48.0	52.8	0.0	52.8
	14	60.7	85.9	46.8	68.0	65.0	61.0	59.0	54.0	52.0	49.0	49.0	48.0	60.7	0.0	60.7
	15	55.1	76.1	48.3	63.0	61.0	58.0	57.0	54.0	52.0	50.0	49.0	49.0	55.1	0.0	55.1
	16	54.9	72.6	47.6	63.0	62.0	59.0	57.0	54.0	52.0	50.0	49.0	48.0	54.9	0.0	54.9
	17	54.2	65.6	47.9	61.0	60.0	58.0	57.0	54.0	52.0	50.0	49.0	48.0	54.2	0.0	54.2
	18	52.6	69.9	44.8	60.0	58.0	56.0	55.0	52.0	51.0	48.0	47.0	45.0	52.6	0.0	52.6
Evening	19	50.3	64.9	43.3	57.0	55.0	53.0	53.0	50.0	49.0	46.0	45.0	44.0	50.3	5.0	55.3
	20	51.4	66.1	44.7	57.0	55.0	54.0	53.0	51.0	50.0	47.0	47.0	45.0	51.4	5.0	56.4
	21	52.3	68.2	45.3	62.0	60.0	56.0	54.0	51.0	49.0	47.0	46.0	46.0	52.3	5.0	57.3
Night	22	50.8	64.1	45.3	58.0	56.0	54.0	53.0	51.0	49.0	46.0	46.0	45.0	50.8	10.0	60.8
	23	50.5	61.7	43.5	57.0	56.0	54.0	53.0	51.0	49.0	46.0	45.0	44.0	50.5	10.0	60.5

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	52.6	65.6	42.3	60.0	58.0	56.0	55.0	52.0	51.0	48.0	47.0	44.0
	Max	61.7	92.9	50.3	68.0	66.0	63.0	63.0	58.0	54.0	52.0	52.0	51.0
Energy Average		56.9	Average:		63.7	61.8	59.1	57.8	54.3	52.2	49.3	48.8	47.6
Evening	Min	50.3	64.9	43.3	57.0	55.0	53.0	53.0	50.0	49.0	46.0	45.0	44.0
	Max	52.3	68.2	45.3	62.0	60.0	56.0	54.0	51.0	50.0	47.0	47.0	46.0
Energy Average		51.4	Average:		58.7	56.7	54.3	53.3	50.7	49.3	46.7	46.0	45.0
Night	Min	44.6	60.4	39.4	52.0	50.0	47.0	46.0	44.0	43.0	41.0	41.0	40.0
	Max	54.1	71.4	47.7	62.0	61.0	58.0	56.0	54.0	52.0	49.0	49.0	48.0
Energy Average		49.6	Average:		56.1	54.4	51.9	50.6	48.2	46.6	44.2	44.0	43.0

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
54.7	56.2	49.6

24-Hour CNEL (dBA)
58.1

24-Hour Noise Level Measurement Summary

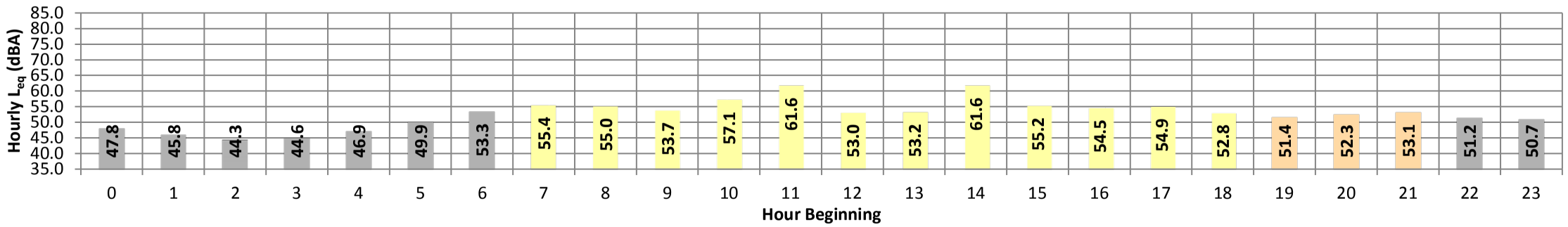
Date: Tuesday, January 08, 2019
Project: 3233 Thatcher Avenue Venice

Location: L3 - Located on Thatcher Avenue near the eastern boundary of the Project site and Mirabella Apartment Homes.

Meter: Piccolo I

JN: 12185
Analyst: R. Saber

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	47.8	58.5	40.9	55.0	54.0	52.0	51.0	48.0	45.0	42.0	42.0	41.0	47.8	10.0	57.8
	1	45.8	61.4	39.5	54.0	52.0	49.0	48.0	45.0	43.0	41.0	41.0	41.0	45.8	10.0	55.8
	2	44.3	60.9	39.5	53.0	51.0	47.0	46.0	43.0	42.0	41.0	41.0	40.0	44.3	10.0	54.3
	3	44.6	59.0	41.1	51.0	49.0	47.0	46.0	44.0	43.0	41.0	41.0	41.0	44.6	10.0	54.6
	4	46.9	65.5	41.3	55.0	52.0	50.0	48.0	46.0	45.0	43.0	42.0	42.0	46.9	10.0	56.9
	5	49.9	65.3	42.5	56.0	55.0	53.0	52.0	50.0	48.0	45.0	44.0	43.0	49.9	10.0	59.9
	6	53.3	67.8	47.2	60.0	59.0	56.0	55.0	53.0	52.0	49.0	49.0	48.0	53.3	10.0	63.3
Day	7	55.4	67.4	49.9	62.0	60.0	59.0	57.0	55.0	54.0	52.0	51.0	51.0	55.4	0.0	55.4
	8	55.0	64.4	48.3	61.0	60.0	58.0	57.0	55.0	54.0	51.0	51.0	49.0	55.0	0.0	55.0
	9	53.7	69.2	46.7	60.0	59.0	57.0	56.0	53.0	52.0	49.0	49.0	48.0	53.7	0.0	53.7
	10	57.1	67.6	46.2	65.0	64.0	63.0	61.0	57.0	54.0	50.0	49.0	47.0	57.1	0.0	57.1
	11	61.6	74.0	45.5	70.0	69.0	67.0	66.0	62.0	58.0	50.0	49.0	47.0	61.6	0.0	61.6
	12	53.0	65.9	42.4	61.0	59.0	57.0	55.0	53.0	51.0	48.0	47.0	44.0	53.0	0.0	53.0
	13	53.2	65.3	47.2	60.0	58.0	56.0	55.0	53.0	52.0	49.0	48.0	47.0	53.2	0.0	53.2
	14	61.6	85.9	47.9	71.0	68.0	62.0	59.0	55.0	53.0	50.0	50.0	49.0	61.6	0.0	61.6
	15	55.2	75.7	48.9	61.0	60.0	58.0	57.0	54.0	53.0	51.0	50.0	49.0	55.2	0.0	55.2
	16	54.5	65.6	47.7	62.0	60.0	58.0	57.0	54.0	52.0	50.0	49.0	49.0	54.5	0.0	54.5
	17	54.9	68.5	49.4	62.0	61.0	59.0	57.0	54.0	53.0	51.0	50.0	50.0	54.9	0.0	54.9
	18	52.8	66.1	45.8	59.0	58.0	56.0	55.0	53.0	51.0	49.0	48.0	47.0	52.8	0.0	52.8
Evening	19	51.4	62.1	44.3	58.0	57.0	55.0	54.0	51.0	50.0	47.0	46.0	45.0	51.4	5.0	56.4
	20	52.3	63.4	46.4	58.0	57.0	55.0	54.0	52.0	51.0	49.0	48.0	47.0	52.3	5.0	57.3
	21	53.1	70.7	45.9	63.0	60.0	56.0	55.0	52.0	50.0	47.0	47.0	46.0	53.1	5.0	58.1
Night	22	51.2	63.4	45.5	57.0	56.0	55.0	54.0	51.0	49.0	47.0	47.0	46.0	51.2	10.0	61.2
	23	50.7	62.9	43.8	58.0	57.0	55.0	53.0	51.0	49.0	46.0	45.0	44.0	50.7	10.0	60.7

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	52.8	64.4	42.4	59.0	58.0	56.0	55.0	53.0	51.0	48.0	47.0	44.0
	Max	61.6	85.9	49.9	71.0	69.0	67.0	66.0	62.0	58.0	52.0	51.0	51.0
Energy Average		56.9	Average:		62.8	61.3	59.2	57.7	54.8	53.1	50.0	49.3	48.1
Evening	Min	51.4	62.1	44.3	58.0	57.0	55.0	54.0	51.0	50.0	47.0	46.0	45.0
	Max	53.1	70.7	46.4	63.0	60.0	56.0	55.0	52.0	51.0	49.0	48.0	47.0
Energy Average		52.3	Average:		59.7	58.0	55.3	54.3	51.7	50.3	47.7	47.0	46.0
Night	Min	44.3	58.5	39.5	51.0	49.0	47.0	46.0	43.0	42.0	41.0	41.0	40.0
	Max	53.3	67.8	47.2	60.0	59.0	56.0	55.0	53.0	52.0	49.0	49.0	48.0
Energy Average		49.3	Average:		55.4	53.9	51.6	50.3	47.9	46.2	43.9	43.6	42.9

L_{eq} (dBA)		
24-Hour	*Daytime*	*Nighttime*
54.7	**56.3**	**49.3**

24-Hour CNEL (dBA)
58.0

24-Hour Noise Level Measurement Summary

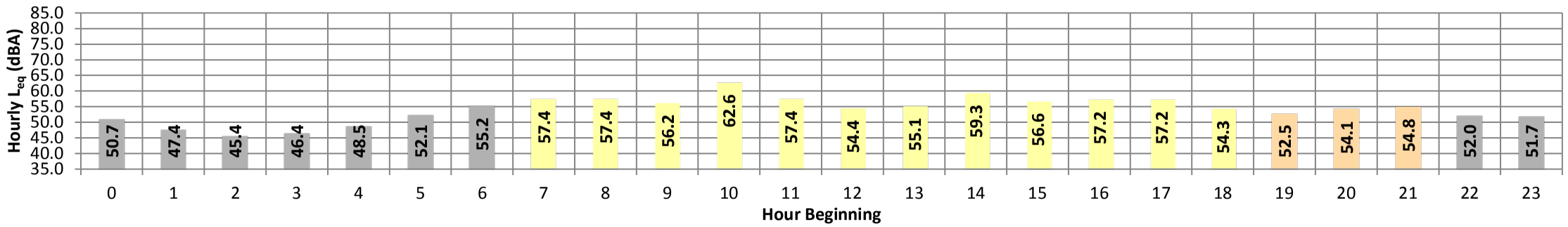
Date: Tuesday, January 08, 2019
Project: 3233 Thatcher Avenue Venice

Location: L4 - Located on Thatcher Avenue near the southern boundary of the Project site and Harbor Crossing Lane.

Meter: Piccolo I

JN: 12185
Analyst: R. Saber

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	50.7	62.4	42.4	58.0	57.0	55.0	54.0	51.0	48.0	45.0	44.0	43.0	50.7	10.0	60.7
	1	47.4	62.6	41.1	56.0	54.0	52.0	50.0	47.0	45.0	42.0	41.0	41.0	47.4	10.0	57.4
	2	45.4	62.9	41.1	53.0	51.0	49.0	47.0	44.0	43.0	42.0	41.0	41.0	45.4	10.0	55.4
	3	46.4	59.6	41.3	54.0	52.0	49.0	48.0	46.0	45.0	43.0	42.0	42.0	46.4	10.0	56.4
	4	48.5	65.7	43.3	57.0	55.0	51.0	50.0	48.0	46.0	44.0	44.0	43.0	48.5	10.0	58.5
	5	52.1	69.8	43.8	60.0	57.0	55.0	54.0	52.0	50.0	46.0	46.0	44.0	52.1	10.0	62.1
	6	55.2	72.1	47.1	63.0	61.0	59.0	58.0	55.0	53.0	50.0	49.0	48.0	55.2	10.0	65.2
Day	7	57.4	70.1	50.4	65.0	63.0	61.0	60.0	57.0	56.0	53.0	52.0	51.0	57.4	0.0	57.4
	8	57.4	71.2	49.9	64.0	63.0	61.0	59.0	57.0	56.0	54.0	53.0	51.0	57.4	0.0	57.4
	9	56.2	69.4	49.0	63.0	62.0	60.0	59.0	56.0	54.0	52.0	51.0	50.0	56.2	0.0	56.2
	10	62.6	74.2	49.6	72.0	71.0	70.0	68.0	61.0	56.0	52.0	52.0	50.0	62.6	0.0	62.6
	11	57.4	76.3	44.4	65.0	63.0	61.0	60.0	57.0	55.0	52.0	50.0	48.0	57.4	0.0	57.4
	12	54.4	72.7	45.6	61.0	60.0	57.0	56.0	54.0	52.0	49.0	49.0	47.0	54.4	0.0	54.4
	13	55.1	72.2	47.9	63.0	60.0	58.0	57.0	55.0	53.0	51.0	50.0	49.0	55.1	0.0	55.1
	14	59.3	79.9	48.9	69.0	67.0	62.0	60.0	57.0	54.0	52.0	51.0	50.0	59.3	0.0	59.3
	15	56.6	72.1	49.1	64.0	62.0	60.0	59.0	56.0	55.0	52.0	51.0	50.0	56.6	0.0	56.6
	16	57.2	75.0	49.6	65.0	63.0	61.0	59.0	56.0	55.0	52.0	51.0	51.0	57.2	0.0	57.2
	17	57.2	75.9	49.4	66.0	65.0	61.0	59.0	56.0	54.0	52.0	51.0	50.0	57.2	0.0	57.2
	18	54.3	75.5	47.3	60.0	58.0	57.0	56.0	54.0	53.0	50.0	50.0	48.0	54.3	0.0	54.3
Evening	19	52.5	64.9	45.8	58.0	56.0	55.0	54.0	53.0	51.0	49.0	48.0	47.0	52.5	5.0	57.5
	20	54.1	74.6	46.2	61.0	59.0	57.0	56.0	54.0	52.0	50.0	49.0	47.0	54.1	5.0	59.1
	21	54.8	77.0	45.5	64.0	61.0	57.0	56.0	53.0	51.0	48.0	47.0	46.0	54.8	5.0	59.8
Night	22	52.0	64.7	44.8	59.0	57.0	55.0	54.0	52.0	50.0	48.0	47.0	45.0	52.0	10.0	62.0
	23	51.7	61.6	45.1	58.0	57.0	56.0	55.0	52.0	50.0	47.0	46.0	46.0	51.7	10.0	61.7

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	54.3	69.4	44.4	60.0	58.0	57.0	56.0	54.0	52.0	49.0	49.0	47.0
	Max	62.6	79.9	50.4	72.0	71.0	70.0	68.0	61.0	56.0	54.0	53.0	51.0
Energy Average		57.7	Average:		64.8	63.1	60.8	59.3	56.3	54.4	51.8	50.9	49.6
Evening	Min	52.5	64.9	45.5	58.0	56.0	55.0	54.0	53.0	51.0	48.0	47.0	46.0
	Max	54.8	77.0	46.2	64.0	61.0	57.0	56.0	54.0	52.0	50.0	49.0	47.0
Energy Average		53.9	Average:		61.0	58.7	56.3	55.3	53.3	51.3	49.0	48.0	46.7
Night	Min	45.4	59.6	41.1	53.0	51.0	49.0	47.0	44.0	43.0	42.0	41.0	41.0
	Max	55.2	72.1	47.1	63.0	61.0	59.0	58.0	55.0	53.0	50.0	49.0	48.0
Energy Average		51.0	Average:		57.6	55.7	53.4	52.2	49.7	47.8	45.2	44.4	43.7

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
55.7	57.2	51.0

24-Hour CNEL (dBA)
59.3

24-Hour Noise Level Measurement Summary

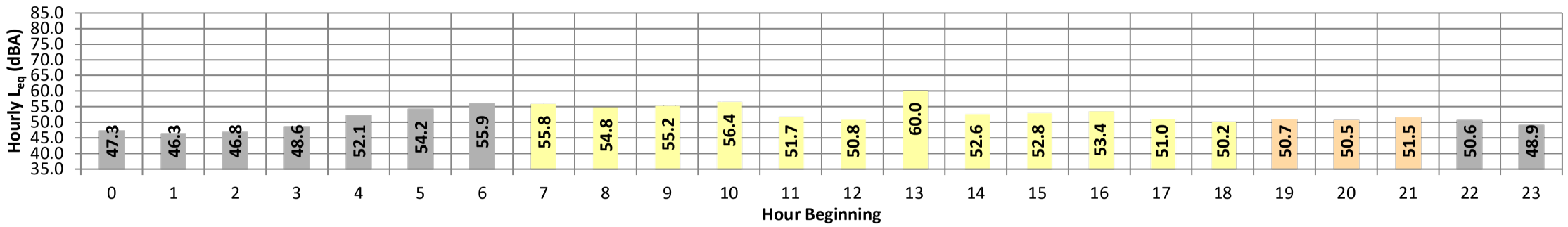
Date: Tuesday, January 08, 2019
Project: 3233 Thatcher Avenue Venice

Location: L5 - Located on Oxford Avenue near the southwestern boundary of the Project site and existing single-family residential homes.

Meter: Piccolo I

JN: 12185
Analyst: R. Saber

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	47.3	59.0	42.9	55.0	54.0	50.0	49.0	47.0	45.0	44.0	44.0	43.0	47.3	10.0	57.3
	1	46.3	61.4	43.0	52.0	50.0	48.0	47.0	46.0	45.0	44.0	44.0	43.0	46.3	10.0	56.3
	2	46.8	62.1	42.9	54.0	50.0	48.0	47.0	46.0	45.0	44.0	44.0	43.0	46.8	10.0	56.8
	3	48.6	64.6	44.2	55.0	53.0	51.0	50.0	48.0	47.0	45.0	45.0	44.0	48.6	10.0	58.6
	4	52.1	66.1	45.7	60.0	58.0	55.0	54.0	52.0	50.0	48.0	47.0	46.0	52.1	10.0	62.1
	5	54.2	62.5	48.6	59.0	58.0	57.0	56.0	55.0	53.0	51.0	50.0	49.0	54.2	10.0	64.2
	6	55.9	65.7	52.6	61.0	59.0	58.0	57.0	56.0	55.0	54.0	53.0	53.0	55.9	10.0	65.9
Day	7	55.8	69.1	51.3	61.0	60.0	59.0	58.0	56.0	54.0	53.0	53.0	52.0	55.8	0.0	55.8
	8	54.8	68.0	48.7	61.0	60.0	58.0	57.0	54.0	53.0	51.0	51.0	50.0	54.8	0.0	54.8
	9	55.2	80.2	46.0	63.0	59.0	57.0	57.0	55.0	52.0	48.0	47.0	47.0	55.2	0.0	55.2
	10	56.4	75.2	45.3	61.0	60.0	59.0	58.0	57.0	55.0	49.0	48.0	47.0	56.4	0.0	56.4
	11	51.7	66.4	43.8	60.0	58.0	56.0	55.0	51.0	49.0	46.0	46.0	44.0	51.7	0.0	51.7
	12	50.8	65.7	44.1	57.0	56.0	54.0	53.0	51.0	49.0	46.0	46.0	45.0	50.8	0.0	50.8
	13	60.0	86.0	44.6	66.0	62.0	58.0	56.0	52.0	49.0	47.0	46.0	45.0	60.0	0.0	60.0
	14	52.6	71.0	45.0	61.0	58.0	56.0	55.0	52.0	50.0	47.0	47.0	46.0	52.6	0.0	52.6
	15	52.8	77.4	45.9	60.0	58.0	56.0	55.0	52.0	50.0	48.0	47.0	46.0	52.8	0.0	52.8
	16	53.4	69.6	45.7	63.0	60.0	57.0	56.0	53.0	50.0	48.0	47.0	46.0	53.4	0.0	53.4
	17	51.0	63.3	45.2	57.0	56.0	55.0	54.0	51.0	49.0	47.0	46.0	45.0	51.0	0.0	51.0
	18	50.2	65.0	44.0	57.0	55.0	53.0	53.0	50.0	48.0	46.0	45.0	44.0	50.2	0.0	50.2
Evening	19	50.7	66.8	45.3	55.0	54.0	53.0	52.0	50.0	49.0	47.0	47.0	46.0	50.7	5.0	55.7
	20	50.5	67.4	45.0	58.0	56.0	53.0	52.0	50.0	48.0	46.0	46.0	45.0	50.5	5.0	55.5
	21	51.5	68.0	46.3	59.0	57.0	54.0	53.0	51.0	49.0	47.0	47.0	46.0	51.5	5.0	56.5
Night	22	50.6	63.1	44.7	57.0	56.0	54.0	53.0	51.0	49.0	47.0	46.0	45.0	50.6	10.0	60.6
	23	48.9	56.7	44.4	54.0	53.0	52.0	51.0	49.0	48.0	46.0	45.0	45.0	48.9	10.0	58.9

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	50.2	63.3	43.8	57.0	55.0	53.0	53.0	50.0	48.0	46.0	45.0	44.0
	Max	60.0	86.0	51.3	66.0	62.0	59.0	58.0	57.0	55.0	53.0	53.0	52.0
Energy Average		54.7	Average:		60.6	58.5	56.5	55.6	52.8	50.7	48.0	47.4	46.4
Evening	Min	50.5	66.8	45.0	55.0	54.0	53.0	52.0	50.0	48.0	46.0	46.0	45.0
	Max	51.5	68.0	46.3	59.0	57.0	54.0	53.0	51.0	49.0	47.0	47.0	46.0
Energy Average		50.9	Average:		57.3	55.7	53.3	52.3	50.3	48.7	46.7	46.7	45.7
Night	Min	46.3	56.7	42.9	52.0	50.0	48.0	47.0	46.0	45.0	44.0	44.0	43.0
	Max	55.9	66.1	52.6	61.0	59.0	58.0	57.0	56.0	55.0	54.0	53.0	53.0
Energy Average		51.3	Average:		56.3	54.6	52.6	51.6	50.0	48.6	47.0	46.4	45.7

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
53.3	54.2	51.3

24-Hour CNEL (dBA)
58.5

24-Hour Noise Level Measurement Summary

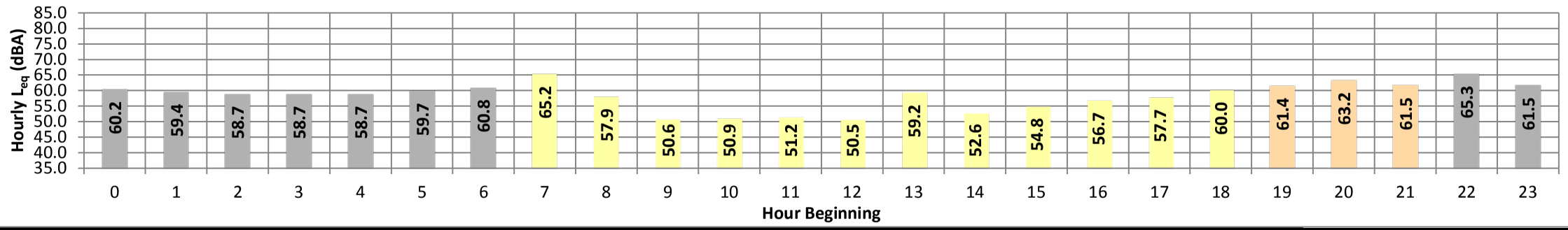
Date: Wednesday, January 09, 2019
Project: 3233 Thatcher Avenue Venice

Location: L6 - Located on Oxford Avenue near the western boundary of the Project site and existing single-family residential homes.

Meter: Piccolo I

JN: 12185
Analyst: R. Saber

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	60.2	74.6	57.5	66.0	64.0	63.0	62.0	60.0	59.0	58.0	58.0	57.0	60.2	10.0	70.2
	1	59.4	71.7	57.5	64.0	63.0	61.0	61.0	59.0	58.0	58.0	57.0	57.0	59.4	10.0	69.4
	2	58.7	67.2	57.6	60.0	60.0	59.0	59.0	58.0	58.0	58.0	58.0	57.0	58.7	10.0	68.7
	3	58.7	66.0	57.4	61.0	60.0	59.0	59.0	58.0	58.0	58.0	58.0	57.0	58.7	10.0	68.7
	4	58.7	70.3	57.5	61.0	60.0	59.0	59.0	58.0	58.0	58.0	57.0	57.0	58.7	10.0	68.7
	5	59.7	71.7	57.4	64.0	63.0	62.0	61.0	59.0	59.0	58.0	58.0	57.0	59.7	10.0	69.7
	6	60.8	70.7	57.5	66.0	65.0	64.0	64.0	60.0	58.0	58.0	58.0	57.0	60.8	10.0	70.8
Day	7	65.2	78.7	57.9	71.0	70.0	69.0	69.0	66.0	62.0	58.0	58.0	58.0	65.2	0.0	65.2
	8	57.9	76.6	42.1	71.0	66.0	61.0	60.0	56.0	50.0	45.0	44.0	43.0	57.9	0.0	57.9
	9	50.6	66.6	43.4	59.0	57.0	55.0	54.0	50.0	48.0	45.0	44.0	44.0	50.6	0.0	50.6
	10	50.9	67.8	43.7	60.0	58.0	54.0	53.0	50.0	48.0	46.0	45.0	44.0	50.9	0.0	50.9
	11	51.2	66.3	43.6	60.0	59.0	56.0	54.0	50.0	48.0	45.0	45.0	44.0	51.2	0.0	51.2
	12	50.5	64.3	42.5	57.0	56.0	54.0	53.0	51.0	49.0	46.0	45.0	44.0	50.5	0.0	50.5
	13	59.2	84.5	44.4	65.0	62.0	58.0	57.0	52.0	50.0	47.0	46.0	44.0	59.2	0.0	59.2
	14	52.6	63.9	46.3	60.0	59.0	57.0	55.0	52.0	50.0	48.0	48.0	47.0	52.6	0.0	52.6
	15	54.8	72.5	49.2	60.0	59.0	57.0	56.0	55.0	53.0	51.0	50.0	50.0	54.8	0.0	54.8
	16	56.7	68.5	54.0	60.0	59.0	58.0	58.0	57.0	56.0	55.0	55.0	54.0	56.7	0.0	56.7
	17	57.7	71.6	56.3	60.0	60.0	59.0	58.0	57.0	57.0	56.0	56.0	56.0	57.7	0.0	57.7
	18	60.0	80.4	56.5	68.0	65.0	62.0	60.0	58.0	58.0	57.0	57.0	56.0	60.0	0.0	60.0
Evening	19	61.4	78.1	56.8	71.0	69.0	65.0	63.0	59.0	58.0	57.0	57.0	57.0	61.4	5.0	66.4
	20	63.2	80.3	56.9	73.0	71.0	69.0	67.0	61.0	59.0	57.0	57.0	57.0	63.2	5.0	68.2
	21	61.5	84.0	56.9	70.0	68.0	65.0	64.0	60.0	58.0	57.0	57.0	57.0	61.5	5.0	66.5
Night	22	65.3	88.6	57.3	73.0	71.0	68.0	66.0	63.0	61.0	58.0	58.0	57.0	65.3	10.0	75.3
	23	61.5	75.9	57.7	68.0	67.0	65.0	64.0	61.0	60.0	58.0	58.0	58.0	61.5	10.0	71.5

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	50.5	63.9	42.1	57.0	56.0	54.0	53.0	50.0	48.0	45.0	44.0	43.0
	Max	65.2	84.5	57.9	71.0	70.0	69.0	69.0	66.0	62.0	58.0	58.0	58.0
Energy Average		58.1	Average:		62.6	60.8	58.3	57.3	54.5	52.4	49.9	49.4	48.7
Evening	Min	61.4	78.1	56.8	70.0	68.0	65.0	63.0	59.0	58.0	57.0	57.0	57.0
	Max	63.2	84.0	56.9	73.0	71.0	69.0	67.0	61.0	59.0	57.0	57.0	57.0
Energy Average		62.1	Average:		71.3	69.3	66.3	64.7	60.0	58.3	57.0	57.0	57.0
Night	Min	58.7	66.0	57.3	60.0	60.0	59.0	59.0	58.0	58.0	58.0	57.0	57.0
	Max	65.3	88.6	57.7	73.0	71.0	68.0	66.0	63.0	61.0	58.0	58.0	58.0
Energy Average		60.9	Average:		64.8	63.7	62.2	61.7	59.6	58.8	58.0	57.8	57.1

L_{eq} (dBA)

24-Hour	*Daytime*	*Nighttime*
60.0	**59.3**	**60.9**

24-Hour CNEL (dBA)

67.5

APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE CONTOURS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Lincoln Bl.
Road Segment: n/o W. Washington Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,170	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	82	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	136.0	feet
Centerline Dist. to Observer:	146.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	3.57	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-13.67	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-17.62	-6.82	-1.20	*-1.35*	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:	62.1	60.2	58.4	52.3	61.0	61.6
Medium Trucks:	56.0	54.5	48.2	46.6	55.1	55.3
Heavy Trucks:	57.4	55.9	46.9	48.1	56.5	56.6
Vehicle Noise:	64.1	62.3	59.1	54.5	63.0	63.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	50	108	233	502
CNEL:	54	116	250	538

Friday, February 01, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Lincoln Bl.
Road Segment: s/o W. Washington Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	40,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,080	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	82	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	136.0	feet
Centerline Dist. to Observer:	146.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.67	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.57	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.53	-6.82	-1.20	*-1.35*	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:	63.2	61.3	59.5	53.4	62.1	62.7
Medium Trucks:	57.1	55.6	49.3	47.7	56.2	56.4
Heavy Trucks:	58.4	57.0	48.0	49.2	57.6	57.7
Vehicle Noise:	65.2	63.4	60.2	55.6	64.1	64.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	59	128	276	594
CNEL:	64	137	295	636

Friday, February 01, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Lincoln Bl.
Road Segment: n/o Jefferson Wy.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	41,600	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,160	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	82	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	136.0	feet
Centerline Dist. to Observer:	146.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.75	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.49	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.44	-6.82	-1.20	*-1.35*	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:	63.2	61.3	59.6	53.5	62.1	62.8
Medium Trucks:	57.2	55.7	49.3	47.8	56.3	56.5
Heavy Trucks:	58.5	57.1	48.1	49.3	57.7	57.8
Vehicle Noise:	65.2	63.5	60.2	55.7	64.2	64.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	60	130	279	602
CNEL:	64	139	299	645

Friday, February 01, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Lincoln Bl.
Road Segment: s/o Jefferson Wy.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	41,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,160 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.75	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.49	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.44	-6.82	-1.20	*-1.35*	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:	63.2	61.3	59.6	53.5	62.1	62.8
Medium Trucks:	57.2	55.7	49.3	47.8	56.3	56.5
Heavy Trucks:	58.5	57.1	48.1	49.3	57.7	57.8
Vehicle Noise:	65.2	63.5	60.2	55.7	64.2	64.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	60	130	279	602
CNEL:	64	139	299	645

Friday, February 01, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Lincoln Bl.
Road Segment: n/o Maxella Av.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,850 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.42	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.82	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.78	-6.82	-1.20	*-1.35*	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:	62.9	61.0	59.2	53.2	61.8	62.4
Medium Trucks:	56.9	55.4	49.0	47.5	55.9	56.2
Heavy Trucks:	58.2	56.8	47.7	49.0	57.3	57.5
Vehicle Noise:	64.9	63.2	59.9	55.4	63.9	64.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	57	123	265	572
CNEL:	61	132	284	612

Friday, February 01, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Lincoln Bl.
Road Segment: s/o Maxella Av.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	44,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,420 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	5.01	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.22	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.18	-6.82	-1.20	*-1.35*	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	61.6	59.8	53.8	62.4	63.0
Medium Trucks:	57.5	56.0	49.6	48.1	56.5	56.8
Heavy Trucks:	58.8	57.4	48.3	49.6	57.9	58.1
Vehicle Noise:	65.5	63.8	60.5	56.0	64.5	64.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	63	135	291	627
CNEL:	67	145	311	671

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Lincoln Bl.
Road Segment: s/o Marina Expy.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,440 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	3.93	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-13.31	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-17.27	-6.82	-1.20	*-1.35*	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:	62.4	60.5	58.8	52.7	61.3	61.9
Medium Trucks:	56.4	54.9	48.5	47.0	55.4	55.7
Heavy Trucks:	57.7	56.3	47.3	48.5	56.9	57.0
Vehicle Noise:	64.4	62.7	59.4	54.9	63.4	63.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	53	114	246	530
CNEL:	57	122	264	568

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: W. Washington Bl.
Road Segment: w/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,370 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	46 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	110.0 feet
Centerline Dist. to Observer:	120.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	117.881
Medium Trucks:	117.806
Heavy Trucks:	117.814

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	2.89	-5.69	-1.20	*-1.05*	0.000	0.000
Medium Trucks:	75.75	-14.35	-5.69	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	81.57	-18.31	-5.69	-1.20	*-1.40*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.3	58.4	56.6	50.6	59.2	59.8
Medium Trucks:	54.5	53.0	46.6	45.1	53.6	53.8
Heavy Trucks:	56.4	55.0	45.9	47.2	55.5	55.6
Vehicle Noise:	62.5	60.8	57.4	53.0	61.5	61.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	33	70	151	326
CNEL:	35	75	162	348

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: W. Washington Bl.
Road Segment: e/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,270 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	46 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	110.0 feet
Centerline Dist. to Observer:	120.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	117.881
Medium Trucks:	117.806
Heavy Trucks:	117.814

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	2.70	-5.69	-1.20	*-1.05*	0.000	0.000
Medium Trucks:	75.75	-14.54	-5.69	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	81.57	-18.49	-5.69	-1.20	*-1.40*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.1	58.2	56.4	50.4	59.0	59.6
Medium Trucks:	54.3	52.8	46.5	44.9	53.4	53.6
Heavy Trucks:	56.2	54.8	45.7	47.0	55.3	55.5
Vehicle Noise:	62.3	60.6	57.2	52.8	61.3	61.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	32	68	147	317
CNEL:	34	73	157	338

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Jefferson Wy.
Road Segment: w/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	200 vehicles
Vehicle Speed:	25 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:	60.0 feet
Centerline Dist. to Observer:	70.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	69.921
Medium Trucks:	69.795
Heavy Trucks:	69.807

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-6.39	-2.29	-1.20	*-0.98*	0.000	0.000
Medium Trucks:	70.80	-23.63	-2.28	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	77.97	-27.58	-2.28	-1.20	*-1.61*	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:	48.9	47.0	45.2	39.1	47.8	48.4
Medium Trucks:	43.7	42.2	35.8	34.3	42.7	43.0
Heavy Trucks:	46.9	45.5	36.5	37.7	46.1	46.2
Vehicle Noise:	51.7	50.1	46.2	42.2	50.8	51.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	4	8	17	36
CNEL:	4	8	18	39

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Maxella Av.
Road Segment: e/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,120 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	40 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	110.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	108.282
Medium Trucks:	108.200
Heavy Trucks:	108.208

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-0.95	-5.14	-1.20	*-1.04*	0.000	0.000
Medium Trucks:	77.72	-18.19	-5.13	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-22.14	-5.13	-1.20	*-1.43*	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:	59.2	57.3	55.6	49.5	58.1	58.7
Medium Trucks:	53.2	51.7	45.3	43.8	52.2	52.5
Heavy Trucks:	54.5	53.1	44.1	45.3	53.7	53.8
Vehicle Noise:	61.2	59.5	56.2	51.7	60.2	60.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	24	53	114	245
CNEL:	26	56	122	262

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Marina Expy.
Road Segment: e/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,230 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	80 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	104.0 feet
Centerline Dist. to Observer:	114.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	106.869
Medium Trucks:	106.786
Heavy Trucks:	106.794

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	2.04	-5.05	-1.20	*-1.05*	0.000	0.000
Medium Trucks:	77.72	-15.19	-5.05	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-19.15	-5.05	-1.20	*-1.42*	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:	62.3	60.4	58.6	52.6	61.2	61.8
Medium Trucks:	56.3	54.8	48.4	46.9	55.3	55.6
Heavy Trucks:	57.6	56.2	47.1	48.4	56.7	56.9
Vehicle Noise:	64.3	62.6	59.3	54.8	63.3	63.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	41	88	189	407
CNEL:	44	94	202	436

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Lincoln Bl.
Road Segment: n/o W. Washington Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,180 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	3.58	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-13.65	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-17.61	-6.82	-1.20	*-1.35*	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:	62.1	60.2	58.4	52.4	61.0	61.6
Medium Trucks:	56.0	54.5	48.2	46.6	55.1	55.3
Heavy Trucks:	57.4	55.9	46.9	48.2	56.5	56.6
Vehicle Noise:	64.1	62.4	59.1	54.5	63.1	63.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	50	108	234	503
CNEL:	54	116	250	539

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Lincoln Bl.
Road Segment: s/o W. Washington Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	40,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,090 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.68	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.56	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.52	-6.82	-1.20	*-1.35*	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:	63.2	61.3	59.5	53.4	62.1	62.7
Medium Trucks:	57.1	55.6	49.3	47.7	56.2	56.4
Heavy Trucks:	58.5	57.0	48.0	49.3	57.6	57.7
Vehicle Noise:	65.2	63.4	60.2	55.6	64.2	64.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	60	128	276	595
CNEL:	64	137	296	637

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Lincoln Bl.
Road Segment: n/o Jefferson Wy.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	41,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,170	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	82	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	136.0	feet
Centerline Dist. to Observer:	146.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.76	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.48	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.43	-6.82	-1.20	*-1.35*	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:	63.3	61.4	59.6	53.5	62.2	62.8
Medium Trucks:	57.2	55.7	49.4	47.8	56.3	56.5
Heavy Trucks:	58.5	57.1	48.1	49.3	57.7	57.8
Vehicle Noise:	65.3	63.5	60.3	55.7	64.2	64.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	60	130	280	603
CNEL:	65	139	300	646

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Lincoln Bl.
Road Segment: s/o Jefferson Wy.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	41,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,170	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	82	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	136.0	feet
Centerline Dist. to Observer:	146.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.76	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.48	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.43	-6.82	-1.20	*-1.35*	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:	63.3	61.4	59.6	53.5	62.2	62.8
Medium Trucks:	57.2	55.7	49.4	47.8	56.3	56.5
Heavy Trucks:	58.5	57.1	48.1	49.3	57.7	57.8
Vehicle Noise:	65.3	63.5	60.3	55.7	64.2	64.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	60	130	280	603
CNEL:	65	139	300	646

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Lincoln Bl.
Road Segment: n/o Maxella Av.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,860 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.43	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.81	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.77	-6.82	-1.20	*-1.35*	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:	62.9	61.0	59.3	53.2	61.8	62.4
Medium Trucks:	56.9	55.4	49.0	47.5	55.9	56.2
Heavy Trucks:	58.2	56.8	47.8	49.0	57.4	57.5
Vehicle Noise:	64.9	63.2	59.9	55.4	63.9	64.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	57	123	266	573
CNEL:	61	132	285	613

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Lincoln Bl.
Road Segment: s/o Maxella Av.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	44,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,430 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	5.02	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.21	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.17	-6.82	-1.20	*-1.35*	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	61.6	59.9	53.8	62.4	63.0
Medium Trucks:	57.5	56.0	49.6	48.1	56.5	56.8
Heavy Trucks:	58.8	57.4	48.3	49.6	58.0	58.1
Vehicle Noise:	65.5	63.8	60.5	56.0	64.5	64.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	63	135	291	628
CNEL:	67	145	312	672

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Lincoln Bl.
Road Segment: s/o Marina Expy.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,450 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	3.94	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-13.30	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-17.26	-6.82	-1.20	*-1.35*	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:	62.4	60.5	58.8	52.7	61.3	61.9
Medium Trucks:	56.4	54.9	48.5	47.0	55.4	55.7
Heavy Trucks:	57.7	56.3	47.3	48.5	56.9	57.0
Vehicle Noise:	64.4	62.7	59.4	54.9	63.4	63.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	53	114	247	531
CNEL:	57	123	264	569

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: W. Washington Bl.
Road Segment: w/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,370 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	46 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	110.0 feet
Centerline Dist. to Observer:	120.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	117.881
Medium Trucks:	117.806
Heavy Trucks:	117.814

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	2.89	-5.69	-1.20	*-1.05*	0.000	0.000
Medium Trucks:	75.75	-14.35	-5.69	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	81.57	-18.31	-5.69	-1.20	*-1.40*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.3	58.4	56.6	50.6	59.2	59.8
Medium Trucks:	54.5	53.0	46.6	45.1	53.6	53.8
Heavy Trucks:	56.4	55.0	45.9	47.2	55.5	55.6
Vehicle Noise:	62.5	60.8	57.4	53.0	61.5	61.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	33	70	151	326
CNEL:	35	75	162	348

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: W. Washington Bl.
Road Segment: e/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,270	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	46	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	110.0	feet
Centerline Dist. to Observer:	120.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	117.881
Medium Trucks:	117.806
Heavy Trucks:	117.814

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	2.70	-5.69	-1.20	*-1.05*	0.000	0.000
Medium Trucks:	75.75	-14.54	-5.69	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	81.57	-18.49	-5.69	-1.20	*-1.40*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.1	58.2	56.4	50.4	59.0	59.6
Medium Trucks:	54.3	52.8	46.5	44.9	53.4	53.6
Heavy Trucks:	56.2	54.8	45.7	47.0	55.3	55.5
Vehicle Noise:	62.3	60.6	57.2	52.8	61.3	61.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	32	68	147	317
CNEL:	34	73	157	338

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Jefferson Wy.
Road Segment: w/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	220 vehicles
Vehicle Speed:	25 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:	60.0 feet
Centerline Dist. to Observer:	70.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	69.921
Medium Trucks:	69.795
Heavy Trucks:	69.807

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-5.97	-2.29	-1.20	*-0.98*	0.000	0.000
Medium Trucks:	70.80	-23.21	-2.28	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	77.97	-27.17	-2.28	-1.20	*-1.61*	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:	49.3	47.4	45.6	39.6	48.2	48.8
Medium Trucks:	44.1	42.6	36.2	34.7	43.2	43.4
Heavy Trucks:	47.3	45.9	36.9	38.1	46.5	46.6
Vehicle Noise:	52.2	50.5	46.6	42.7	51.2	51.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	4	8	18	39
CNEL:	4	9	19	41

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Maxella Av.
Road Segment: e/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,130 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	40 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	110.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	108.282
Medium Trucks:	108.200
Heavy Trucks:	108.208

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-0.91	-5.14	-1.20	*-1.04*	0.000	0.000
Medium Trucks:	77.72	-18.15	-5.13	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-22.10	-5.13	-1.20	*-1.43*	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:	59.3	57.4	55.6	49.5	58.2	58.8
Medium Trucks:	53.2	51.7	45.4	43.8	52.3	52.5
Heavy Trucks:	54.6	53.1	44.1	45.4	53.7	53.8
Vehicle Noise:	61.3	59.5	56.3	51.7	60.3	60.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	25	53	114	246
CNEL:	26	57	122	264

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Marina Expy.
Road Segment: e/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,230 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	80 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	104.0 feet
Centerline Dist. to Observer:	114.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	106.869
Medium Trucks:	106.786
Heavy Trucks:	106.794

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	2.04	-5.05	-1.20	*-1.05*	0.000	0.000
Medium Trucks:	77.72	-15.19	-5.05	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-19.15	-5.05	-1.20	*-1.42*	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:	62.3	60.4	58.6	52.6	61.2	61.8
Medium Trucks:	56.3	54.8	48.4	46.9	55.3	55.6
Heavy Trucks:	57.6	56.2	47.1	48.4	56.7	56.9
Vehicle Noise:	64.3	62.6	59.3	54.8	63.3	63.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	41	88	189	407
CNEL:	44	94	202	436

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future Without Project
Road Name: Lincoln Bl.
Road Segment: n/o W. Washington Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,370 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	3.84	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-13.40	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-17.36	-6.82	-1.20	*-1.35*	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:	62.3	60.4	58.7	52.6	61.2	61.8
Medium Trucks:	56.3	54.8	48.4	46.9	55.3	55.6
Heavy Trucks:	57.6	56.2	47.2	48.4	56.8	56.9
Vehicle Noise:	64.3	62.6	59.3	54.8	63.3	63.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	52	113	243	523
CNEL:	56	121	260	560

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future Without Project
Road Name: Lincoln Bl.
Road Segment: s/o W. Washington Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	43,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,330 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.93	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.31	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.27	-6.82	-1.20	*-1.35*	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:	63.4	61.5	59.8	53.7	62.3	62.9
Medium Trucks:	57.4	55.9	49.5	48.0	56.4	56.7
Heavy Trucks:	58.7	57.3	48.2	49.5	57.9	58.0
Vehicle Noise:	65.4	63.7	60.4	55.9	64.4	64.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	62	133	287	618
CNEL:	66	143	307	662

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future Without Project
Road Name: Lincoln Bl.
Road Segment: n/o Jefferson Wy.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	44,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,420	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	82	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	136.0	feet
Centerline Dist. to Observer:	146.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	5.01	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.22	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.18	-6.82	-1.20	*-1.35*	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	61.6	59.8	53.8	62.4	63.0
Medium Trucks:	57.5	56.0	49.6	48.1	56.5	56.8
Heavy Trucks:	58.8	57.4	48.3	49.6	57.9	58.1
Vehicle Noise:	65.5	63.8	60.5	56.0	64.5	64.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	63	135	291	627
CNEL:	67	145	311	671

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future Without Project
Road Name: Lincoln Bl.
Road Segment: s/o Jefferson Wy.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	44,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,410 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	5.00	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.23	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.19	-6.82	-1.20	*-1.35*	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	61.6	59.8	53.8	62.4	63.0
Medium Trucks:	57.5	56.0	49.6	48.0	56.5	56.7
Heavy Trucks:	58.8	57.4	48.3	49.6	57.9	58.1
Vehicle Noise:	65.5	63.8	60.5	55.9	64.5	64.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	63	135	290	626
CNEL:	67	144	311	670

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future Without Project
Road Name: Lincoln Bl.
Road Segment: n/o Maxella Av.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	40,900	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,090	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	82	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	136.0	feet
Centerline Dist. to Observer:	146.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.68	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.56	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.52	-6.82	-1.20	*-1.35*	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:	63.2	61.3	59.5	53.4	62.1	62.7
Medium Trucks:	57.1	55.6	49.3	47.7	56.2	56.4
Heavy Trucks:	58.5	57.0	48.0	49.3	57.6	57.7
Vehicle Noise:	65.2	63.4	60.2	55.6	64.2	64.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	60	128	276	595
CNEL:	64	137	296	637

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future Without Project
Road Name: Lincoln Bl.
Road Segment: s/o Maxella Av.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,690 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	5.27	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-11.97	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-15.92	-6.82	-1.20	*-1.35*	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:	63.8	61.9	60.1	54.0	62.7	63.3
Medium Trucks:	57.7	56.2	49.9	48.3	56.8	57.0
Heavy Trucks:	59.1	57.6	48.6	49.8	58.2	58.3
Vehicle Noise:	65.8	64.0	60.8	56.2	64.7	65.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	65	140	303	652
CNEL:	70	150	324	698

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future Without Project
Road Name: Lincoln Bl.
Road Segment: s/o Marina Expy.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,650 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.18	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-13.05	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-17.01	-6.82	-1.20	*-1.35*	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:	62.7	60.8	59.0	53.0	61.6	62.2
Medium Trucks:	56.6	55.1	48.8	47.2	55.7	55.9
Heavy Trucks:	58.0	56.5	47.5	48.8	57.1	57.2
Vehicle Noise:	64.7	63.0	59.7	55.1	63.7	64.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	55	119	256	552
CNEL:	59	127	274	591

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future Without Project
Road Name: W. Washington Bl.
Road Segment: w/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,510 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	46 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	110.0 feet
Centerline Dist. to Observer:	120.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	117.881
Medium Trucks:	117.806
Heavy Trucks:	117.814

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	3.14	-5.69	-1.20	*-1.05*	0.000	0.000
Medium Trucks:	75.75	-14.10	-5.69	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	81.57	-18.06	-5.69	-1.20	*-1.40*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.5	58.7	56.9	50.8	59.5	60.1
Medium Trucks:	54.8	53.3	46.9	45.3	53.8	54.0
Heavy Trucks:	56.6	55.2	46.2	47.4	55.8	55.9
Vehicle Noise:	62.8	61.1	57.6	53.2	61.8	62.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	34	73	157	339
CNEL:	36	78	168	362

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future Without Project
Road Name: W. Washington Bl.
Road Segment: e/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,410 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	46 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	110.0 feet
Centerline Dist. to Observer:	120.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	117.881
Medium Trucks:	117.806
Heavy Trucks:	117.814

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	2.96	-5.69	-1.20	*-1.05*	0.000	0.000
Medium Trucks:	75.75	-14.28	-5.69	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	81.57	-18.23	-5.69	-1.20	*-1.40*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.4	58.5	56.7	50.7	59.3	59.9
Medium Trucks:	54.6	53.1	46.7	45.2	53.6	53.9
Heavy Trucks:	56.4	55.0	46.0	47.2	55.6	55.7
Vehicle Noise:	62.6	60.9	57.4	53.1	61.6	62.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	33	71	153	330
CNEL:	35	76	163	352

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future Without Project
Road Name: Jefferson Wy.
Road Segment: w/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	210 vehicles
Vehicle Speed:	25 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:	60.0 feet
Centerline Dist. to Observer:	70.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	69.921
Medium Trucks:	69.795
Heavy Trucks:	69.807

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-6.18	-2.29	-1.20	*-0.98*	0.000	0.000
Medium Trucks:	70.80	-23.41	-2.28	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	77.97	-27.37	-2.28	-1.20	*-1.61*	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:	49.1	47.2	45.4	39.4	48.0	48.6
Medium Trucks:	43.9	42.4	36.0	34.5	43.0	43.2
Heavy Trucks:	47.1	45.7	36.7	37.9	46.3	46.4
Vehicle Noise:	52.0	50.3	46.4	42.5	51.0	51.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	4	8	17	38
CNEL:	4	9	19	40

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future Without Project
Road Name: Maxella Av.
Road Segment: e/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,190 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	40 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	110.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	108.282
Medium Trucks:	108.200
Heavy Trucks:	108.208

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-0.68	-5.14	-1.20	*-1.04*	0.000	0.000
Medium Trucks:	77.72	-17.92	-5.13	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-21.88	-5.13	-1.20	*-1.43*	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:	59.5	57.6	55.8	49.8	58.4	59.0
Medium Trucks:	53.5	52.0	45.6	44.0	52.5	52.7
Heavy Trucks:	54.8	53.4	44.3	45.6	53.9	54.1
Vehicle Noise:	61.5	59.8	56.5	51.9	60.5	60.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	25	55	118	255
CNEL:	27	59	127	273

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future Without Project
Road Name: Marina Expy.
Road Segment: e/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,600	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,360	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	80	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	104.0	feet
Centerline Dist. to Observer:	114.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	106.869
Medium Trucks:	106.786
Heavy Trucks:	106.794

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	2.29	-5.05	-1.20	*-1.05*	0.000	0.000
Medium Trucks:	77.72	-14.95	-5.05	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-18.90	-5.05	-1.20	*-1.42*	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:	62.5	60.7	58.9	52.8	61.5	62.1
Medium Trucks:	56.5	55.0	48.7	47.1	55.6	55.8
Heavy Trucks:	57.8	56.4	47.4	48.6	57.0	57.1
Vehicle Noise:	64.6	62.8	59.5	55.0	63.5	64.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	42	91	196	423
CNEL:	45	97	210	453

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future With Project
Road Name: Lincoln Bl.
Road Segment: n/o W. Washington Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,370 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	3.84	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-13.40	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-17.36	-6.82	-1.20	*-1.35*	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:	62.3	60.4	58.7	52.6	61.2	61.8
Medium Trucks:	56.3	54.8	48.4	46.9	55.3	55.6
Heavy Trucks:	57.6	56.2	47.2	48.4	56.8	56.9
Vehicle Noise:	64.3	62.6	59.3	54.8	63.3	63.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	52	113	243	523
CNEL:	56	121	260	560

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future With Project
Road Name: Lincoln Bl.
Road Segment: s/o W. Washington Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	43,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,340 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.94	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.30	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.26	-6.82	-1.20	*-1.35*	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:	63.4	61.5	59.8	53.7	62.3	62.9
Medium Trucks:	57.4	55.9	49.5	48.0	56.4	56.7
Heavy Trucks:	58.7	57.3	48.3	49.5	57.9	58.0
Vehicle Noise:	65.4	63.7	60.4	55.9	64.4	64.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	62	133	287	619
CNEL:	66	143	308	663

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future With Project
Road Name: Lincoln Bl.
Road Segment: n/o Jefferson Wy.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	44,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,430 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	5.02	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.21	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.17	-6.82	-1.20	*-1.35*	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	61.6	59.9	53.8	62.4	63.0
Medium Trucks:	57.5	56.0	49.6	48.1	56.5	56.8
Heavy Trucks:	58.8	57.4	48.3	49.6	58.0	58.1
Vehicle Noise:	65.5	63.8	60.5	56.0	64.5	64.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	63	135	291	628
CNEL:	67	145	312	672

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future With Project
Road Name: Lincoln Bl.
Road Segment: s/o Jefferson Wy.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	44,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,420 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	5.01	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.22	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.18	-6.82	-1.20	*-1.35*	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	61.6	59.8	53.8	62.4	63.0
Medium Trucks:	57.5	56.0	49.6	48.1	56.5	56.8
Heavy Trucks:	58.8	57.4	48.3	49.6	57.9	58.1
Vehicle Noise:	65.5	63.8	60.5	56.0	64.5	64.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	63	135	291	627
CNEL:	67	145	311	671

Friday, February 01, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future With Project
Road Name: Lincoln Bl.
Road Segment: n/o Maxella Av.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	41,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,100 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.69	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-12.55	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-16.51	-6.82	-1.20	*-1.35*	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:	63.2	61.3	59.5	53.5	62.1	62.7
Medium Trucks:	57.1	55.6	49.3	47.7	56.2	56.4
Heavy Trucks:	58.5	57.0	48.0	49.3	57.6	57.7
Vehicle Noise:	65.2	63.5	60.2	55.6	64.2	64.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	60	128	277	596
CNEL:	64	138	296	638

Friday, February 01, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future With Project
Road Name: Lincoln Bl.
Road Segment: s/o Maxella Av.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	47,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,700	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	82	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	136.0	feet
Centerline Dist. to Observer:	146.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	5.28	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-11.96	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-15.91	-6.82	-1.20	*-1.35*	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:	63.8	61.9	60.1	54.1	62.7	63.3
Medium Trucks:	57.7	56.2	49.9	48.3	56.8	57.0
Heavy Trucks:	59.1	57.6	48.6	49.9	58.2	58.3
Vehicle Noise:	65.8	64.0	60.8	56.2	64.8	65.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	65	141	303	653
CNEL:	70	151	325	699

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future With Project
Road Name: Lincoln Bl.
Road Segment: s/o Marina Expy.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,660 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	136.0 feet
Centerline Dist. to Observer:	146.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	140.214
Medium Trucks:	140.151
Heavy Trucks:	140.157

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	4.20	-6.82	-1.20	*-1.07*	0.000	0.000
Medium Trucks:	77.72	-13.04	-6.82	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-17.00	-6.82	-1.20	*-1.35*	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:	62.7	60.8	59.0	53.0	61.6	62.2
Medium Trucks:	56.7	55.1	48.8	47.2	55.7	55.9
Heavy Trucks:	58.0	56.6	47.5	48.8	57.1	57.3
Vehicle Noise:	64.7	63.0	59.7	55.1	63.7	64.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	55	119	257	553
CNEL:	59	127	275	592

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future With Project
Road Name: W. Washington Bl.
Road Segment: w/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,520 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	46 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	110.0 feet
Centerline Dist. to Observer:	120.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	117.881
Medium Trucks:	117.806
Heavy Trucks:	117.814

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	3.15	-5.69	-1.20	*-1.05*	0.000	0.000
Medium Trucks:	75.75	-14.08	-5.69	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	81.57	-18.04	-5.69	-1.20	*-1.40*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.6	58.7	56.9	50.8	59.5	60.1
Medium Trucks:	54.8	53.3	46.9	45.4	53.8	54.1
Heavy Trucks:	56.6	55.2	46.2	47.4	55.8	55.9
Vehicle Noise:	62.8	61.1	57.6	53.2	61.8	62.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	34	73	158	340
CNEL:	36	78	168	363

Friday, February 01, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future With Project
Road Name: W. Washington Bl.
Road Segment: e/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,410 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	46 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	110.0 feet
Centerline Dist. to Observer:	120.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	117.881
Medium Trucks:	117.806
Heavy Trucks:	117.814

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	2.96	-5.69	-1.20	*-1.05*	0.000	0.000
Medium Trucks:	75.75	-14.28	-5.69	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	81.57	-18.23	-5.69	-1.20	*-1.40*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	60.4	58.5	56.7	50.7	59.3	59.9
Medium Trucks:	54.6	53.1	46.7	45.2	53.6	53.9
Heavy Trucks:	56.4	55.0	46.0	47.2	55.6	55.7
Vehicle Noise:	62.6	60.9	57.4	53.1	61.6	62.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	33	71	153	330
CNEL:	35	76	163	352

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future With Project
Road Name: Jefferson Wy.
Road Segment: w/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	230 vehicles
Vehicle Speed:	25 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:	60.0 feet
Centerline Dist. to Observer:	70.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	69.921
Medium Trucks:	69.795
Heavy Trucks:	69.807

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-5.78	-2.29	-1.20	*-0.98*	0.000	0.000
Medium Trucks:	70.80	-23.02	-2.28	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	77.97	-26.98	-2.28	-1.20	*-1.61*	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:	49.5	47.6	45.8	39.7	48.4	49.0
Medium Trucks:	44.3	42.8	36.4	34.9	43.3	43.6
Heavy Trucks:	47.5	46.1	37.1	38.3	46.7	46.8
Vehicle Noise:	52.4	50.7	46.8	42.9	51.4	51.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	4	9	19	40
CNEL:	4	9	20	42

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future With Project
Road Name: Maxella Av.
Road Segment: e/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,190 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	40 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	100.0 feet
Centerline Dist. to Observer:	110.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	108.282
Medium Trucks:	108.200
Heavy Trucks:	108.208

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-0.68	-5.14	-1.20	*-1.04*	0.000	0.000
Medium Trucks:	77.72	-17.92	-5.13	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-21.88	-5.13	-1.20	*-1.43*	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:	59.5	57.6	55.8	49.8	58.4	59.0
Medium Trucks:	53.5	52.0	45.6	44.0	52.5	52.7
Heavy Trucks:	54.8	53.4	44.3	45.6	53.9	54.1
Vehicle Noise:	61.5	59.8	56.5	51.9	60.5	60.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	25	55	118	255
CNEL:	27	59	127	273

Friday, February 01, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Future With Project
Road Name: Marina Expy.
Road Segment: e/o Lincoln Bl.

Project Name: Thatcher
Job Number: 12185

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,370 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	80 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	104.0 feet
Centerline Dist. to Observer:	114.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	106.869
Medium Trucks:	106.786
Heavy Trucks:	106.794

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	2.31	-5.05	-1.20	*-1.05*	0.000	0.000
Medium Trucks:	77.72	-14.93	-5.05	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.99	-18.89	-5.05	-1.20	*-1.42*	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:	62.6	60.7	58.9	52.8	61.5	62.1
Medium Trucks:	56.5	55.0	48.7	47.1	55.6	55.8
Heavy Trucks:	57.9	56.4	47.4	48.7	57.0	57.1
Vehicle Noise:	64.6	62.8	59.6	55.0	63.6	64.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	42	91	197	424
CNEL:	45	98	211	454

Friday, February 01, 2019

APPENDIX 10.1:

OPERATIONAL NOISE CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL 1/31/2019

Observer Location: **R1**
Source: Mechanical Ventilation Equipment
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	193.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	183.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	10.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	20.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	193.0	-31.7	-31.7	-31.7	-31.7	-31.7	-31.7
Shielding (Barrier Attenuation)	183.0	-4.9	-4.9	-4.9	-4.9	-4.9	-4.9
Raw (Distance + Barrier)		40.6	-36.6	-36.6	-36.6	-36.6	-36.6
60 Minute Hourly Adjustment		**40.6**	**-36.6**	**-36.6**	**-36.6**	**-36.6**	**-36.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 1/31/2019

Observer Location: **R1**
Source: Trash Enclosure Activity
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	650.0 feet	***Barrier Height:***	**40.0 feet**
Noise Distance to Barrier:	30.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	620.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	650.0	-42.3	-42.3	-42.3	-42.3	-42.3	-42.3
Shielding (Barrier Attenuation)	30.0	-17.9	-17.9	-17.9	-17.9	-17.9	-17.9
Raw (Distance + Barrier)		17.1	-60.2	-60.2	-60.2	-60.2	-60.2
60 Minute Hourly Adjustment		**17.1**	**-60.2**	**-60.2**	**-60.2**	**-60.2**	**-60.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 1/31/2019

Observer Location: **R1**
Source: Pad-Mounted Transformer
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	633.0	feet	***Barrier Height:***	**40.0 feet**
Noise Distance to Barrier:	15.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	618.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	6.0	56.0	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	633.0	-40.5	-40.5	-40.5	-40.5	-40.5	-40.5
Shielding (Barrier Attenuation)	15.0	-18.5	-18.5	-18.5	-18.5	-18.5	-18.5
Raw (Distance + Barrier)		-3.0	-59.0	-59.0	-59.0	-59.0	-59.0
60 Minute Hourly Adjustment		**-3.0**	**-59.0**	**-59.0**	**-59.0**	**-59.0**	**-59.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 1/31/2019

Observer Location: **R1**
Source: Playground/Park Activity
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	233.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	223.0	feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	10.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	63.4	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	233.0	-33.4	-33.4	-33.4	-33.4	-33.4	-33.4
Shielding (Barrier Attenuation)	223.0	-5.6	-5.6	-5.6	-5.6	-5.6	-5.6
Raw (Distance + Barrier)		24.4	-39.0	-39.0	-39.0	-39.0	-39.0
60 Minute Hourly Adjustment		**24.4**	**-39.0**	**-39.0**	**-39.0**	**-39.0**	**-39.0**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/31/2019

Observer Location: **R2**
Source: Mechanical Ventilation Equipment
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	140.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	140.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	20.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	140.0	-28.9	-28.9	-28.9	-28.9	-28.9	-28.9
Shielding (Barrier Attenuation)	140.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		48.3	-28.9	-28.9	-28.9	-28.9	-28.9
60 Minute Hourly Adjustment		**48.3**	**-28.9**	**-28.9**	**-28.9**	**-28.9**	**-28.9**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/31/2019

Observer Location: **R2**
Source: Trash Enclosure Activity
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	459.0 feet	***Barrier Height:***	**40.0 feet**
Noise Distance to Barrier:	30.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	429.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	459.0	-39.3	-39.3	-39.3	-39.3	-39.3	-39.3
Shielding (Barrier Attenuation)	30.0	-18.0	-18.0	-18.0	-18.0	-18.0	-18.0
Raw (Distance + Barrier)		20.0	-57.3	-57.3	-57.3	-57.3	-57.3
60 Minute Hourly Adjustment		**20.0**	**-57.3**	**-57.3**	**-57.3**	**-57.3**	**-57.3**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/31/2019

Observer Location: **R2**
Source: Pad-Mounted Transformer
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	442.0	feet	***Barrier Height:***	**40.0 feet**
Noise Distance to Barrier:	15.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	427.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	6.0	56.0	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	442.0	-37.3	-37.3	-37.3	-37.3	-37.3	-37.3
Shielding (Barrier Attenuation)	15.0	-18.5	-18.5	-18.5	-18.5	-18.5	-18.5
Raw (Distance + Barrier)		0.2	-55.8	-55.8	-55.8	-55.8	-55.8
60 Minute Hourly Adjustment		**0.2**	**-55.8**	**-55.8**	**-55.8**	**-55.8**	**-55.8**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/31/2019

Observer Location: **R2**
Source: Playground/Park Activity
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	157.0	feet	***Barrier Height:***	**40.0 feet**
Noise Distance to Barrier:	10.0	feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	147.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	63.4	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	157.0	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9
Shielding (Barrier Attenuation)	10.0	-18.8	-18.8	-18.8	-18.8	-18.8	-18.8
Raw (Distance + Barrier)		14.7	-48.7	-48.7	-48.7	-48.7	-48.7
60 Minute Hourly Adjustment		**14.7**	**-48.7**	**-48.7**	**-48.7**	**-48.7**	**-48.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/31/2019

Observer Location: **R3**
Source: Mechanical Ventilation Equipment
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	145.0 feet	***Barrier Height:***	**40.0 feet**
Noise Distance to Barrier:	75.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	70.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	9.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	20.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	145.0	-29.2	-29.2	-29.2	-29.2	-29.2	-29.2
Shielding (Barrier Attenuation)	75.0	-15.7	-15.7	-15.7	-15.7	-15.7	-15.7
Raw (Distance + Barrier)		32.3	-44.9	-44.9	-44.9	-44.9	-44.9
60 Minute Hourly Adjustment		**32.3**	**-44.9**	**-44.9**	**-44.9**	**-44.9**	**-44.9**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/31/2019

Observer Location: **R3**
Source: Trash Enclosure Activity
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	374.0 feet	***Barrier Height:***	**40.0 feet**
Noise Distance to Barrier:	30.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	344.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	9.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	374.0	-37.5	-37.5	-37.5	-37.5	-37.5	-37.5
Shielding (Barrier Attenuation)	30.0	-17.9	-17.9	-17.9	-17.9	-17.9	-17.9
Raw (Distance + Barrier)		21.9	-55.4	-55.4	-55.4	-55.4	-55.4
60 Minute Hourly Adjustment		**21.9**	**-55.4**	**-55.4**	**-55.4**	**-55.4**	**-55.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 1/31/2019

Observer Location: **R3**
Source: Pad-Mounted Transformer
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	357.0 feet	***Barrier Height:***	**40.0 feet**
Noise Distance to Barrier:	15.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	342.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	9.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	6.0	56.0	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	357.0	-35.5	-35.5	-35.5	-35.5	-35.5	-35.5
Shielding (Barrier Attenuation)	15.0	-18.5	-18.5	-18.5	-18.5	-18.5	-18.5
Raw (Distance + Barrier)		2.0	-54.0	-54.0	-54.0	-54.0	-54.0
60 Minute Hourly Adjustment		**2.0**	**-54.0**	**-54.0**	**-54.0**	**-54.0**	**-54.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 1/31/2019

Observer Location: **R3**
Source: Playground/Park Activity
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	125.0 feet	***Barrier Height:***	**40.0 feet**
Noise Distance to Barrier:	10.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	115.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	9.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	63.4	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	125.0	-28.0	-28.0	-28.0	-28.0	-28.0	-28.0
Shielding (Barrier Attenuation)	10.0	-18.8	-18.8	-18.8	-18.8	-18.8	-18.8
Raw (Distance + Barrier)		16.6	-46.8	-46.8	-46.8	-46.8	-46.8
60 Minute Hourly Adjustment		**16.6**	**-46.8**	**-46.8**	**-46.8**	**-46.8**	**-46.8**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/31/2019

Observer Location: **R4**
Source: Mechanical Ventilation Equipment
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	482.0	feet	***Barrier Height:***	**40.0 feet**
Noise Distance to Barrier:	45.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	437.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	9.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	20.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	482.0	-39.7	-39.7	-39.7	-39.7	-39.7	-39.7
Shielding (Barrier Attenuation)	45.0	-13.6	-13.6	-13.6	-13.6	-13.6	-13.6
Raw (Distance + Barrier)		23.9	-53.3	-53.3	-53.3	-53.3	-53.3
60 Minute Hourly Adjustment		**23.9**	**-53.3**	**-53.3**	**-53.3**	**-53.3**	**-53.3**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/31/2019

Observer Location: **R4**
Source: Trash Enclosure Activity
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	63.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	63.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	9.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	63.0	-22.0	-22.0	-22.0	-22.0	-22.0	-22.0
Shielding (Barrier Attenuation)	63.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		55.3	-22.0	-22.0	-22.0	-22.0	-22.0
60 Minute Hourly Adjustment		**55.3**	**-22.0**	**-22.0**	**-22.0**	**-22.0**	**-22.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 1/31/2019

Observer Location: **R4**
Source: Pad-Mounted Transformer
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	68.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	68.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	9.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	6.0	56.0	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	68.0	-21.1	-21.1	-21.1	-21.1	-21.1	-21.1
Shielding (Barrier Attenuation)	68.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		34.9	-21.1	-21.1	-21.1	-21.1	-21.1
60 Minute Hourly Adjustment		**34.9**	**-21.1**	**-21.1**	**-21.1**	**-21.1**	**-21.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 1/31/2019

Observer Location: **R4**
Source: Playground/Park Activity
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	376.0 feet	***Barrier Height:***	**40.0 feet**
Noise Distance to Barrier:	30.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	346.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	9.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	63.4	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	376.0	-37.5	-37.5	-37.5	-37.5	-37.5	-37.5
Shielding (Barrier Attenuation)	30.0	-18.0	-18.0	-18.0	-18.0	-18.0	-18.0
Raw (Distance + Barrier)		7.9	-55.5	-55.5	-55.5	-55.5	-55.5
60 Minute Hourly Adjustment		**7.9**	**-55.5**	**-55.5**	**-55.5**	**-55.5**	**-55.5**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/31/2019

Observer Location: **R5**
Source: Mechanical Ventilation Equipment
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	455.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	406.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	49.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	20.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	455.0	-39.2	-39.2	-39.2	-39.2	-39.2	-39.2
Shielding (Barrier Attenuation)	406.0	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1
Raw (Distance + Barrier)		32.9	-44.3	-44.3	-44.3	-44.3	-44.3
60 Minute Hourly Adjustment		**32.9**	**-44.3**	**-44.3**	**-44.3**	**-44.3**	**-44.3**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/31/2019

Observer Location: **R5**
Source: Trash Enclosure Activity
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	75.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	35.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	40.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	75.0	-23.5	-23.5	-23.5	-23.5	-23.5	-23.5
Shielding (Barrier Attenuation)	35.0	-5.3	-5.3	-5.3	-5.3	-5.3	-5.3
Raw (Distance + Barrier)		48.5	-28.8	-28.8	-28.8	-28.8	-28.8
60 Minute Hourly Adjustment		**48.5**	**-28.8**	**-28.8**	**-28.8**	**-28.8**	**-28.8**

STATIONARY SOURCE NOISE PREDICTION MODEL 1/31/2019

Observer Location: **R5**
Source: Pad-Mounted Transformer
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	77.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	43.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	34.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	6.0	56.0	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	77.0	-22.2	-22.2	-22.2	-22.2	-22.2	-22.2
Shielding (Barrier Attenuation)	43.0	-5.3	-5.3	-5.3	-5.3	-5.3	-5.3
Raw (Distance + Barrier)		28.5	-27.5	-27.5	-27.5	-27.5	-27.5
60 Minute Hourly Adjustment		**28.5**	**-27.5**	**-27.5**	**-27.5**	**-27.5**	**-27.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 1/31/2019

Observer Location: **R5**
Source: Playground/Park Activity
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	339.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	288.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	51.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	63.4	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	339.0	-36.6	-36.6	-36.6	-36.6	-36.6	-36.6
Shielding (Barrier Attenuation)	288.0	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1
Raw (Distance + Barrier)		21.7	-41.7	-41.7	-41.7	-41.7	-41.7
60 Minute Hourly Adjustment		**21.7**	**-41.7**	**-41.7**	**-41.7**	**-41.7**	**-41.7**

STATIONARY SOURCE NOISE PREDICTION MODEL 1/31/2019

Observer Location: **R6**
Source: Mechanical Ventilation Equipment
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	251.0 feet	***Barrier Height:***	**25.0 feet**
Noise Distance to Barrier:	100.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	151.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	20.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	251.0	-34.0	-34.0	-34.0	-34.0	-34.0	-34.0
Shielding (Barrier Attenuation)	100.0	-8.5	-8.5	-8.5	-8.5	-8.5	-8.5
Raw (Distance + Barrier)		34.7	-42.5	-42.5	-42.5	-42.5	-42.5
60 Minute Hourly Adjustment		**34.7**	**-42.5**	**-42.5**	**-42.5**	**-42.5**	**-42.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 1/31/2019

Observer Location: **R6**
Source: Trash Enclosure Activity
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	284.0 feet	***Barrier Height:***	**25.0 feet**
Noise Distance to Barrier:	35.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	249.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	284.0	-35.1	-35.1	-35.1	-35.1	-35.1	-35.1
Shielding (Barrier Attenuation)	35.0	-15.9	-15.9	-15.9	-15.9	-15.9	-15.9
Raw (Distance + Barrier)		26.3	-51.0	-51.0	-51.0	-51.0	-51.0
60 Minute Hourly Adjustment		**26.3**	**-51.0**	**-51.0**	**-51.0**	**-51.0**	**-51.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 1/31/2019

Observer Location: **R6**
Source: Pad-Mounted Transformer
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	271.0	feet	***Barrier Height:***	**25.0 feet**
Noise Distance to Barrier:	15.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	256.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	6.0	56.0	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	271.0	-33.1	-33.1	-33.1	-33.1	-33.1	-33.1
Shielding (Barrier Attenuation)	15.0	-17.2	-17.2	-17.2	-17.2	-17.2	-17.2
Raw (Distance + Barrier)		5.7	-50.3	-50.3	-50.3	-50.3	-50.3
60 Minute Hourly Adjustment		**5.7**	**-50.3**	**-50.3**	**-50.3**	**-50.3**	**-50.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 1/31/2019

Observer Location: **R6**
Source: Playground/Park Activity
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	139.0	feet	***Barrier Height:***	**25.0 feet**
Noise Distance to Barrier:	20.0	feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	119.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	63.4	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	139.0	-28.9	-28.9	-28.9	-28.9	-28.9	-28.9
Shielding (Barrier Attenuation)	20.0	-17.2	-17.2	-17.2	-17.2	-17.2	-17.2
Raw (Distance + Barrier)		17.3	-46.1	-46.1	-46.1	-46.1	-46.1
60 Minute Hourly Adjustment		**17.3**	**-46.1**	**-46.1**	**-46.1**	**-46.1**	**-46.1**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/31/2019

Observer Location: **R7**
Source: Mechanical Ventilation Equipment
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	184.0	feet	***Barrier Height:***	**25.0 feet**
Noise Distance to Barrier:	60.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	124.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	20.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	184.0	-31.3	-31.3	-31.3	-31.3	-31.3	-31.3
Shielding (Barrier Attenuation)	60.0	-8.5	-8.5	-8.5	-8.5	-8.5	-8.5
Raw (Distance + Barrier)		37.4	-39.8	-39.8	-39.8	-39.8	-39.8
60 Minute Hourly Adjustment		**37.4**	**-39.8**	**-39.8**	**-39.8**	**-39.8**	**-39.8**

STATIONARY SOURCE NOISE PREDICTION MODEL

1/31/2019

Observer Location: **R7**
Source: Trash Enclosure Activity
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	482.0	feet	***Barrier Height:***	**25.0 feet**
Noise Distance to Barrier:	35.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	447.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	482.0	-39.7	-39.7	-39.7	-39.7	-39.7	-39.7
Shielding (Barrier Attenuation)	35.0	-15.7	-15.7	-15.7	-15.7	-15.7	-15.7
Raw (Distance + Barrier)		21.9	-55.4	-55.4	-55.4	-55.4	-55.4
60 Minute Hourly Adjustment		**21.9**	**-55.4**	**-55.4**	**-55.4**	**-55.4**	**-55.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 1/31/2019

Observer Location: **R7**
Source: Pad-Mounted Transformer
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	467.0	feet	***Barrier Height:***	**25.0 feet**
Noise Distance to Barrier:	15.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	452.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	6.0	56.0	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	467.0	-37.8	-37.8	-37.8	-37.8	-37.8	-37.8
Shielding (Barrier Attenuation)	15.0	-17.1	-17.1	-17.1	-17.1	-17.1	-17.1
Raw (Distance + Barrier)		1.1	-54.9	-54.9	-54.9	-54.9	-54.9
60 Minute Hourly Adjustment		**1.1**	**-54.9**	**-54.9**	**-54.9**	**-54.9**	**-54.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 1/31/2019

Observer Location: **R7**
Source: Playground/Park Activity
Condition: Operational

Project Name: Thatcher
Job Number: 12185
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	150.0	feet	***Barrier Height:***	**25.0 feet**
Noise Distance to Barrier:	10.0	feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	140.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	63.4	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	150.0	-29.5	-29.5	-29.5	-29.5	-29.5	-29.5
Shielding (Barrier Attenuation)	10.0	-17.6	-17.6	-17.6	-17.6	-17.6	-17.6
Raw (Distance + Barrier)		16.3	-47.1	-47.1	-47.1	-47.1	-47.1
60 Minute Hourly Adjustment		**16.3**	**-47.1**	**-47.1**	**-47.1**	**-47.1**	**-47.1**