APPENDIX 12

Comstock Residential

NOISE IMPACT ANALYSIS

CITY OF WHITTIER

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
L_{min}	Minimum level measured over the time interval
mph	Miles per hour
OPR	Office of Planning and Research
PPV	Peak particle velocity
Project	Comstock 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 potential noise impacts and the necessary noise mitigation measures, if any, for the proposed Comstock Residential ("Project"). The Project site is located at the southwest corner of the intersection of Philadelphia Street and Comstock Avenue, in the City of Whittier.

The results of this Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines (1). Table ES-1 shows the findings of significance for each potential noise and/or vibration impact under CEQA. All impacts are considered less than significant without mitigation.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

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

As discussed in the following report:

- the proposed buildings on the Project site would be exposed to noise levels that are normally compatible noise level standards of the City of Whittier;
- with standard construction techniques and the provision of mechanical ventilation for each unit, interior noise levels would comply with State and City of Whittier interior noise standards;
- operational noise sources, including heating, ventilation, and air conditioning units, and trash enclosure/collection activity, would not substantially increase noise levels in the Project area;
- construction activities would not expose local properties to excessive noise levels or result in substantial noise level increases; and,
- construction activities would not expose local properties to excessive vibration levels.

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1 INTRODUCTION

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

1.1 SITE LOCATION

The proposed Comstock Residential ("Project") is located at the southwest corner of the intersection of Philadelphia Street and Comstock Avenue, in the City of Whittier. The Project's location in relation to the surrounding area is shown on Exhibit 1-A.

The Project site is generally surrounded by commercial, medical, and residential land uses, with the nearest residential land use is approximately 36 feet west of the Project site and the Whittier Hospital Women's Health Center is located 80 feet north of the Project site.

1.2 PROJECT DESCRIPTION

Exhibit 1-B illustrates the preliminary Project site plan. The proposed Project consists of the development of a 52-unit multifamily development within a single four-story building with units ranging from studios to two bedrooms.

PROJECT DESIGN FEATURE

Project Design Features (PDF)

STRUCTURAL

To meet the State and City of Whittier 45 dBA CNEL interior noise standards for residential land use the Project is committed to and shall provide the following or equivalent noise abatement measures on Buildings A through F:

- Windows & Glass Doors: Windows and glass doors will be well-fitted, well-weather-stripped assemblies and shall have minimum sound transmission class (STC) ratings of 27.
- Exterior Doors: All exterior doors facing SR74 on Lots 1 through 32 will be well-fitted, 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.
- 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. All exterior wall assemblies facing Riverside Drive or Grand Avenue shall have a minimum STC rating of 46.

- Roof: Roof sheathing of wood construction shall be per manufacturer's specification or caulked plywood of at least one-half inch thick. Insulation with at least a rating of R-19 shall be used in the attic space.
- Ceilings: Ceilings shall be per manufacturer's specification or constructed of well-sealed gypsum board of at least one-half inch thick.
- 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.

EXHIBIT 1-A: LOCATION MAP

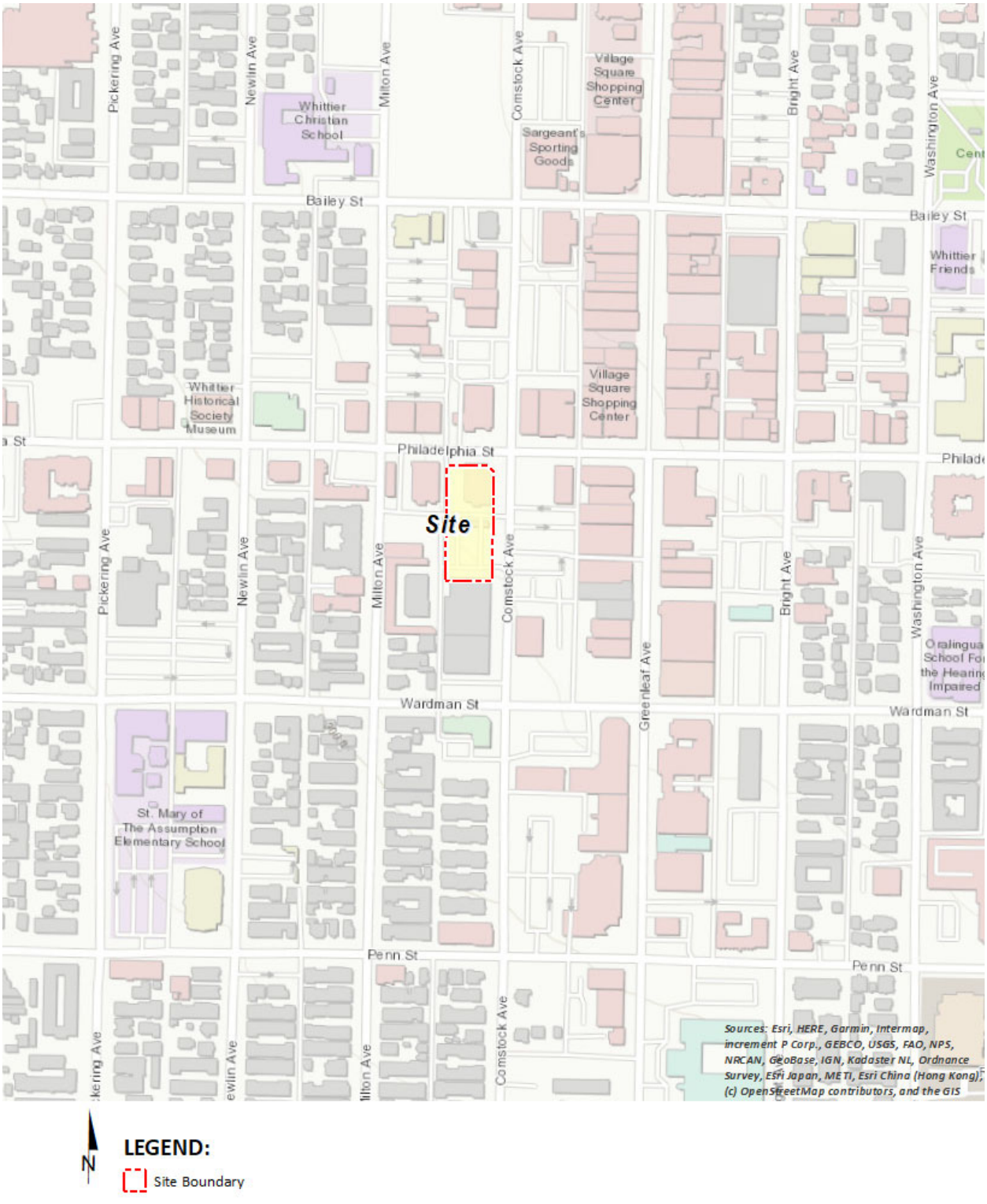
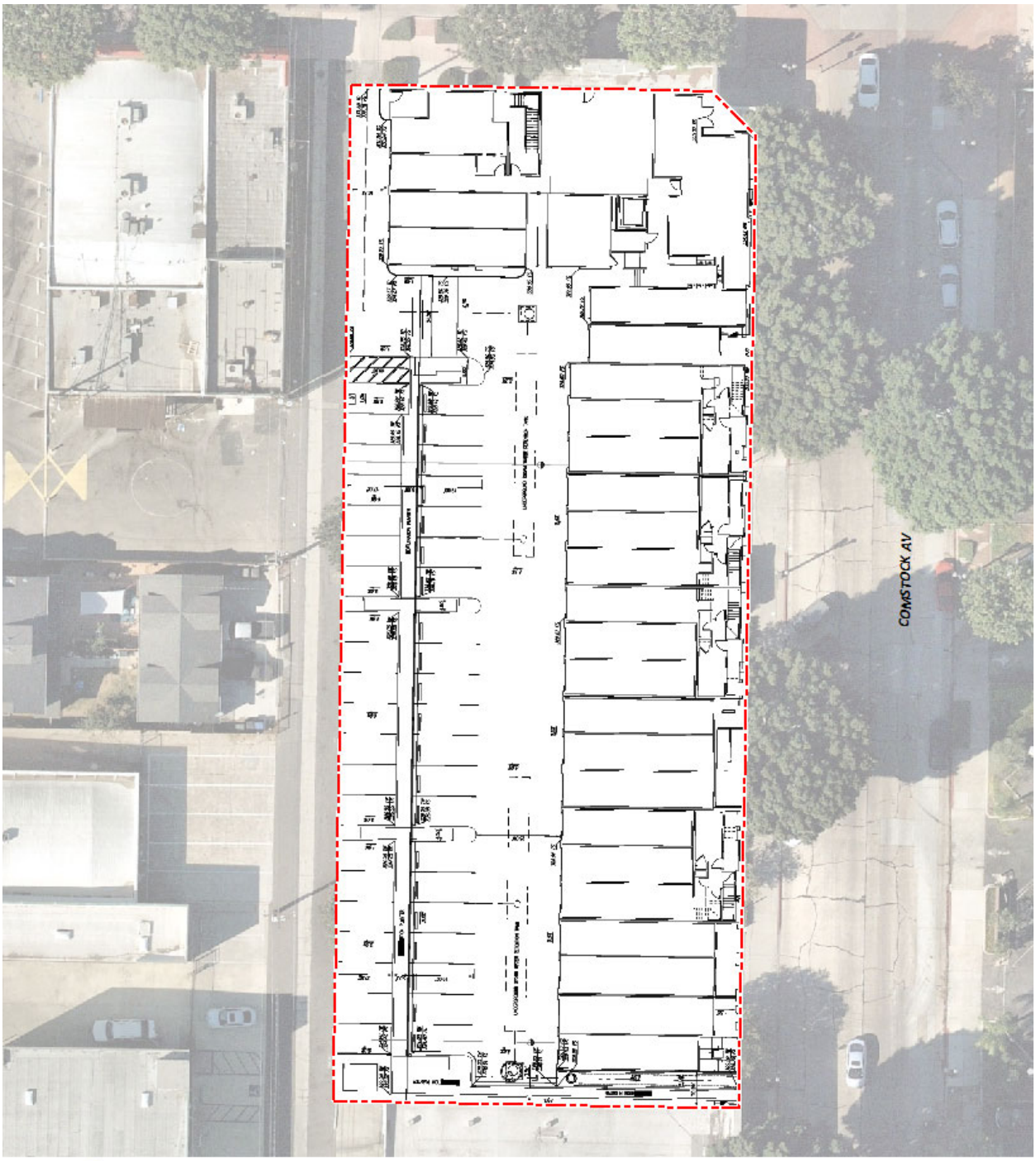


EXHIBIT 1-B: SITE PLAN



2 FUNDAMENTALS

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

EXHIBIT 2-A: TYPICAL NOISE LEVELS

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

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

2.1 RANGE OF NOISE

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

at approximately 100 feet, which can cause serious discomfort (3). Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

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

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

2.3 SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. Based on guidance from the U.S. Department of Transportation, Federal Highway Administration (FHWA), Office of Environment and Planning, Noise and Air Quality Branch, the way noise reduces with distance depends on the following factors.

2.3.1 GEOMETRIC SPREADING

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

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation

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

2.3.3 ATMOSPHERIC EFFECTS

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

2.3.4 SHIELDING

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an “out of sight, out of mind” effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearest residents. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The Federal Highway Administration (FHWA) does not consider the planting of vegetation to be a noise abatement measure (4).

2.3.5 REFLECTION

Field studies conducted by the FHWA have shown that the reflection from barriers and buildings does not substantially increase noise levels (4). If all the noise striking a structure was reflected back to a given receiving point, the increase would be theoretically limited to 3 dBA. Further, not all the acoustical energy is reflected back to same point. Some of the energy would go over the structure, some is reflected to points other than the given receiving point, some is scattered by ground coverings (e.g., grass and other plants), and some is blocked by intervening structures and/or obstacles (e.g., the noise source itself). Additionally, some of the reflected energy is lost due to the longer path that the noise must travel. FHWA measurements made to quantify reflective increases in traffic noise have not shown an increase of greater than 1-2 dBA; an increase that is not perceptible to the average human ear.

2.4 NOISE CONTROL

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

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by up to 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receiver. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source (4).

2.6 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, recreation areas or buildings where people normally sleep. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized (5).

2.7 COMMUNITY RESPONSE TO NOISE

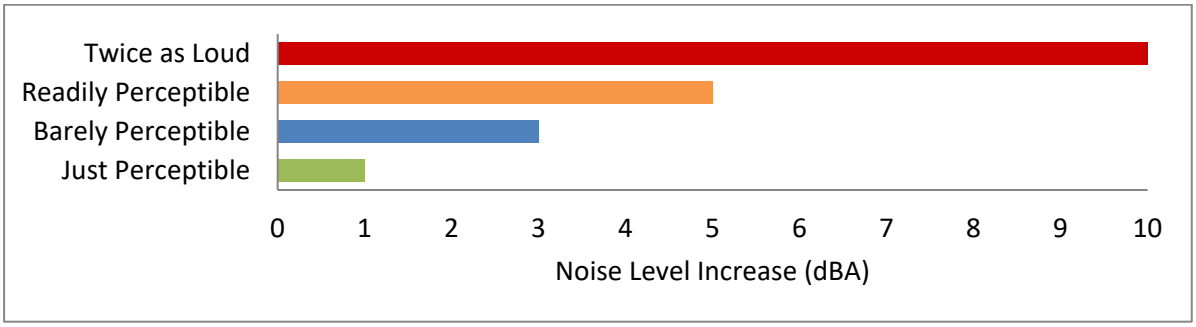
Community responses to noise varies depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

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

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

environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment (6). Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain (6). Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. A change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (4)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



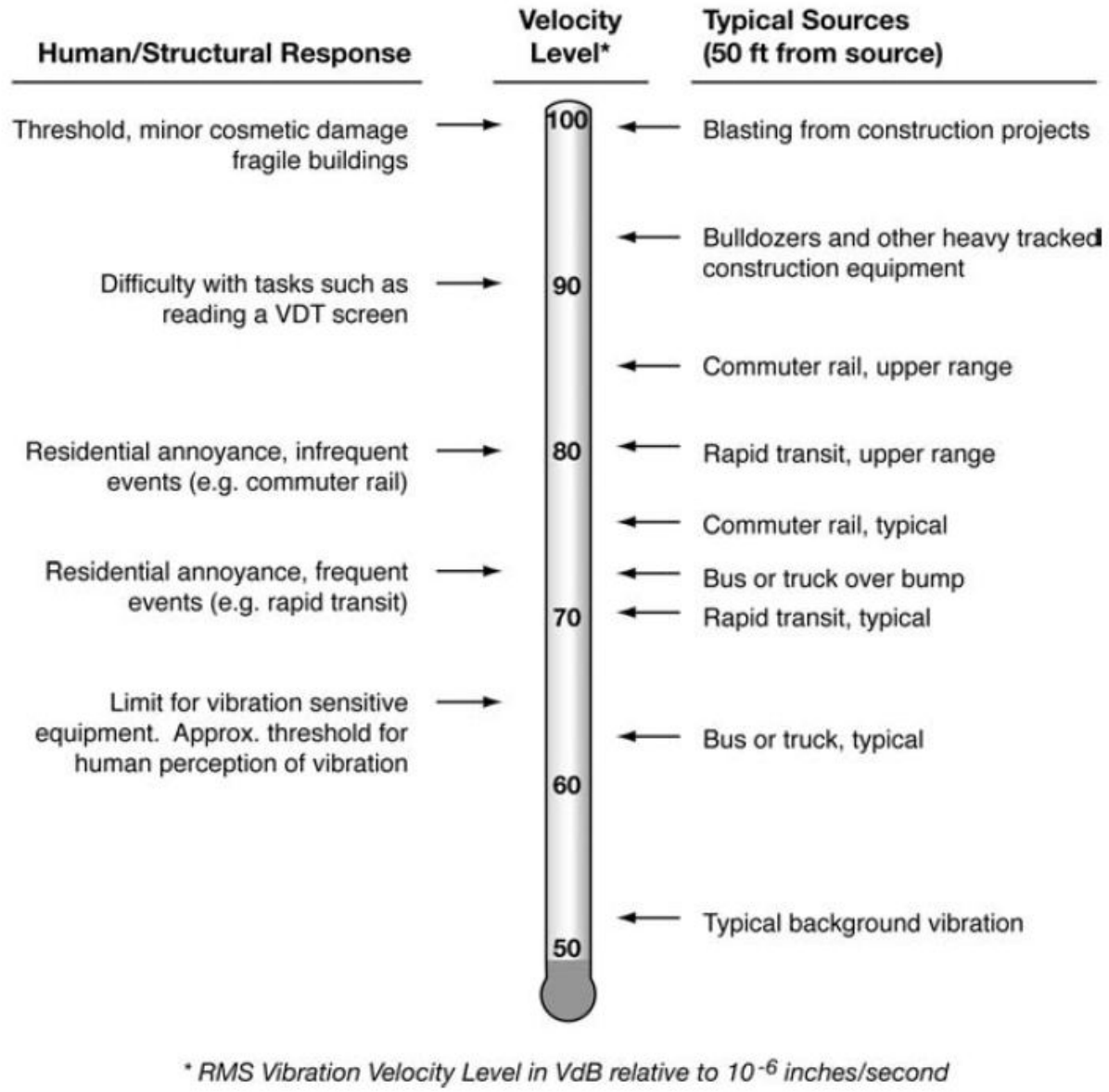
2.8 VIBRATION

Per the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (7), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

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

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

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



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

3 REGULATORY SETTING

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

3.1 STATE

CALIFORNIA ENVIRONMENTAL QUALITY ACT

The State of California regulates transportation noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research (OPR). (8) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

CALIFORNIA BUILDING CODE – TITLE 24

The State of California's interior noise standards for all new construction with habitable spaces are codified in the California Code of Regulations (CCR), Title 24, Building Standards Administrative Code, Chapter 12, Section 1206. A habitable space in a building is defines as a space used for "living, sleeping, eating, or cooking. Bathrooms, toilet rooms, closets, halls, storage, or utility spaces and similar areas are not considered habitable spaces." These noise standards are primarily applicable to all new residential construction, inns, hotels, motels, and residential care facility land uses in California for controlling interior noise levels resulting from exterior noise sources. The acceptable interior noise limit is 45 CNEL in all habitable rooms (9).

3.2 CITY OF WHITTIER

GENERAL PLAN

The City of Whittier has adopted Section 8, *Noise Element,* of the General Plan to control and abate environmental noise, and to protect the citizens of Whittier from excessive exposure to noise (10). The Noise section specifies the maximum allowable exterior noise levels for new developments impacted by transportation noise sources such as arterial roads, freeways, airports, and railroads. In addition, the Noise section identifies noise polices designed to protect, create, and maintain an environment free from noise that may jeopardize the health or welfare

of sensitive receivers, or degrade quality of life. To protect City of Whittier residents from excessive noise, the Noise section contains the following goal related to the Project:

Goal 1: Minimize Noise Levels

Policy 1.1: Work for Separation of Freeways and Highways from noise-sensitive land uses.

Policy 1.2: Correct existing noise problems and avoid future noise problems.

Goal 2: Discourage Noise

Policy 2.1: Control Noise at their source.

Policy 2.2: Evaluate and control noise impacts during review process.

Policy 2.3: Encourage noise attenuation devices and limited hours of operation.

Policy 2.4: Support the enforcement of noise control regulations.

Policy 2.5: Establish acceptable noise standards.

Land Use Compatibility

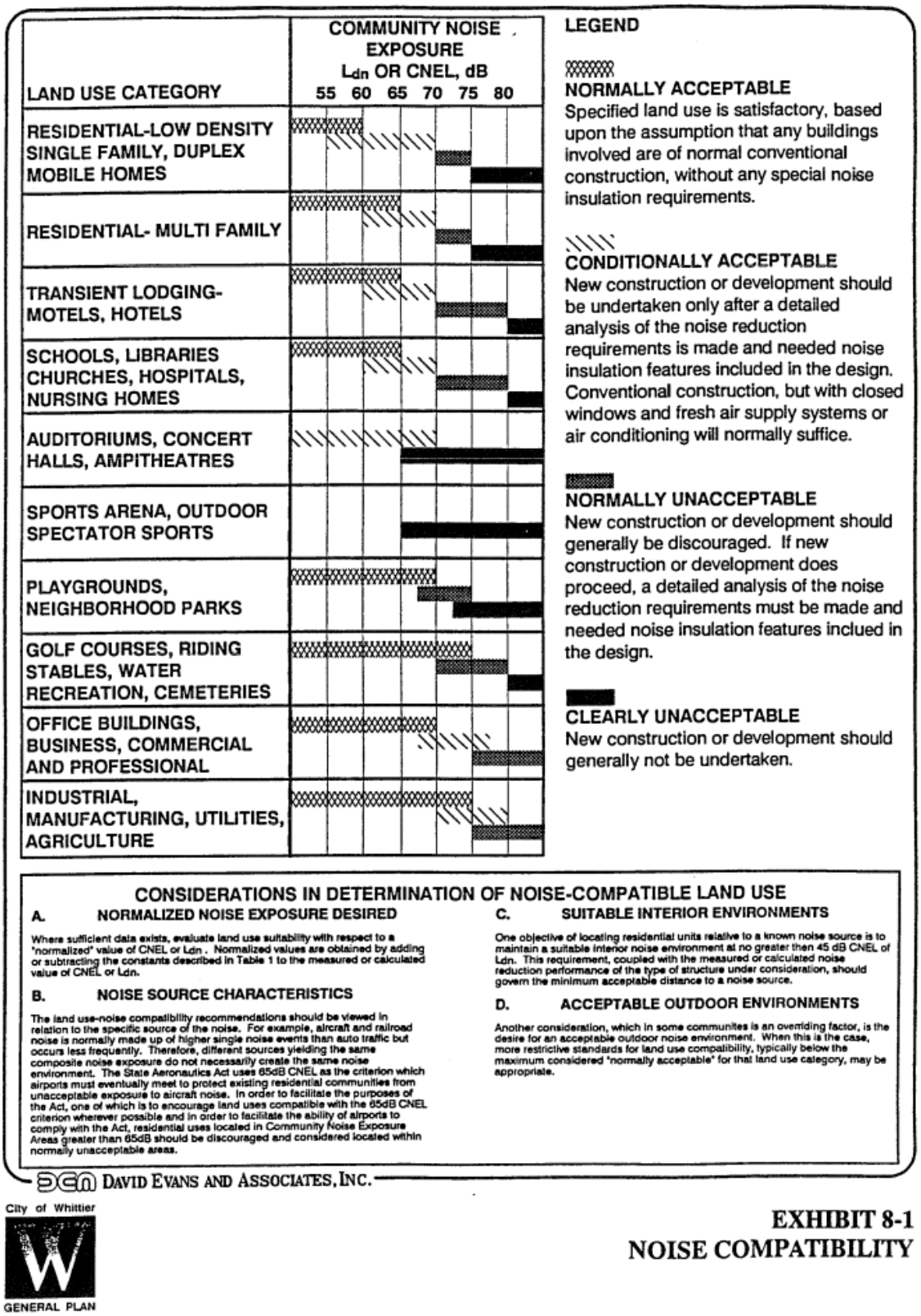
The *Noise Compatibility Matrix* (Table 3-1) in the City of Whittier General Plan Noise section provides guidelines to evaluate the land use compatibility of transportation related noise. The compatibility criteria, shown on Exhibit 3-A, provides the City with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels.

The *Noise Compatibility Matrix* describes categories of compatibility and not specific noise standards. According to these categories of compatibility, sensitive residential land use in the Project Study area is considered *clearly compatible* with exterior noise levels below 60 dBA CNEL and *normally compatible* with exterior noise levels below 70 dBA CNEL. For *normally compatible* land use, *new construction or development should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.* (10)

MUNICIPAL CODE

To analyze noise impacts originating from a designated fixed location or private property such as the Comstock Residential Project, stationary-source (operational) noise is typically evaluated against standards established under a City's Municipal Code where available.

EXHIBIT 3-A: NOISE AND LAND USE COMPATIBILITY MATRIX



Source: City of Whittier General Plan, 1993.

Chapter 8.32 of the City of Whittier Municipal Code regulates control of noise and vibration. This Chapter was updated in January 2010 and replaced text that prescribed specific noise limits, similar to the County Code above. The current City Municipal Code is more general in nature and does not prescribe specific noise limits. Section 8.32.030 of the City Municipal Code specifies: It shall be unlawful for any person to willfully make or continue, or cause to be made or continued, any excessive or unreasonable 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. Section 8.32.060 indicates that the official's normal hearing faculties shall be the primary means of noise detection. Based on the evaluation criteria, a readily noticeable change of ≥ 5 dBA CNEL Project increase is used to evaluate operational noise impacts. City of Whittier noise ordinance is included in Appendix 3.1.

3.4 CONSTRUCTION NOISE STANDARDS

Section 8.32.040 discusses loud, annoying, and unnecessary noises, and specifically defines horns and signaling devices (section F), erection or demolition of buildings, the grading and excavation of land, the start up and use of heavy equipment (e.g., dump trucks and graders), and the use of jack hammers. These noises would be in violation of the Municipal Code except on weekdays between the hours of 7:00 a.m. and 6:00 p.m. and on Saturdays 8:00 a.m. to 5:00 p.m.

However, neither the City of Whittier General Plan nor Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers. Therefore, a numerical construction threshold based on Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* is used for analysis of daytime construction impacts. According to the FTA, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should account for the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. Due to the lack of standardized construction noise thresholds, the FTA provides guidelines that can be considered reasonable criteria for construction noise assessment. The FTA considers a daytime exterior construction noise level of 80 dBA L_{eq} as a reasonable threshold for residential land uses, 85 dBA L_{eq} for commercial land uses, and 90 dBA L_{eq} for industrial uses (7 p. 179).

3.5 CONSTRUCTION VIBRATION STANDARDS

Construction activity can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. (7)

To analyze vibration impacts originating from the operation and construction of the Comstock Residential, vibration-generating activities are appropriately evaluated against standards established under a City's Municipal Code, if such standards exist. However, the City of Whittier

does not identify specific vibration level limits. Therefore, for analysis purposes, the Caltrans *Transportation and Construction Vibration Guidance Manual*, (11 p. 38) Table 19, vibration damage are used in this noise study to assess potential temporary construction-related impacts at adjacent building locations.

The construction vibration damage potential criteria include consideration of the building conditions. (3 p. 182) Table 3-1 describes the maximum acceptable transient and continuous vibration building damage potential levels by structure type and condition. The existing buildings adjacent to the Project site can best be described as "older residential structures" with a maximum acceptable continuous vibration threshold of 0.3 PPV (in/sec).

TABLE 3-1: BUILDING DAMAGE VIBRATION CRITERIA

Structure and Condition	Maximum Transient Vibration Levels PPV (in/sec)	Maximum Continuous Vibration Levels PPV (in/sec)
Extremely fragile historic buildings	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, Tables 19, p. 38.

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

4.1 CEQA GUIDELINES NOT FURTHER ANALYZED

The Project site is not located within two miles of a public airport or within an airport land use plan. The closest airport is the San Gabriel Valley Airport located 7.2 miles north of the Project site. As such, the Project site would not be exposed to excessive noise levels from airport operations, and therefore, impacts are considered *less than significant,* and no further noise analysis is conducted in relation to Guideline C.

4.2 NOISE-SENSITIVE RECEIVERS

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (12)

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged. The Federal Interagency Committee on Noise (FICON) (13) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient

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

As previously stated, the approach used in this noise study recognizes *that there is no single noise increase that renders the noise impact significant*, based on a 2008 California Court of Appeal ruling on Gray v. County of Madera. (12) For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria would be exceeded. Therefore, for this analysis, FICON identifies a *readily perceptible* 5 dBA or greater project-related noise level increase is considered a significant impact when the noise compatibility levels (Exhibit 3-A) for a given land use is exceeded. Per the FICON, in areas where the without project noise levels range from 60 to 65 dBA, a 3 dBA *barely perceptible* noise level increase appears to be appropriate for most people. When the without project noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance.

The FICON guidance provides an established source of criteria to assess the impacts of a substantial permanent increase in ambient noise levels. Based on the FICON criteria, the amount to which a given noise level increase is considered acceptable is reduced when the without Project noise levels are already shown to exceed certain land-use specific exterior noise level criteria. The specific levels are based on typical responses to noise level increases of 5 dBA or *readily perceptible*, 3 dBA or *barely perceptible*, and 1.5 dBA depending on the underlying without Project noise levels for noise-sensitive uses. These levels of increases and their perceived acceptance are consistent with guidance provided by both the Federal Highway Administration (4 p. 9) and Caltrans (14 p. 2_48).

Based on Section 8.32.060 of the City of Whittier Municipal Code, a readily noticeable change of ≥ 5 dBA CNEL Project increase is used to evaluate operational noise impacts.

4.3 SIGNIFICANCE CRITERIA SUMMARY

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

TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Condition(s)	Significance Criteria	
		Daytime	Nighttime
On-Site	Exterior Noise Compatibility[1]	See Exhibit 3-A	
	Interior Noise Level Standard[1]	45 dBA CNEL	
Operational	Exterior Noise Level Standards[2]	≥ 5 dBA CNEL Project increase	
Construction	Noise Level Threshold[3]	80 dBA L_{eq}	n/a
	Vibration Level Threshold[3]	0.3 in/sec PPV	

[1] City of Whittier General Plan.
[2] City of Whittier Municipal Code Section 8.32.060.
[3] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, 2018.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at five locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Tuesday, November 23rd, 2021. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (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 every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (2) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (7)

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. (7) 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.

5.3 NOISE MEASUREMENT RESULTS

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

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

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]	
		Daytime	Nighttime
L1	Located northwest of the Project site near multi-family residential at 6704 Milton Avenue.	55.4	48.9
L2	Located east of the Project site near Victory Outreach Church at 7021 Greenleaf Ave #1305.	58.2	53.4
L3	Located southwest of the Project site near single-family residence at 7052 Milton Avenue.	62.8	54.7
L4	Located west of the Project site near single-family residence at 7014 Milton Avenue.	55.9	51.0

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

Table 5-1 provides the (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 local surface streets surrounding the Project site and measurement locations. This includes the auto and heavy truck activities on study area roadway segments near the noise level measurement locations.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

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6 TRAFFIC NOISE PREDICTION METHODS AND PROCEDURES

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

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The expected roadway noise level increases from vehicular traffic were calculated by Urban Crossroads, Inc. using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (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. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (18)

Table 6-1 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. Table 6-2 provides the time of day (daytime, evening, and nighttime) vehicle splits and Table 6-3 presents the traffic flow distributions (vehicle mix) used for this analysis. The vehicle mix provides the hourly distribution percentages of automobile, medium trucks, and heavy trucks for input into the FHWA noise prediction model.

TABLE 6-1: ROADWAY PARAMETERS

Roadway	Lanes	Classification[1]	Design Capacity (ADT)[2]	Speed (MPH)[3]	Site Conditions
Philadelphia Street	4	Secondary	15,000	30	Soft
Comstock Street	2	Collector	15,000	25	Soft

[1] City of Redlands General Plan, Exhibit 4-1 Proposed Arterial Highway Plan.
[2] City of Whittier General Plan, Table 4-5: Buildout ADT Volume/Capacity Ratios.
[3] Posted Speed Limit

TABLE 6-2: TIME OF DAY VEHICLE SPLITS

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

[1] Typical Southern California vehicle mix.
"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

TABLE 6-3: 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%

[1] Typical Southern California vehicle mix.

7 ON-SITE TRAFFIC NOISE IMPACTS

An on-site exterior noise impact analysis has been completed to determine the traffic noise exposure and to identify potential necessary noise abatement measures for the proposed Comstock Residential Project that is consistent with City of Whittier noise standards. It is expected that the primary source of noise impacts to the Project site will be traffic noise from Philadelphia Street and Comstock Avenue. The Project will also experience some background traffic noise from the Project's internal local streets, however, due to the low traffic volume/speeds, traffic noise from these roads will not make a significant contribution to the noise environment.

7.1 ON-SITE EXTERIOR NOISE ANALYSIS

Using the FHWA traffic noise prediction model and the parameters outlined in Section 6, the expected future exterior noise levels for the building façade were calculated. Table 7-1 presents a summary of future exterior noise levels at the building façade within the Project site. The on-site traffic noise level analysis indicates that the building facades will experience exterior noise levels ranging from 62.1 to 64.9 dBA CNEL.

The future exterior noise levels at the proposed buildings facades are shown to range from 62.1 to 64.9 dBA CNEL. This noise analysis shows that the future noise will meet the City of Whittier 65 dBA CNEL exterior noise level standards for multi-family residential land uses.

TABLE 7-1: EXTERIOR NOISE LEVELS (CNEL)

Roadway	Unmitigated Exterior Noise Level (dBA CNEL)[1]			
	1st Floor	2nd Floor	3rd Floor	4th Floor
Philadelphia Street	64.9	64.4	64.5	63.7
Comstock Street	63.6	64.1	63.1	62.1

[1] Exterior noise calculations at the building façade are shown in Appendix 7.1.

As shown in Table 7-1, exterior noise levels will meet the City of Whittier noise level *normally compatible* level for multi-family residential land uses. Therefore, "*Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.*"

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8 SENSITIVE RECEIVER LOCATIONS

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

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

R1: R1 represents the Whittier Hospital Medical Center Emergency Room at 6737 Milton Avenue, approximately 352 feet northwest of the Project site and is placed at the nearest building façade. A 24-hour noise measurement was taken near this location, L1.

R2: R2 represents the Grace Brethren Church Whittier at 15215 Janine Drive, approximately 563 feet north of the Project site and is placed at the nearest building façade. A 24-hour noise measurement was taken near this location, L1.

R3: R3 represents the Victory Outreach Church at 7021 Greenleaf Ave #1305, approximately 225 feet east of the Project site and is placed at the nearest building façade. A 24-hour noise measurement was taken near this location, L2.

R4: R4 represents an existing single-family residence at 7052 Milton Avenue, approximately 174 feet southwest of the Project site and is placed at the outdoor living areas (backyards). A 24-hour noise measurement was taken near this location, L3.

R5: R5 represents an existing single-family residence at 7014 Milton Avenue, approximately 33 feet west of the Project site and is placed at the outdoor living areas (backyards). A 24-hour noise measurement was taken near this location, L4.

EXHIBIT 8-A: SENSITIVE RECEIVER LOCATIONS

9 OPERATIONAL NOISE IMPACTS

This section analyzes the potential stationary-source (i.e., on-site) operational noise impacts at the nearest receiver locations, identified in Section 8, resulting from the operation of the proposed Comstock Residential Project.

9.1 OPERATIONAL NOISE SOURCES

This operational noise analysis is intended to describe noise level impacts associated with the expected typical daytime and nighttime activities at the Project site. The proposed residential development is not expected to include any specific type of operational noise levels beyond the typical noise sources associated with residential land uses in the Project study area. However, to present a conservative approach, on-site Project-only operational noise sources are analyzed in this noise study and are expected to include: heating, ventilation, and air conditioning units, and trash enclosure/collection activity.

ROOF-TOP AIR CONDITIONING UNITS

The primary noise sources on-site would be the ventilation for the mechanical equipment used to heat and cool living spaces. The specific equipment has not been selected at this stage of design, however, based on the size of the dwelling units, it is estimated that each unit would have an air conditioning unit similar to a Carrier model 24ABC6-24. Based on manufactures specifications, a model 24ABC6-24 generates a sound power level of 76 dBA L_w. This is equivalent to a continuous sound level of 44.4 dBA L_{eq} at 50 feet.

While operating at full power air conditioners would operate in multiple cycles approximately 15-30 minutes out of an hour during the nighttime and 20-45 minutes during the daytime. To be conservative, it was assumed the air conditioners would operate 45 minutes during the daytime and 30 minutes at night. This is equivalent to the air conditioning units operating at full capacity. These sources of noise activity will likely vary throughout the day as well as the year. For this noise analysis, the air conditioning units are expected to be located the roofs of the buildings.

TRASH ENCLOSURE/COLLECTION ACTIVITY

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

9.2 REFERENCE NOISE LEVELS

While sound pressure levels (e.g., L_{eq}) quantify in decibels the intensity of given sound sources at a reference distance, sound power levels (L_w) are connected to the sound source and are independent of distance. Sound pressure levels vary substantially with distance from the source and diminish because of intervening obstacles and barriers, air absorption, wind, and other factors. Sound power is the acoustical energy emitted by the sound source and is an absolute value that is not affected by the environment. The reference project operational noise levels are based on the Project related noise sources shown on Exhibit 9-A. The reference Project operational sound power levels are summarized in Table 9-1.

TABLE 9-1: REFERENCE NOISE LEVELS

Noise Source	Noise Source Height (Feet)	Source Type	Min./Hour[2]		Reference Noise Level (dBA L_{eq}) @ 50 Feet	Sound Power Level (dBA)[3]
			Day	Night		
Rooftop AC 2.5 Ton	3'	Point	45	30	44.4	76.0
Trash Enclosure Activity[1]	5'	Point	10	10	57.3	88.9

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

9.3 CADNAA NOISE PREDICTION MODEL

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

Using the ISO 9613 protocol, CadnaA will calculate the distance from each noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation inputs to provide a summary of noise level at each receiver and the partial noise level contributions by noise source. Consistent with the ISO 9613 protocol, the CadnaA noise prediction model relies on the reference sound power level (L_w) to describe individual noise sources. While sound pressure levels (e.g., L_{eq}) quantify in decibels the intensity of given sound sources at a reference distance, sound power levels (L_w) are connected to the sound source and are independent of distance. Sound pressure levels vary substantially with distance from the source and diminish because of intervening obstacles and barriers, air absorption, wind, and other factors. Sound power is the acoustical energy emitted by the sound source and is an absolute value that is not affected by the environment.

The operational noise level calculations provided in this noise study account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. A default ground attenuation factor of 0.5 was used in the noise analysis to account for mixed ground representing a combination of hard and soft surfaces. Appendix 9.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section.

9.4 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed Project operations that include heating, ventilation, and air conditioning units, and trash enclosure/collection activity, Urban Crossroads, Inc. calculated the unmitigated operational source noise levels that are expected to be generated at the Project site and the Project-related noise level increases that would be experienced at each of the sensitive receiver locations. Table 9-2 shows the Project operational daytime noise levels. The hourly noise levels at the off-site receiver locations are expected to range from 35.6 to 48.9 dBA L_{eq}. Appendix 9.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section.

TABLE 9-2: PROJECT DAYTIME OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA L_{eq})				
	R1	R2	R3	R4	R5
Rooftop AC 2.5 Ton	36.9	33.9	41.6	39.3	47.5
Trash Enclosure Activity1	34.7	30.6	27.3	32.6	43.2
Total (All Noise Sources)	**38.9**	**35.6**	**41.8**	**40.1**	**48.9**

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

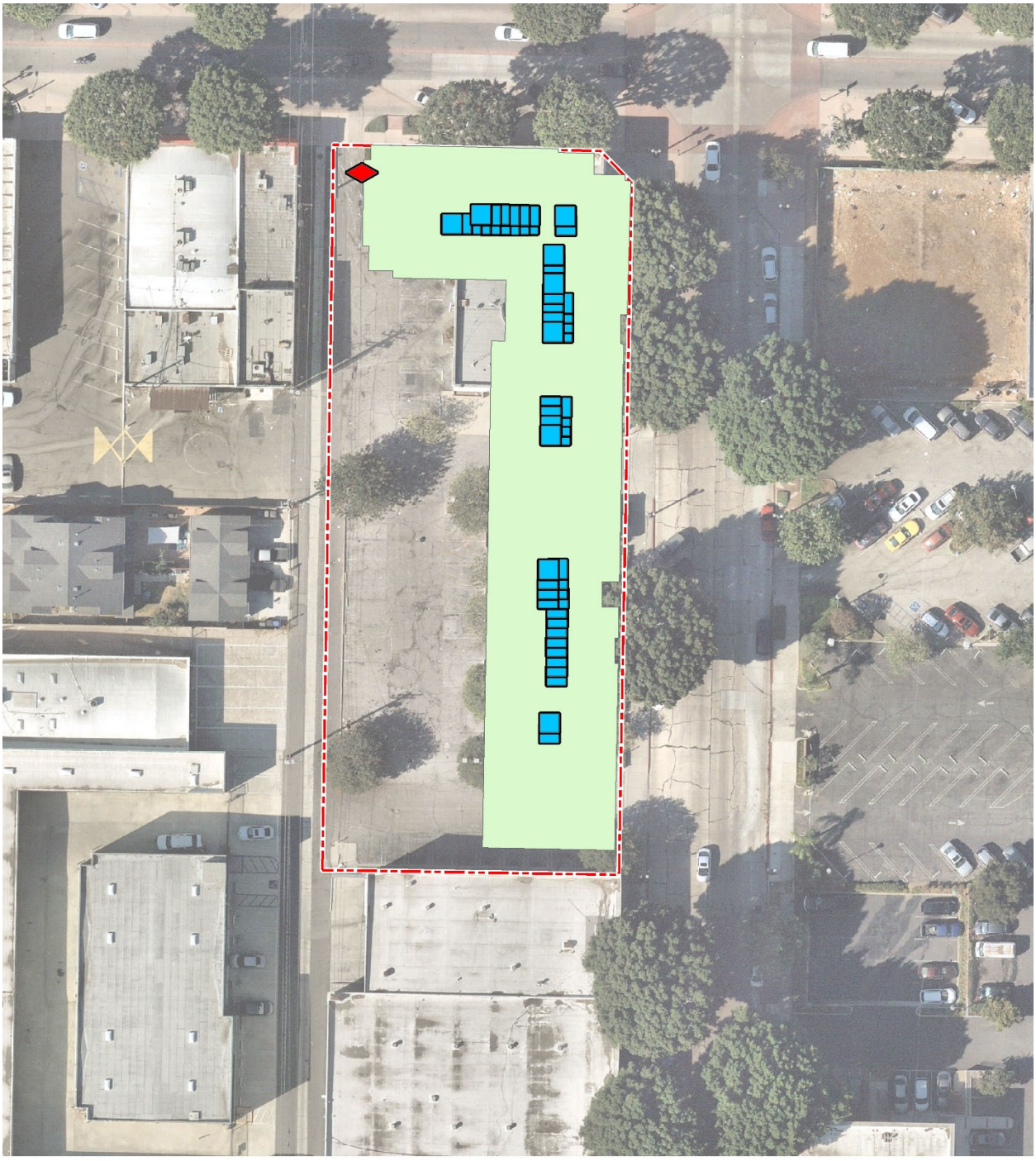
Table 9-3 shows the Project operational noise levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. The nighttime hourly noise levels at the off-site receiver locations are expected to range from 33.8 to 47.1 dBA L_{eq}. The differences between the daytime and nighttime noise levels is largely related to the duration of noise activity (Table 9-1). Appendix 9.1 includes the detailed noise model inputs including the existing perimeter walls used to estimate the Project operational noise levels presented in this section.

TABLE 9-3: PROJECT NIGHTTIME OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA L_{eq})				
	R1	R2	R3	R4	R5
Rooftop AC 2.5 Ton	35.1	32.1	39.9	37.6	45.8
Trash Enclosure Activity1	33.0	28.8	25.5	30.8	41.4
Total (All Noise Sources)	**37.2**	**33.8**	**40.1**	**38.4**	**47.1**

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

EXHIBIT 9-A: OPERATIONAL NOISE SOURCE LOCATIONS



9.5 PROJECT OPERATIONAL NOISE LEVEL INCREASES

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

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

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describes the Project noise level increases to the existing ambient noise environment. Noise levels that would be experienced at receiver locations when Project-source noise is added to the daytime and nighttime ambient conditions are presented on Tables 9-2 and 9-3, respectively.

As indicated on Tables 9-4 and 9-5, the Project will generate an unmitigated daytime and nighttime operational noise level increases ranging from 0.0 to 1.5 dBA L_{eq} at the nearest receiver locations. In effect, the amount to which a given noise level increase is considered acceptable is reduced based on existing ambient noise conditions. Based on the significance criteria presented in Section 4.2, the Project-related operational noise level increases will satisfy the operational noise level increase criteria at the nearest sensitive receiver locations and the impact will be *less than significant.*

TABLE 9-4: DAYTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria[7]	Increase Criteria Exceeded?
R1	38.9	L1	55.4	55.5	0.1	5.0	No
R2	35.6	L1	55.4	55.4	0.0	5.0	No
R3	41.8	L2	58.2	58.3	0.1	5.0	No
R4	40.1	L3	62.8	62.8	0.0	3.0	No
R5	48.9	L4	55.9	56.7	0.8	5.0	No

[1] See Exhibit 9-A for the receiver locations.
[2] Total Project daytime operational noise levels as shown on Table 9-2.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] See Table 4.1.

TABLE 9-5: NIGHTTIME OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria[7]	Increase Criteria Exceeded?
R1	37.2	L1	48.9	49.2	0.3	5.0	No
R2	33.8	L1	48.9	49.0	0.1	5.0	No
R3	40.1	L2	53.4	53.6	0.2	5.0	No
R4	38.4	L3	54.7	54.8	0.1	5.0	No
R5	47.1	L4	51.0	52.5	1.5	5.0	No

[1] See Exhibit 9-A for the receiver locations.
[2] Total Project nighttime operational noise levels as shown on Table 9-3.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed nighttime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] See Table 4.1.

10 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 10-A shows the construction noise source locations in relation to the nearest sensitive receiver locations previously described in Section 8. To prevent high noise-levels of construction noise from impacting noise-sensitive land uses, Section 8.32.040 of the City of Whittier Municipal Code prohibits construction activities between the hours of 6:00 p.m. and 7:00 a.m. and on Saturdays 5:00 p.m. and 8:00 a.m. .

10.1 CONSTRUCTION ACTIVITIES

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 are expected to occur in the following stages:

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

10.2 TYPICAL CONSTRUCTION REFERENCE NOISE LEVELS

To describe peak construction noise activities, this construction noise analysis was prepared using reference noise level measurements published in the *FHWA Road Construction Nosie Model* (RCNM) (19). The RCNM database provides a conservative source of reference construction noise levels. Table 10-1 provides a summary of the FHWA construction reference noise level measurements expressed in hourly average dBA L_{eq} using the estimated FHWA RCNM usage factors to describe the typical construction activities for each stage of Project construction (19).

EXHIBIT 10-A: TYPICAL CONSTRUCTION NOISE SOURCE LOCATIONS

TABLE 10-1: TYPICAL CONSTRUCTION REFERENCE NOISE LEVELS

Construction Stage	Reference Construction Equipmnet[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})	Composite Reference Noise Level (dBA L_{eq})	Reference Power Level (dBA L_w)
Demolition	Front End Loader	75.0	83.8	115.4
	All Other Equip	82.0		
	Excavator	77.0		
Site Preparation	Dozer	78.0	81.0	112.7
	Front End Loader	75.0		
	Front End Loader	75.0		
Grading	Dozer	78.0	81.8	113.5
	Excavator	77.0		
	Compactor (ground)	76.0		
Building Construction	Crane	73.0	81.1	112.8
	Tractor	80.0		
	Welder/Torch	70.0		
Paving	Paver	74.0	83.1	114.7
	All Other Equip	82.0		
	Roller	73.0		
Architectural Coating	Crane	73.0	77.4	109.1
	Compressor (air)	74.0		
	Generator (<25kVA)	70.0		

[1] FHWA Road Construction Noise Model.

10.3 TYPICAL CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearest sensitive receiver locations were completed. To assess the worst-case construction noise levels, the Project construction noise analysis relies on the highest combined reference noise level operating at the closest point from the edge of primary construction activity (Project site boundary) to each receiver location. As shown on Table 10-2, the construction noise levels are expected to range from 52.9 to 77.2 dBA L_{eq}, and the highest construction levels are expected to range from 59.3 to 77.2 dBA L_{eq} at the nearest receiver locations. Appendix 10.1 includes the detailed CadnaA construction noise model inputs.

TABLE 10-2: TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})						
	Demolition	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Highest Levels[2]
R1	62.2	59.4	60.2	59.5	61.5	55.8	62.2
R2	59.3	56.5	57.3	56.6	58.6	52.9	59.3
R3	67.1	64.3	65.1	64.4	66.4	60.7	67.1
R4	67.2	64.4	65.2	64.5	66.5	60.8	67.2
R5	77.2	74.4	75.2	74.5	76.5	70.8	77.2

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

10.4 TYPICAL CONSTRUCTION NOISE LEVEL COMPLIANCE

To evaluate whether the Project will generate potentially significant short-term noise levels at nearest receiver locations, a construction-related daytime noise level thresholds based on land use as developed by the FTA are used as reasonable thresholds to assess the daytime construction noise level impacts. The construction noise analysis shows that the nearest receiver locations will satisfy the significance thresholds during Project construction activities as shown on Table 10-3. Therefore, the noise impacts due to Project construction noise is considered *less than significant* at all receiver locations.

TABLE 11-3: TYPICAL CONSTRUCTION NOISE LEVEL COMPLIANCE

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})			
	Highest Construction Noise Levels[2]	Land Use	Threshold[3]	Threshold Exceeded?[4]
R1	62.2	Medical	80	No
R2	59.3	Religious	80	No
R3	67.1	Religious	80	No
R4	67.2	Residential	80	No
R5	77.2	Residential	80	No

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Highest construction noise level operating at the Project site boundary to nearby receiver locations (Table 11-2).
[3] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual.
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

10.5 TYPICAL CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. Ground vibration levels associated with various types of construction equipment are summarized on Table 10-4. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential Project construction vibration levels using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 10-4: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

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

Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, 2018.

Table 10-5 presents the expected typical construction equipment vibration levels at the nearest receiver locations. At distances ranging from 33 feet to 563 from typical Project construction activities (at the Project site boundary), construction vibration levels are estimated to range from 0.001 to 0.059 in/sec PPV at the nearest receiver locations. The Project construction is not expected to generate vibration levels exceeding the City of Whittier maximum acceptable vibration standard of 0.03 in/sec PPV. Further, impacts at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period, but will occur rather only during the times that heavy construction equipment is operating proximate to the Project site perimeter.

Moreover, construction at the Project site will be restricted to daytime hours consistent with City requirements thereby eliminating potential vibration impact during the sensitive nighttime hours. On this basis the potential for the Project to result in exposure of persons to, or generation of, excessive ground-borne vibration is determined to be *less than significant*.

TABLE 10-5: TYPICAL CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver Location[1]	Distance to Const. Activity (Feet)[2]	Typical Construction Vibration Levels PPV (in/sec)[3]					Thresholds PPV (in/sec)[4]	Thresholds Exceeded?[5]
		Small bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer	Highest Vibration Level		
R1	352'	0.000	0.001	0.001	0.002	0.002	0.30	No
R2	563'	0.000	0.000	0.001	0.001	0.001	0.30	No
R3	225'	0.000	0.001	0.003	0.003	0.003	0.30	No
R4	174'	0.000	0.002	0.004	0.005	0.005	0.30	No
R5	33'	0.002	0.023	0.050	0.059	0.059	0.30	No

[1] Construction receiver locations are shown on Exhibit 10-A.
[2] Distance from receiver location to Project construction boundary.
[3] Based on the Vibration Source Levels of Construction Equipment (Table 10-5).
[4] FTA Construction Noise and Vibration Manual, 2018.
[5] Does the peak vibration exceed the acceptable vibration thresholds?
"PPV" = Peak Particle Velocity

11 REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G.* 2018.
2. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
3. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March 1974. EPA/ONAC 550/9/74-004.
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5. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
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8. **Office of Planning and Research.** *State of California General Plan Guidelines.* October 2017.
9. **State of California.** California Code of Regulations, Title 24, Part 2, Volume 1, Chapter 12, Section 1206.4, Allowable Interior Noise Level. *ICC Digital Coes.* [Online] 2019. https://codes.iccsafe.org/content/CABCV12019/chapter-12-interior-environment.
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12. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
13. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.
14. **California Department of Transportation.** *Technical Noise Supplement.* November 2009.
15. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
16. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.
17. **California Department of Transportation Environmental Program, Office of Environmental Engineering.** *Use of California Vehicle Noise Reference Energy Mean Emission Levels (Calveno REMELs) in FHWA Highway Traffic Noise Prediction.* September 1995. TAN 95-03.
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. **U.S. Department of Transportation, Federal Highway Administration.** *Road Construction Noise Model, version 1.0.* 2006.

12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Comstock 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 (619) 788-1971.

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EDUCATION

Bachelor of Science in Urban and Regional Planning
California Polytechnic State University, Pomona • June 2000

PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
APA – American Planning Association
AWMA – Air and Waste Management Association

PROFESSIONAL CERTIFICATIONS

Approved Acoustical Consultant • County of San Diego
FHWA Traffic Noise Model of Training • November 2004
CadnaA Basic and Advanced Training Certificate • October 2008.

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APPENDIX 3.1:

CITY OF WHITTIER NOISE ORDINANCE

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Chapter 8.32 - NOISE CONTROL

Sections:

Footnotes:
*--- (**2**) ---*
***Editor's note—** Ord. No. 2943, § 1, adopted Jan. 12, 2010, repealed the former Chapter 8.32, §§ 8.32.010—8.32.120, and enacted a new Chapter 8.32 as set out herein. The former Chapter 8.32 pertained to similar subject matter and derived from Ord. 2747, § 2(part), adopted in 1999; and Ord. 2869, § 29, adopted in 2006.*

8.32.010 - Purpose.

A. The making and creation of loud, unnecessary or unusual noises within the limits of the city is a condition which has existed for some time and the extent and volume of such noises is increasing.

B. The making, creation or maintenance of such loud, unnecessary, unnatural or unusual noises which are prolonged, unusual and unnatural in their time, place and use affect and are a detriment to public health, comfort, convenience, safety, welfare and prosperity of the residents of the city; and

C. The necessity in the public interest for the provisions of this chapter is declared as a matter of legislative determination and public policy, and it is further declared that the provisions of this chapter are for the purpose of securing and promoting the public health, comfort, convenience, safety, welfare, prosperity and peace and quiet of the city and its inhabitants.

(Ord. No. 2943, § 1, 1-12-10)

8.32.020 - Definitions.

A. "City" means the city of Whittier.

B. "City manager" means the city manager of the city of Whittier, or his/her designee.

C. "Chief of police" means the chief of the Whittier Police Department.

D. "Construction" means any site preparation, assembly, erection, substantial repair, alteration, demolition, or similar action.

E. "Continuous sound" means and denotes a sound the intensity of which remains essentially constant during a given period of time.

F. "Director" means the director of community development of the city of Whittier, or his/her designee.

G. "Daytime" denotes the local time of day between the hours of seven a.m. and nine p.m. on weekdays and between the hours of nine a.m. and nine p.m. on Saturdays, Sundays and local legal holidays.

H. "Emergency" means any occurrence or set of circumstances involving actual or imminent physical trauma or property damage, which demands immediate action.

I. "Emergency signal device" means any audible warning device, such as a gong, whistle or siren or any air horn or any similar device, used for emergency purposes or alert the public or emergency personnel to the existence of an emergency.

J. "Emergency work" means any work performed for the purpose of preventing or alleviating the physical trau property damage threatened or caused by an emergency.

K. "Mobile source" means any moving sound source on a public right-of-way.

L. "Motor vehicle" means a vehicle that is self-propelled. "Motor vehicle" includes, but is not limited to, passenger cars, trucks, truck-trailers, semi-trailers, campers, motorcycles, minibikes, go-carts, snowmobiles, mopeds, amphibious craft on land, dune buggies, all-terrain vehicles or racing vehicles. "Motor vehicle" does not include a self-propelled wheelchair, motorized tricycle, or motorized quadricycle, if operated by a person who, by reason of physical disability, is otherwise unable to move about as a pedestrian.

1. "Motorcycle" means (1) a motor vehicle having a seat or saddle for the use of the rider, designed to travel on not more than three wheels in contact with the ground; (2) a motor vehicle that has four wheels in contact with the ground, two of which are a functional part of a sidecar, is a motorcycle if the vehicle otherwise comes within the definition of subdivision (1); (3) a farm tractor is not a motorcycle; (4) a three-wheeled motor vehicle that otherwise meets the requirements of subdivision (1), has a partially or completely enclosed seating area for the driver and passenger, is used by local public agencies for the enforcement of parking control provisions, and is operated at slow speeds on public streets, is not a motorcycle. However, a motor vehicle described in this subdivision shall comply with the applicable sections of this code imposing equipment installation requirements on motorcycles.
2. "All-terrain vehicle (ATV)" means a motor vehicle that is all of the following: (1) designed for operation off of the highway by an operator with no more than one passenger; (2) fifty inches or less in width; (3) nine hundred pounds or less unladen weight; (4) suspended on three or more low-pressure tires; (5) has a single seat designed to be straddled by the operator, or a single seat designed to be straddled by the operator and a seat for no more than one passenger; (6) has handlebars for steering control.

M. "Nighttime" means those hours excluded from the definition of "daytime."

N. "Person" means any individual, corporation, partnership firm or any legal successor, representative or agent of the foregoing.

O. "Public right-of-way" means any street, avenue, boulevard, highway, alley, sidewalk or public space which has been dedicated for use by the general public and the dedication of which has been accepted by the appropriate governmental entity.

P. "Real property boundary" means an imaginary line along the ground surface, and its vertical extension, which separates the real property owned by one person from that owned by another person, but it does not include intra-building real property division.

Q. "Small power equipment" means any motorized or engine powered device, including but not limited to lawn mowers, lawn and garden tools, leaf blowers, riding lawn mowers and power saws, but excluding motor vehicles.

R. "Sound amplifying equipment" means any machine or device for the amplification of the human voice, music or any other sound. Sound amplifying equipment as used herein shall not be construed

as including standard automobile radio when used and primarily audible only by the occupants of the vehicle in which installed or warning devices on authorized emergency vehicles or horns or other warning devices on other vehicles used only for traffic safety purposes.

S. "Special event" means assemblages, public meetings, and other special events including festivals, ceremonies, addresses, speeches, exhibits, performances, plays, circuses, musical events, athletic events that occur at a particular place and for a limited duration of time.

T. "Stadium event" means events held at a facility with permanent seating and accommodations for more than one thousand spectators.

U. "Stationary source" means any sound source operating or occurring on any public or private property.

V. "Weekday" means any day Monday through Friday, which is not a legal holiday.

(Ord. No. 2943, § 1, 1-12-10)

(Ord. No. 3112 , § 2, 2-25-20)

8.32.030 - Loud, annoying and unnecessary noises prohibited.

A. It shall be unlawful for any person to willfully make or continue, or cause to be made or continued, any excessive or unreasonable 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.

B. The standard that may be considered in determining whether a violation of the provisions of this section exists may include, but not be limited to, the following:

1. The level of the noise;
2. Whether the nature of the noise is usual or unusual;
3. Whether the origin of the noise is natural or unnatural;
4. The level and intensity of the background noise, if any;
5. The proximity of the noise to residential sleeping facilities;
6. The nature and zoning of the area within which the noise emanates;
7. The density of the inhabitation of the area within which the noise emanates;
8. The time of the day and night the noise occurs;
9. The duration of the noise, including whether it is of a temporary or short-term nature;
10. Whether the noise is recurrent, intermittent, or constant; and
11. Whether the noise is produced by a commercial or noncommercial activity.

(Ord. No. 2943, § 1, 1-12-10)

8.32.040 - Loud, annoying and unnecessary noises—Enumerated.

The city council finds the following to be loud, annoying and unnecessary noises, which are hereby declared to be in violation of this chapter; this list is deemed illustrative and shall not be construed in any way to be an exclusive or all-inclusive list of the noises prohibited by this chapter, it being the intent and purpose of this chapter to include

and prohibit all noises of the character described in this section. Where no specific distance is set for the determination of audibility, reference to noise disturbance shall be deemed to mean plainly audible at a distance of one hundred feet from the real property boundary of the source of the sound, if the sound occurs on privately owned property, or from the source of the sound, if the sound occurs on the public right-of-way, public property, or private property open to the public. References to "adjacent" or "neighboring" residences or units in this section shall mean those residences or units located next to or in close proximity to the source of the noise, and no specific distance standard shall be required for such locations.

A. Animals and Birds. The keeping of any animal or bird that causes frequent or long continued noise plainly audible by inhabitants or occupants of any adjacent or neighboring residential properties or units, or plainly audible at a distance of fifty feet from any nonresidential building or structure, shall be presumed to disturb the comfort and repose of any person in the vicinity and shall be prima facie evidence of a violation of this chapter; however, nothing in this subsection shall be construed to apply to occasional noises emanating from a legally operated kennel, animal hospital or veterinary clinic, humane society or pound.

B. Defect in Vehicle or Load. The use of any automobile, motorcycle or other vehicle so out of repair, so loaded or in such manner as to create loud and unnecessary grating, grinding, rattling or other noise.

C. Motor Vehicle Noises. Any loud or annoying noise made by any motor vehicle and not reasonably necessary to the operation thereof under the circumstances, including, but not limited to, noise caused by screeching of tires; racing or accelerating the engine, except in the course of repair or adjustment thereof during nighttime hours; backfiring the engine; or the emission of exhaust from the engine tail pipe or muffler.

D. Domestic Power Tools. Operating or permitting the operation of any mechanically powered saw, sander, drill, grinder, lawn or garden tool, snow blower, small power equipment, or similar device used outdoors in residential areas during nighttime hours so as to cause a noise disturbance across a residential real property boundary.

E. Engine-Repair and Testing. It shall be unlawful for any person to repair, rebuild or test any engine so as to create a noise disturbance, during nighttime hours.

F. Horns and Signaling Devices. The sounding of any horn or signaling device on any automobile, motor vehicle or any other vehicle on any street or public street except as a danger warning; the creation by means of any such signaling device of any unreasonably and unnecessarily loud or harsh sounds; the sounding of any such signaling device for an unnecessarily or unreasonably long period of time; or the use of any horn, whistle or other device operated by engine exhaust

G. Loudspeakers/Public Address System. The using, operating or playing, or permitting to be played, used or operated, of any radio receiving set, musical instrument, audio system, loudspeaker, sound amplifying equipment or other machine or device for the producing or reproducing of sound, which casts sound upon the streets for the purpose of commercial or noncommercial advertising, or attracting the attention of the public to any building, structure or attraction (1) such that the sound there from creates a loud, annoying or unnecessary noise across a residential area; or (2) on a public right-of-way or public space, except as provided in Section 8.32.080.

H. Radios, Musical Instruments and Similar Devices. The using, operating or playing, or the permitting to be used or operated, any stereo, radio receiving set, musical instrument, audio system, television set or any machine or device that produces or reproduces sound, in such manner as to disturb at any time, the pea and comfort of the neighboring inhabitants, with louder volume than is necessary for convenient hearin person or persons who are in the room, vehicle, chamber or place in which the machine or device is ope who are voluntarily listening thereto. The operation of any such machine or device during nighttime hou manner as to be plainly audible by inhabitants or occupants of any adjacent or neighboring residential p or units, or plainly audible at a distance of fifty feet from any nonresidential building, structure, vehicle c which it is located, shall be prima facie evidence of a violation of this subsection.

I. Yelling and Shouting. Loud or raucous yelling, shouting, hooting, whistling or singing in the public streets or in public places, or any other place, so as to annoy or disturb the quiet, comfort or repose of persons in any office or inhabitants or occupants of any neighboring or adjacent dwelling, hotel, apartment building or other kind of residence. The occurrence of such conduct during nighttime hours shall be prima facie evidence of a violation of this subsection.

J. Noise in Proximity to Schools, Courts, Churches or Hospitals. The creation of any excessive noise on any street adjacent to a school, institution of learning, church or court while such facilities are in use, or adjacent to any hospital which unreasonably interferes with the work of the institution or which disturbs or unduly annoys patients of the hospital; however, this subsection shall not apply unless conspicuous signs are displayed in such streets indicating that there is located in the vicinity a school, hospital, court or church.

K. Hawkers and Peddlers. The shouting or crying of peddlers, hawkers or vendors, so as to disturb the peace and quiet of the neighborhood.

L. Erection or demolition of buildings, excluding owner resident additions or remodeling, and the grading and excavation of land including the use of blasting, the start up and use of heavy equipment such as dump trucks and graders and the use of jack hammers except on weekdays between the hours of seven a.m. and six p.m. and on Saturdays eight a.m. to five p.m. The city manager may waive any or all of the provisions of this subsection in cases of urgent necessity, or in the interest of public health and safety. The provisions of this subsection may also be waived or modified pursuant to a conditional use permit or other development entitlement processed and issued in accordance with the applicable city requirements and procedures.

M. Late night disturbances of any kind that are plainly audible by inhabitants or occupants of any adjacent or neighboring residential properties or units, or are plainly audible at a distance of fifty feet from a real property boundary, that occur during nighttime hours, shall be prima facie evidence of violation of this subsection.

(Ord. No. 2943, § 1, 1-12-10)

8.32.050 - Mixed use developments.

Due to the unique nature of mixed use developments, as are designated as such in a specific plan, violations of this chapter shall be determined pursuant to Section 8.32.030. The distance requirements of Section 8.32.040 shall not apply to mixed use neighborhoods.

(Ord. No. 2943, § 1, 1-12-10)

8.32.060 - Assessment of noise disturbance.

Any law enforcement officer, code enforcement officer, or other employee or official designated by the city manager or designee who hears a noise or sound that is plainly audible, as defined in Sections 8.32.030 and 8.32.040, in violation of this chapter, may enforce this chapter and shall assess the noise or sound according to the following standards:

A. The primary means of detection shall be by means of the official's normal hearing faculties, not artificially enhanced.

B. The official shall first attempt to have a direct line of sight and hearing to the vehicle or real property from which the sound or noise emanates so that the official can readily identify the offending source of the sound or noise and the distance involved. If the official is unable to have a direct line of sight and hearing to the vehicle or real property from which the sound or noise emanates, then the official shall confirm the source of the sound or noise by approaching the suspected vehicle or real property until the official is able to obtain a direct line of sight and hearing, and confirm the source of the sound or noise that was heard at the place of the original assessment of the sound or noise.

C. The official need not be required to identify words, song titles, artists, or lyrics in order to establish a violation.

(Ord. No. 2943, § 1, 1-12-10)

8.32.070 - Defenses.

In any prosecution for a violation of this chapter, it shall be a sufficient defense that the noise of which complaint is made resulted from reasons beyond the control of the person charged with making the noise, unless the noise is due to a reparable or otherwise curable cause which was not diligently cured or repaired; that it was necessary to make the noise to prevent injury to persons or property or that the creation or emission of the noise was done by or with a device, such as a horn, siren or muffler, installed and operated pursuant to state law and meeting the requirements thereof.

(Ord. No. 2943, § 1, 1-12-10)

8.32.080 - Exemptions and waivers.

The following uses of any activity shall be exempt from noise level regulations:

A. Emergency Exemption. The provisions of this chapter shall not apply to: (1) the emission of sound for the purpose of alerting persons to the existence of an emergency, or (2) the emission of sound in the

performance of emergency work performed by authorized personnel for the purpose of securing the immediate health and safety of the public.

B. Warning Devices. Warning devices necessary for the protection of public safety, as for example, police, fire and ambulance sirens, and train horns, shall be exempted from the provisions of this chapter.

C. Outdoor Activities. The provisions of this chapter shall not apply to outdoor gatherings, public dances, shows and sporting and entertainment events, provided such events are conducted pursuant to a permit or license issued by the city relative to the staging of the events.

D. Any noise resulting from activities of a temporary duration permitted by law and/or for which a waiver has been granted by the director.

E. The unamplified human voice, except as provided for in Section 8.32.040(I) (Yelling and Shouting).

F. Bells, chimes, carillons while being used for religious purposes or in conjunction with religious services, or for national celebrations or public holidays.

G. Scheduled stadium events, subject, however, to frequency and time limitations, parades, school activities, including band practice sessions.

H. Refuse collection trucks, provided the trucks do not collect refuse between the hours of nine p.m. and five a.m.

I. Permitted construction during daytime hours.

J. Federal or State Preempted Activities. Any other activity to the extent regulation thereof has been preempted by state or federal law shall be exempted from the regulations of this chapter.

K. Any activity by the city or any governmental entity.

L. Any activity that is protected by the First Amendment, provided that it takes place during daytime hours, except subject to time, place manner restrictions and/or any regulations imposed by a required or issued permit for such activity.

(Ord. No. 2943, § 1, 1-12-10)

8.32.090 - Thirty-day waivers.

A. Any person seeking a waiver pursuant to this section shall file an application with the director. The application shall contain information which demonstrates that bringing the source of sound or activity for which the waiver is sought into compliance with this chapter would constitute an unreasonable hardship on the applicant, on the community, or on other persons. The application shall be accompanied by a fee, as established by council resolution.

B. A separate application shall be filed for each noise source; provided, however, that several mobile sources under common ownership, or several fixed sources on a single property may be combined into one application.

C. Before a waiver application can be considered, the applicant must show proof that he/she has provided notice of the waiver application to all affected persons within a four-foot radius of the anticipated noise

source.

D. Any individual who claims to be adversely affected by allowance of the waiver may file a statement with the director containing any information to support his/her claim. If at any time the director finds that a sufficient controversy exists regarding an application, a public hearing will be held.

E. In determining whether to grant or deny the application, the director shall balance denial as a hardship on the applicant against: (1) the adverse impact on the health, safety and welfare of other persons affected; (2) the adverse impact on property affected; and (3) any other adverse impacts of granting the waiver. Applicants and persons contesting the waiver shall be required to submit such information as the director may reasonably require.

F. A waiver shall be denied if the director determines that the balance of hardships weighs against the applicant and that granting the waiver shall substantially adversely impact the health, safety and welfare of other persons affected, including the quiet enjoyment of property. The decision on the waiver application shall be in writing, explaining the reasons therefor. The notice of denial shall issue within ten days of the application.

G. Waivers shall be granted by notice to the applicant containing all necessary conditions, including a time limit on the permitted activity. Acceptance of the waiver implies acceptance of any conditions imposed. Noncompliance with any condition of the waiver shall terminate the waiver and subject the person holding it to those provisions of this chapter for which the waiver was granted. Notification that a waiver has been granted shall issue in writing within ten days of the application.

H. A waiver will not exceed thirty days from the date on which it becomes effective. Any request for extension of time to a waiver beyond the original thirty days or for modification of other material conditions of the waiver shall require a new application.

(Ord. No. 2943, § 1, 1-12-10)

8.32.100 - Special events not subject to waiver requirement.

A special event scheduled to take place either on public or private property is exempt from the requirement of obtaining a noise disturbance waiver, provided the special event is not scheduled to last more than forty-eight hours. Notwithstanding this exemption, the organizer or sponsor of an event must obtain and comply with any and all necessary city permits.

(Ord. No. 2943, § 1, 1-12-10; Ord. No. 3112 , § 2, 2-25-20)

8.32.110 - Request for appeal hearing.

Any person may contest the denial of a waiver by submitting a written request to the city manager for an appeal hearing, clearly stating the reasons for the appeal, within ten days from the date of service of the denial notice. A hearing before the city manager shall be set for a date that is not less than five, nor more than twenty days from the date the request for hearing is filed. The person requesting the hearing (the appellant) shall be notified of the time and place set for the hearing at least five days prior to the date of the hearing.

(Ord. No. 2943, § 1, 1-12-10)

8.32.120 - Appeal hearing process.

A. No hearing to contest the denial of a waiver before the city manager shall be held unless and until a written request for a hearing has been timely submitted and any applicable fines have been deposited.

B. The city manager shall only consider evidence that is relevant to whether the grounds for the denial of the waiver are valid and supported by evidence.

C. The appellant shall be given the opportunity to testify and present witnesses and any relevant evidence concerning the denial of the waiver.

D. The formal rules of evidence shall not apply. All relevant evidence may be considered, and the city manager has the discretion to exclude evidence if he/she finds such evidence to be irrelevant or needlessly repetitive. The city manager has the authority to cut off presentation of evidence if he/she reasonably believes that the evidence being presented is irrelevant or needlessly repetitive.

E. 1. The failure of the appellant to appear at the appeal hearing shall be considered an abandonment of the appeal and consent to its denial.

2. Notwithstanding the above, upon a showing of good cause by the appellant, the city manager may excuse the appellant's failure to appear at the hearing and reschedule the hearing. Under no circumstances shall the hearing be rescheduled more than one time.

F. The notice of denial of the waiver and any additional documents submitted by the director shall constitute prima facie evidence of the respective facts contained in those documents.

G. At least five days prior to the hearing, the appellant shall be provided with copies of reports and any other documents submitted or relied upon by the director. No other discovery disclosure is required.

H. The city manager may continue the hearing and request additional information from the director or the appellant prior to issuing a written decision.

(Ord. No. 2943, § 1, 1-12-10; Ord. No. 3112 , § 2, 2-25-20)

8.32.130 - City manager's decision—Right to judicial review.

A. After considering all of the testimony and evidence submitted at the hearing, the city manager shall issue a written decision to sustain or overrule the denial of the waiver and shall list in the decision the reasons for that decision. The decision of the city manager shall be final.

B. If the decision is to overrule the denial, suspension or revocation, then the director shall issue the waiver within ten days of the service of the decision.

C. The time for a challenge to the city manager's decision in a court of law is governed by California Code of Civil Procedure Sections 1094.5 and 1094.6. Notice of the city manager's decision shall include citation to California Code of Civil Procedure Sections 1094.5 and 1094.6.

D. The city manager's written decision shall be served on the appellant within ten days from the date of the hearing by mailing to the appellant by certified mail, return receipt requested, via the U.S mail. Service of

the hearing officer's decision shall be deemed to have been completed on the date of mailing.

(Ord. No. 2943, § 1, 1-12-10)

8.32.140 - Exceptions for time to comply.

A. Within ninety days following the effective date of this chapter, the owner of any commercial or industrial activity, which is the source of sound that constitute a violation of this chapter, may apply to the director for an exception to the time to comply with the provisions of this chapter. The director shall have the authority to grant an exception not to exceed one hundred eighty days from the effective date of this chapter.

B. Appeals. Appeals of an adverse decision under this section shall be made to the city manager. The city manager's review shall be limited to whether the decision is supported by substantial evidence. The appeal procedures outlined in this chapter shall apply to appeals under this section.

(Ord. No. 2943, § 1, 1-12-10)

8.32.150 - Violation—Enforcement and penalties.

A. A violation of this chapter shall be punished as prescribed in Section 1.08.010.

B. A violation of this chapter is hereby declared to be a public nuisance, which may be abated by the city in the manner provided by the laws of the State of California and the ordinances of this city for the abatement of a public nuisance, and the city shall also have all rights provided by such laws and ordinances to recover damages suffered from any such nuisance and to recover from the owner of the property upon which such nuisance is located the cost of any abatement thereof by the city.

C. Joint and Several Responsibility. In addition to the person causing the offending sound, the owner, tenant or lessee of property, or a manager, overseer or agent, or any other person lawfully entitled to possess the property from which the offending sound is emitted at the time the offending sound is emitted, shall be responsible for compliance with this chapter if the additionally responsible party knows or should have known of the offending noise disturbance. It shall not be a lawful defense to assert that some other person caused the sound. The lawful possessor or operator of the premises shall be responsible for operating or maintaining the premises in compliance with this chapter and may be cited regardless of whether or not the person actually causing the sound is also cited. Notwithstanding the foregoing, an owner, manager, overseer or agent of property from which offending sound is emitted and who does not reside on such property shall not be cited for violation of the provisions of this chapter unless such owner, manager, overseer or agent has previously been informed in writing by a law enforcement officer, code enforcement officer, or other employee or official designated by the city manager or designee of the existence of an offending noise disturbance on the property, and such disturbance continues, occurs again or is otherwise not reasonably or fully rectified or brought into compliance with this chapter.

(Ord. No. 2943, § 1, 1-12-10)

APPENDIX 5.1:

STUDY AREA PHOTOS

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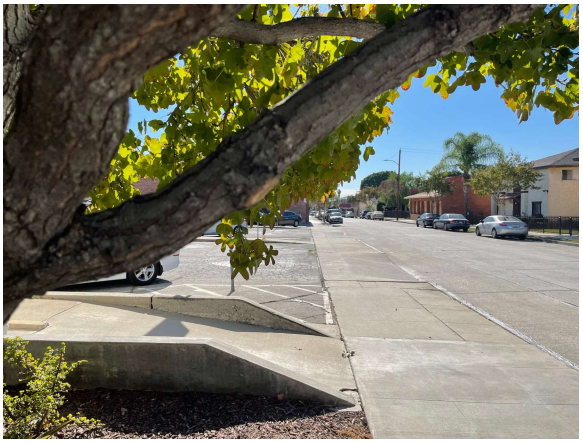
JN: 14480 Study Area Photos

L1_E
33, 58' 50.140000"118, 2' 22.740000"

L1_N
33, 58' 50.310000"118, 2' 22.900000"



L1_S
33, 58' 50.250000"118, 2' 22.880000"

L1_W
33, 58' 50.130000"118, 2' 22.740000"

L2_E
33, 58' 42.710000"118, 2' 16.970000"

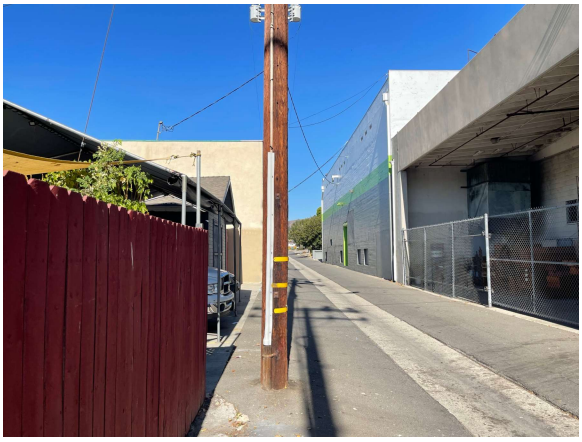
L2_N
33, 58' 42.820000"118, 2' 17.000000"

JN: 14480 Study Area Photos

L2_S
33, 58' 42.770000"118, 2' 17.000000"

L2_W
33, 58' 42.700000"118, 2' 17.000000"

L3_E
33, 58' 39.180000"118, 2' 21.010000"



L3_N
33, 58' 39.200000"118, 2' 20.980000"

L3_S
33, 58' 39.200000"118, 2' 20.980000"

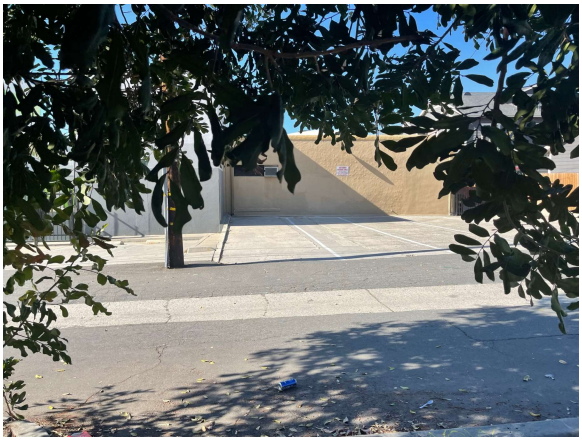
L3_W
33, 58' 39.200000"118, 2' 21.010000"

JN: 14480 Study Area Photos

L4_E
33, 58' 42.000000"118, 2' 20.630000"

L4_N
33, 58' 42.220000"118, 2' 21.010000"

L4_S
33, 58' 42.150000"118, 2' 20.870000"



L4_W
33, 58' 42.000000"118, 2' 20.680000"

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APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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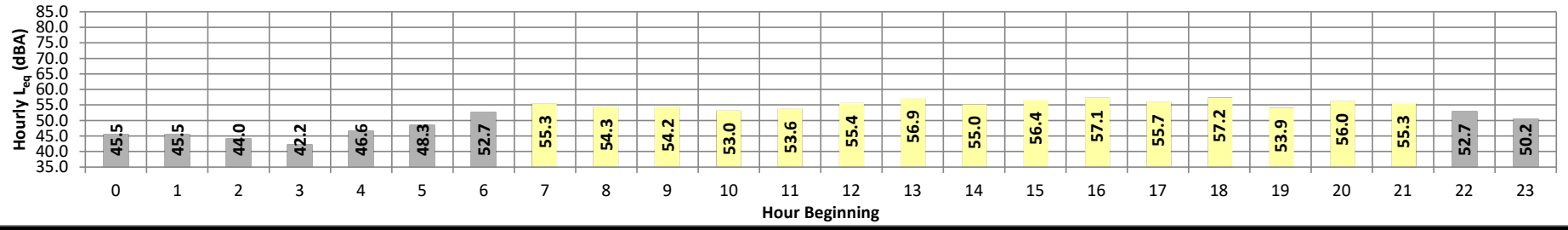
24-Hour Noise Level Measurement Summary

Date: Tuesday, November 23, 2021 *Location:* L1 - Located northwest of the Project site near multi- *Meter:* Piccolo II *JN:* 14480

Project: Whittier Residential *Source:* family residential at 6704 Milton Avenue. *Analyst:* A. Khan

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	45.5	54.8	38.5	54.3	53.9	52.5	50.5	45.2	41.3	39.0	38.8	38.6	45.5	10.0	55.5
	1	45.5	56.8	39.4	56.3	55.2	51.2	49.6	43.0	41.2	39.9	39.7	39.5	45.5	10.0	55.5
	2	44.0	63.2	40.0	62.6	61.4	56.5	50.6	44.2	41.9	40.4	40.3	40.1	44.0	10.0	54.0
	3	42.2	48.7	39.9	48.4	48.0	46.2	44.8	41.9	41.0	40.3	40.2	40.0	42.2	10.0	52.2
	4	46.6	54.0	43.6	53.6	53.0	51.1	49.5	46.4	45.3	44.1	44.0	43.7	46.6	10.0	56.6
	5	48.3	57.2	43.3	57.0	56.5	54.6	53.6	46.5	45.2	43.8	43.6	43.4	48.3	10.0	58.3
	6	52.7	61.0	45.5	60.4	59.9	58.3	57.5	52.4	49.2	46.4	46.0	45.6	52.7	10.0	62.7
Day	7	55.3	66.7	46.4	65.9	64.3	61.5	59.9	54.4	50.8	47.4	47.0	46.5	55.3	0.0	55.3
	8	54.3	61.3	47.4	60.9	60.4	59.1	58.1	55.3	52.3	49.0	48.4	47.7	54.3	0.0	54.3
	9	54.2	63.2	45.6	62.8	62.3	60.6	59.1	54.3	50.7	46.9	46.4	45.8	54.2	0.0	54.2
	10	53.0	68.9	44.8	68.5	67.8	65.8	62.7	54.8	51.2	46.1	45.5	45.0	53.0	0.0	53.0
	11	53.6	63.6	44.7	63.1	62.3	59.8	57.9	53.5	49.9	46.0	45.5	44.9	53.6	0.0	53.6
	12	55.4	85.2	46.6	84.4	83.4	75.3	73.0	55.3	51.4	47.8	47.3	46.8	55.4	0.0	55.4
	13	56.9	74.2	48.9	73.6	73.0	71.4	70.3	67.4	58.6	51.8	50.4	49.2	56.9	0.0	56.9
	14	55.0	63.8	46.8	63.3	62.9	61.0	59.1	55.3	52.1	48.1	47.6	47.0	55.0	0.0	55.0
	15	56.4	67.7	48.2	67.4	66.9	64.4	61.8	56.0	53.1	49.4	48.9	48.4	56.4	0.0	56.4
	16	57.1	66.2	48.7	65.5	64.9	63.0	61.4	57.4	54.0	49.9	49.4	48.8	57.1	0.0	57.1
	17	55.7	72.2	48.5	71.3	70.4	66.8	62.7	56.1	53.0	49.6	49.2	48.7	55.7	0.0	55.7
	18	57.2	68.3	47.5	67.8	67.3	65.0	62.7	56.9	53.5	48.6	48.0	47.6	57.2	0.0	57.2
	19	53.9	67.8	46.2	66.8	65.9	64.3	61.8	54.6	50.9	47.2	46.8	46.3	53.9	5.0	58.9
	20	56.0	63.7	49.9	63.4	63.0	61.7	60.3	56.4	53.5	50.7	50.3	50.0	56.0	5.0	61.0
	21	55.3	73.8	47.7	73.2	72.7	70.8	68.3	56.1	52.2	48.8	48.4	47.8	55.3	5.0	60.3
Night	22	52.7	60.5	45.0	60.2	59.7	58.3	57.3	53.7	49.9	46.0	45.6	45.1	52.7	10.0	62.7
	23	50.2	58.4	42.2	58.0	57.4	55.7	54.4	51.6	47.1	43.2	42.7	42.3	50.2	10.0	60.2

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	53.0	61.3	44.7	60.9	60.4	59.1	57.9	53.5	49.9	46.0	45.5	44.9
	Max	57.2	85.2	49.9	84.4	83.4	75.3	73.0	67.4	58.6	51.8	50.4	50.0
Energy Average		55.4	Average:		67.9	67.2	64.7	62.6	56.2	52.5	48.5	47.9	47.4
Night	Min	42.2	48.7	38.5	48.4	48.0	46.2	44.8	41.9	41.0	39.0	38.8	38.6
	Max	52.7	63.2	45.5	62.6	61.4	58.3	57.5	53.7	49.9	46.4	46.0	45.6
Energy Average		48.9	Average:		56.8	56.1	53.8	52.0	47.2	44.7	42.6	42.3	42.1

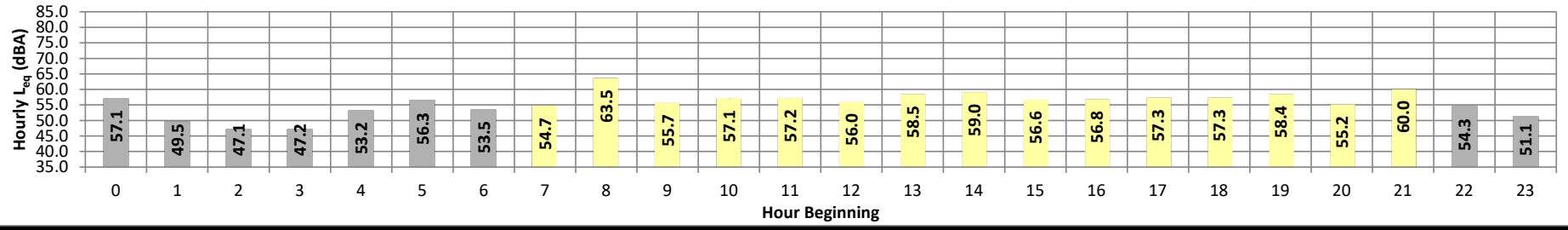
24-Hour	L_{eq} (dBA) Daytime (7am-10pm)	Nighttime (10pm-7am)
54.0	**55.4**	**48.9**

24-Hour Noise Level Measurement Summary

Date: Tuesday, November 23, 2021 *Location:* L2 - Located east of the Project site near Victory *Meter:* Piccolo II *JN:* 14480

Project: Whittier Residential *Source:* Outreach Church at 7021 Greenleaf Ave #1305. *Analyst:* A. Khan

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	57.1	69.5	43.6	68.8	67.7	65.2	63.4	53.0	50.5	44.7	44.0	43.7	57.1	10.0	67.1
	1	49.5	58.9	43.9	58.3	57.6	56.1	54.8	47.9	46.2	44.3	44.2	44.0	49.5	10.0	59.5
	2	47.1	53.1	44.6	52.8	52.5	51.0	50.0	47.1	45.9	45.0	44.9	44.7	47.1	10.0	57.1
	3	47.2	54.7	44.6	54.1	53.5	52.1	50.8	46.5	45.7	45.0	44.9	44.7	47.2	10.0	57.2
	4	53.2	58.6	48.8	58.3	57.9	56.6	56.0	53.7	52.2	49.9	49.7	49.0	53.2	10.0	63.2
	5	56.3	60.7	50.3	60.4	60.2	59.6	59.2	57.5	55.9	52.2	51.7	50.9	56.3	10.0	66.3
	6	53.5	62.6	48.0	61.5	60.4	58.3	57.1	54.0	51.4	48.8	48.5	48.1	53.5	10.0	63.5
Day	7	54.7	61.4	49.7	60.9	60.4	59.1	58.3	55.5	52.9	50.4	50.1	49.8	54.7	0.0	54.7
	8	63.5	76.3	51.9	75.2	73.7	70.2	68.2	61.1	57.2	52.7	52.4	52.1	63.5	0.0	63.5
	9	55.7	64.2	49.7	63.5	62.6	60.6	59.3	56.0	53.8	51.0	50.4	49.8	55.7	0.0	55.7
	10	57.1	67.3	47.7	66.5	65.7	63.7	62.3	56.2	53.4	49.5	48.8	48.0	57.1	0.0	57.1
	11	57.2	65.1	48.6	64.5	63.9	62.3	61.2	57.8	55.2	51.5	50.2	48.8	57.2	0.0	57.2
	12	56.0	63.4	51.5	62.7	61.9	60.2	59.1	56.3	54.5	52.6	52.2	51.7	56.0	0.0	56.0
	13	58.5	70.0	51.0	68.7	67.2	65.0	63.2	56.8	53.9	51.7	51.5	51.1	58.5	0.0	58.5
	14	59.0	66.8	53.2	66.3	65.7	64.0	63.0	59.2	56.9	54.5	53.9	53.4	59.0	0.0	59.0
	15	56.6	66.2	48.4	65.4	64.5	62.4	61.3	57.0	53.2	49.5	49.0	48.5	56.6	0.0	56.6
	16	56.8	65.8	49.1	65.1	64.2	62.5	61.3	57.2	53.8	50.3	49.8	49.3	56.8	0.0	56.8
	17	57.3	66.2	50.2	65.4	64.7	63.0	61.9	57.0	54.8	51.6	51.0	50.4	57.3	0.0	57.3
	18	57.3	66.8	50.1	65.8	64.7	62.9	61.6	57.9	54.3	51.0	50.6	50.2	57.3	0.0	57.3
	19	58.4	67.9	49.3	67.0	66.1	64.2	63.1	59.1	55.1	50.8	50.1	49.5	58.4	5.0	63.4
	20	55.2	62.8	48.5	62.1	61.4	59.9	59.0	56.2	53.3	49.8	49.3	48.7	55.2	5.0	60.2
	21	60.0	70.1	47.9	69.4	68.5	66.8	65.7	59.8	54.5	49.3	48.7	48.1	60.0	5.0	65.0
Night	22	54.3	61.4	47.0	60.9	60.3	59.3	58.7	55.1	52.1	48.2	47.6	47.2	54.3	10.0	64.3
	23	51.1	57.8	44.6	57.4	57.1	56.1	55.2	52.3	49.0	45.3	45.0	44.7	51.1	10.0	61.1

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	54.7	61.4	47.7	60.9	60.4	59.1	58.3	55.5	52.9	49.3	48.7	48.0
	Max	63.5	76.3	53.2	75.2	73.7	70.2	68.2	61.1	57.2	54.5	53.9	53.4
Energy Average		58.2	Average:		65.9	65.0	63.1	61.9	57.5	54.5	51.1	50.5	50.0
Night	Min	47.1	53.1	43.6	52.8	52.5	51.0	50.0	46.5	45.7	44.3	44.0	43.7
	Max	57.1	69.5	50.3	68.8	67.7	65.2	63.4	57.5	55.9	52.2	51.7	50.9
Energy Average		53.4	Average:		59.2	58.6	57.1	56.1	51.9	49.9	47.1	46.7	46.3

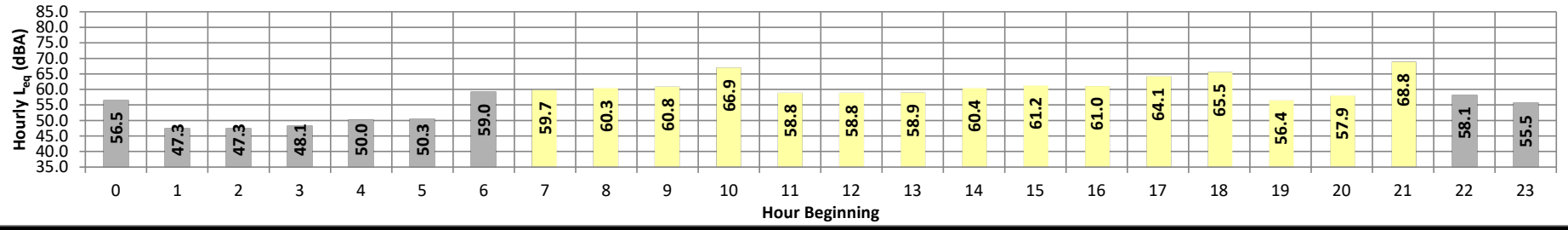
24-Hour	L_{eq} (dBA) Daytime (7am-10pm)	Nighttime (10pm-7am)
56.9	**58.2**	**53.4**

24-Hour Noise Level Measurement Summary

Date: Tuesday, November 23, 2021 *Location:* L3 - Located southwest of the Project site near single- *Meter:* Piccolo II *JN:* 14480

Project: Whittier Residential *Source:* family residence at 7052 Milton Avenue. *Analyst:* A. Khan

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	56.5	70.1	43.9	69.6	68.5	64.2	59.1	51.6	46.1	44.4	44.2	44.0	56.5	10.0	66.5
	1	47.3	55.5	44.2	55.0	54.3	52.4	51.3	46.4	45.1	44.5	44.4	44.3	47.3	10.0	57.3
	2	47.3	53.8	44.9	53.3	52.7	51.3	50.5	47.3	46.0	45.2	45.1	45.0	47.3	10.0	57.3
	3	48.1	58.2	44.6	56.8	55.9	53.2	51.7	47.6	45.4	44.9	44.8	44.7	48.1	10.0	58.1
	4	50.0	56.0	47.4	55.4	54.8	53.5	52.8	50.4	48.8	47.8	47.7	47.5	50.0	10.0	60.0
	5	50.3	56.7	47.5	56.0	55.4	54.2	53.1	50.3	49.2	48.1	47.9	47.6	50.3	10.0	60.3
	6	59.0	73.1	48.9	71.7	69.6	64.4	62.9	56.4	52.4	49.5	49.3	49.0	59.0	10.0	69.0
Day	7	59.7	67.8	54.7	67.3	66.9	65.2	63.7	59.8	57.5	55.2	55.0	54.8	59.7	0.0	59.7
	8	60.3	69.3	52.0	68.3	67.4	65.6	64.6	61.0	57.8	53.4	52.9	52.2	60.3	0.0	60.3
	9	60.8	71.4	48.9	70.9	70.1	67.8	65.4	60.3	56.1	50.3	49.7	49.1	60.8	0.0	60.8
	10	66.9	78.6	49.2	77.8	77.2	75.1	74.0	60.9	55.7	50.5	49.9	49.4	66.9	0.0	66.9
	11	58.8	69.1	49.7	68.6	67.7	65.3	63.5	58.1	54.4	51.0	50.4	49.8	58.8	0.0	58.8
	12	58.8	69.1	49.2	68.5	68.0	65.6	63.9	57.7	54.8	50.8	50.2	49.4	58.8	0.0	58.8
	13	58.9	68.8	49.4	67.9	67.0	65.0	63.4	59.0	55.8	51.2	50.5	49.7	58.9	0.0	58.9
	14	60.4	72.6	49.0	71.0	69.8	67.6	66.0	58.3	54.6	50.4	49.8	49.1	60.4	0.0	60.4
	15	61.2	72.4	51.8	71.8	71.1	68.5	66.1	59.0	56.2	52.8	52.4	51.9	61.2	0.0	61.2
	16	61.0	70.3	50.5	69.5	68.7	66.7	65.4	62.4	57.3	52.0	51.3	50.6	61.0	0.0	61.0
	17	64.1	74.3	50.4	73.2	72.5	71.0	69.8	64.4	57.6	51.9	51.2	50.6	64.1	0.0	64.1
	18	65.5	77.0	49.3	75.9	74.9	73.1	71.8	61.9	56.1	51.0	50.3	49.6	65.5	0.0	65.5
	19	56.4	64.1	48.2	63.6	63.0	61.8	60.9	57.5	53.8	49.5	48.9	48.4	56.4	5.0	61.4
	20	57.9	65.8	48.9	65.4	64.8	63.5	62.5	58.7	55.1	50.3	49.7	49.1	57.9	5.0	62.9
	21	68.8	83.6	48.9	82.7	81.0	76.6	71.2	59.0	54.6	50.3	49.8	49.1	68.8	5.0	73.8
Night	22	58.1	66.2	48.5	65.5	65.0	63.6	62.8	59.0	55.3	49.9	49.1	48.7	58.1	10.0	68.1
	23	55.5	63.6	46.1	63.2	62.7	61.5	60.2	56.2	52.6	47.4	46.9	46.3	55.5	10.0	65.5

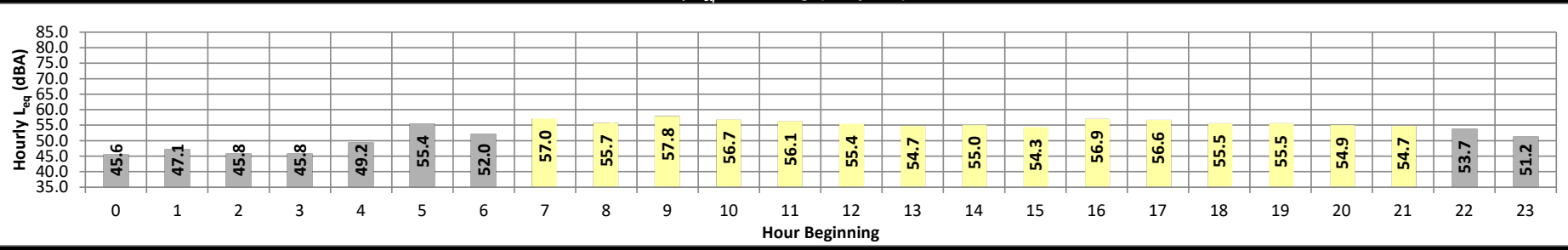
Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	56.4	64.1	48.2	63.6	63.0	61.8	60.9	57.5	53.8	49.5	48.9	48.4
	Max	68.8	83.6	54.7	82.7	81.0	76.6	74.0	64.4	57.8	55.2	55.0	54.8
Energy Average		62.8	Average:		70.8	70.0	67.9	66.1	59.9	55.8	51.4	50.8	50.2
Night	Min	47.3	53.8	43.9	53.3	52.7	51.3	50.5	46.4	45.1	44.4	44.2	44.0
	Max	59.0	73.1	48.9	71.7	69.6	64.4	62.9	59.0	55.3	49.9	49.3	49.0
Energy Average		54.7	Average:		60.7	59.9	57.6	56.1	51.7	49.0	46.9	46.6	46.3

L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
61.2	**62.8**	**54.7**

24-Hour Noise Level Measurement Summary

Date: Tuesday, November 23, 2021 *Location:* L4 - Located west of the Project site near single- *Meter:* Piccolo II *JN:* 14480
Project: Whittier Residential *Source:* family residence at 7014 Milton Avenue. *Analyst:* A. Khan

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	45.6	73.3	42.5	72.8	71.9	67.0	61.5	51.7	48.6	43.4	43.0	42.6	45.6	10.0	55.6
	1	47.1	56.5	42.4	56.1	55.4	53.6	51.5	45.8	43.7	42.7	42.6	42.5	47.1	10.0	57.1
	2	45.8	53.5	42.7	52.9	51.9	50.3	49.5	45.7	44.2	43.2	43.0	42.8	45.8	10.0	55.8
	3	45.8	53.7	43.0	53.2	52.7	50.9	49.4	45.1	43.9	43.3	43.2	43.1	45.8	10.0	55.8
	4	49.2	54.6	45.9	54.3	54.0	53.0	52.3	49.5	48.1	46.8	46.6	46.1	49.2	10.0	59.2
	5	55.4	60.8	49.0	60.6	60.3	59.6	59.0	56.8	53.8	51.3	50.1	49.3	55.4	10.0	65.4
	6	52.0	59.9	47.1	59.0	58.2	56.6	55.5	52.4	50.5	47.8	47.6	47.2	52.0	10.0	62.0
Day	7	57.0	67.4	50.3	66.2	65.2	63.3	61.3	56.7	53.9	51.1	50.7	50.4	57.0	0.0	57.0
	8	55.7	63.4	48.0	62.9	62.5	60.9	59.8	56.5	53.5	49.3	48.7	48.2	55.7	0.0	55.7
	9	57.8	70.5	53.3	69.9	68.9	66.0	64.0	59.9	57.3	54.2	53.8	53.4	57.8	0.0	57.8
	10	56.7	67.1	48.3	66.7	66.1	64.6	63.3	57.3	53.9	49.9	49.2	48.5	56.7	0.0	56.7
	11	56.1	64.2	49.8	63.4	62.4	60.6	59.7	56.9	54.5	51.3	50.6	50.0	56.1	0.0	56.1
	12	55.4	63.5	48.7	63.2	62.7	60.5	59.6	55.5	53.2	49.8	49.3	48.8	55.4	0.0	55.4
	13	54.7	61.2	49.0	60.8	60.3	59.2	58.3	55.5	53.2	50.2	49.7	49.1	54.7	0.0	54.7
	14	55.0	63.8	48.0	63.2	62.4	60.4	59.2	55.3	52.8	49.3	48.7	48.2	55.0	0.0	55.0
	15	54.3	68.6	47.9	68.2	67.2	64.1	62.4	55.5	53.0	49.3	48.8	48.1	54.3	0.0	54.3
	16	56.9	63.9	49.6	63.5	63.1	62.0	61.0	57.7	55.0	50.9	50.3	49.7	56.9	0.0	56.9
	17	56.6	67.9	49.8	67.5	67.0	65.4	63.2	57.0	54.1	51.0	50.5	50.0	56.6	0.0	56.6
	18	55.5	64.2	49.3	63.6	63.0	61.5	60.4	57.0	53.7	50.6	50.1	49.5	55.5	0.0	55.5
	19	55.5	66.6	47.6	66.2	65.6	63.2	61.4	55.6	52.2	48.8	48.3	47.8	55.5	5.0	60.5
	20	54.9	62.9	48.4	62.5	61.8	60.0	59.0	55.3	53.1	49.5	49.1	48.5	54.9	5.0	59.9
	21	54.7	67.6	48.0	67.0	65.8	63.0	61.4	56.7	53.2	49.2	48.6	48.1	54.7	5.0	59.7
Night	22	53.7	61.2	46.7	60.8	60.1	58.4	57.5	54.8	51.7	47.8	47.3	46.9	53.7	10.0	63.7
	23	51.2	57.5	44.3	57.2	56.9	56.0	55.3	52.5	49.3	45.2	44.8	44.4	51.2	10.0	61.2

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	54.3	61.2	47.6	60.8	60.3	59.2	58.3	55.3	52.2	48.8	48.3	47.8
	Max	57.8	70.5	53.3	69.9	68.9	66.0	64.0	59.9	57.3	54.2	53.8	53.4
Energy Average		55.9	Average:		65.0	64.3	62.3	60.9	56.6	53.8	50.3	49.7	49.2
Night	Min	45.6	53.5	42.4	52.9	51.9	50.3	49.4	45.1	43.7	42.7	42.6	42.5
	Max	55.4	73.3	49.0	72.8	71.9	67.0	61.5	56.8	53.8	51.3	50.1	49.3
Energy Average		51.0	Average:		58.5	57.9	56.2	54.6	50.5	48.2	45.7	45.4	45.0

L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
54.6	**55.9**	**51.0**

APPENDIX 7.1:

ON-SITE NOISE MODEL

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard No Wall
Road Name: Philadelphia Street
Lot No:

Project Name: Whittier Residential
Job Number: 14880
Analyst: A. Khan

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,500 vehicles
Vehicle Speed:	30 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:	0.0 feet
Centerline Dist. to Observer:	40.0 feet
Barrier Distance to Observer:	40.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

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:	0.00		
Medium Trucks:	2.30		
Heavy Trucks:	8.01	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	33.838
Medium Trucks:	42.608
Heavy Trucks:	48.317

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	62.51	1.57	2.44	-1.20	-11.69	0.000	0.000
Medium Trucks:	73.11	-15.67	0.94	-1.20	12.36	-17.383	-20.383
Heavy Trucks:	78.76	-19.62	0.12	-1.20	15.83	-17.800	-20.800

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.3	63.4	61.7	55.6	64.2	64.8
Medium Trucks:	57.2	55.7	49.3	47.8	56.2	56.5
Heavy Trucks:	58.1	56.6	47.6	48.8	57.2	57.3
Vehicle Noise:	66.6	64.8	62.1	57.0	65.6	66.0

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.3	63.4	61.7	55.6	64.2	64.8
Medium Trucks:	39.8	38.3	31.9	30.4	38.8	39.1
Heavy Trucks:	40.3	38.8	29.8	31.0	39.4	39.5
Vehicle Noise:	65.3	63.5	61.7	55.6	64.3	64.9

Tuesday, December 14, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Backyard No Wall
Road Name: Comstock Street
Lot No:

Project Name: Whittier Residential
Job Number: 14880
Analyst: A. Khan

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,500 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:	0.0 feet
Centerline Dist. to Observer:	35.0 feet
Barrier Distance to Observer:	35.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

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:	0.00		
Medium Trucks:	2.30		
Heavy Trucks:	8.01	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	28.810
Medium Trucks:	37.652
Heavy Trucks:	43.361

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	59.44	2.36	3.49	-1.20	-11.67	0.000	0.000
Medium Trucks:	71.09	-14.88	1.74	-1.20	12.38	-17.386	-20.386
Heavy Trucks:	77.24	-18.83	0.82	-1.20	15.85	-17.802	-20.802

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.1	62.2	60.4	54.4	63.0	63.6
Medium Trucks:	56.8	55.2	48.9	47.3	55.8	56.0
Heavy Trucks:	58.0	56.6	47.6	48.8	57.2	57.3
Vehicle Noise:	65.7	63.9	60.9	56.1	64.6	65.1

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.1	62.2	60.4	54.4	63.0	63.6
Medium Trucks:	39.4	37.9	31.5	30.0	38.4	38.6
Heavy Trucks:	40.2	38.8	29.8	31.0	39.4	39.5
Vehicle Noise:	64.1	62.2	60.4	54.4	63.0	63.6

Tuesday, December 14, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: First Floor With Wall
Road Name: Philadelphia Street
Lot No:

Project Name: Whittier Residential
Job Number: 14880
Analyst: A. Khan

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,500 vehicles
Vehicle Speed:	30 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:	0.0 feet
Centerline Dist. to Observer:	40.0 feet
Barrier Distance to Observer:	40.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

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:	0.00		
Medium Trucks:	2.30		
Heavy Trucks:	8.01	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	33.838
Medium Trucks:	42.608
Heavy Trucks:	48.317

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	62.51	1.57	2.44	-1.20	-11.69	0.000	0.000
Medium Trucks:	73.11	-15.67	0.94	-1.20	12.36	-17.383	-20.383
Heavy Trucks:	78.76	-19.62	0.12	-1.20	15.83	-17.800	-20.800

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.3	63.4	61.7	55.6	64.2	64.8
Medium Trucks:	57.2	55.7	49.3	47.8	56.2	56.5
Heavy Trucks:	58.1	56.6	47.6	48.8	57.2	57.3
Vehicle Noise:	66.6	64.8	62.1	57.0	65.6	66.0

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.3	63.4	61.7	55.6	64.2	64.8
Medium Trucks:	39.8	38.3	31.9	30.4	38.8	39.1
Heavy Trucks:	40.3	38.8	29.8	31.0	39.4	39.5
Vehicle Noise:	65.3	63.5	61.7	55.6	64.3	64.9

Tuesday, December 14, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: First Floor With Wall
Road Name: Comstock Street
Lot No:

Project Name: Whittier Residential
Job Number: 14880
Analyst: A. Khan

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,500 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:	0.0 feet
Centerline Dist. to Observer:	35.0 feet
Barrier Distance to Observer:	35.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

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:	0.00		
Medium Trucks:	2.30		
Heavy Trucks:	8.01	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	28.810
Medium Trucks:	37.652
Heavy Trucks:	43.361

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	59.44	2.36	3.49	-1.20	-11.67	0.000	0.000
Medium Trucks:	71.09	-14.88	1.74	-1.20	12.38	-17.386	-20.386
Heavy Trucks:	77.24	-18.83	0.82	-1.20	15.85	-17.802	-20.802

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.1	62.2	60.4	54.4	63.0	63.6
Medium Trucks:	56.8	55.2	48.9	47.3	55.8	56.0
Heavy Trucks:	58.0	56.6	47.6	48.8	57.2	57.3
Vehicle Noise:	65.7	63.9	60.9	56.1	64.6	65.1

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.1	62.2	60.4	54.4	63.0	63.6
Medium Trucks:	39.4	37.9	31.5	30.0	38.4	38.6
Heavy Trucks:	40.2	38.8	29.8	31.0	39.4	39.5
Vehicle Noise:	64.1	62.2	60.4	54.4	63.0	63.6

Tuesday, December 14, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Second Floor With Wall
Road Name: Philadelphia Street
Lot No:

Project Name: Whittier Residential
Job Number: 14880
Analyst: A. Khan

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,500 vehicles
Vehicle Speed:	30 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:	0.0 feet
Centerline Dist. to Observer:	40.0 feet
Barrier Distance to Observer:	40.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

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:	0.00		
Medium Trucks:	2.30		
Heavy Trucks:	8.01	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	36.277
Medium Trucks:	44.676
Heavy Trucks:	50.385

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	62.51	1.57	1.99	-1.20	*-11.36*	0.000	0.000
Medium Trucks:	73.11	-15.67	0.63	-1.20	*12.57*	-17.408	-20.408
Heavy Trucks:	78.76	-19.62	-0.15	-1.20	*17.47*	-17.996	-20.996

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	56.9	55.4	49.0	47.5	55.9	56.2
Heavy Trucks:	57.8	56.4	47.3	48.6	56.9	57.1
Vehicle Noise:	66.2	64.4	61.6	56.6	65.1	65.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	39.5	38.0	31.6	30.1	38.5	38.7
Heavy Trucks:	39.8	38.4	29.3	30.6	38.9	39.1
Vehicle Noise:	64.9	63.0	61.2	55.2	63.8	64.4

Tuesday, December 14, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Second Floor With Wall
Road Name: Comstock Street
Lot No:

Project Name: Whittier Residential
Job Number: 14880
Analyst: A. Khan

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,500 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:	0.0 feet
Centerline Dist. to Observer:	35.0 feet
Barrier Distance to Observer:	35.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

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:	0.00		
Medium Trucks:	2.30		
Heavy Trucks:	8.01	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	31.639
Medium Trucks:	30.691
Heavy Trucks:	45.702

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	59.44	2.36	2.88	-1.20	*-11.25*	0.000	0.000
Medium Trucks:	71.09	-14.88	3.08	-1.20	*-12.57*	0.000	0.000
Heavy Trucks:	77.24	-18.83	0.48	-1.20	*17.70*	-18.024	-21.024

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:	58.1	56.6	50.2	48.7	57.1	57.4
Heavy Trucks:	57.7	56.3	47.2	48.5	56.8	57.0
Vehicle Noise:	65.4	63.7	60.5	55.8	64.4	64.8

Mitigated Noise Levels (with 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:	58.1	56.6	50.2	48.7	57.1	57.4
Heavy Trucks:	39.7	38.2	29.2	30.5	38.8	38.9
Vehicle Noise:	64.6	62.8	60.3	54.9	63.5	64.1

Tuesday, December 14, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Third Floor With Wall
Road Name: Philadelphia Street
Lot No:

Project Name: Whittier Residential
Job Number: 14880
Analyst: A. Khan

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,500 vehicles
Vehicle Speed:	30 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:	0.0 feet
Centerline Dist. to Observer:	40.0 feet
Barrier Distance to Observer:	40.0 feet
Observer Height (Above Pad):	23.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

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:	0.00		
Medium Trucks:	2.30		
Heavy Trucks:	8.01	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	40.608
Medium Trucks:	39.352
Heavy Trucks:	54.147

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	62.51	1.57	1.25	-1.20	*-10.85*	0.000	0.000
Medium Trucks:	73.11	-15.67	1.46	-1.20	*-12.48*	0.000	0.000
Heavy Trucks:	78.76	-19.62	-0.62	-1.20	*18.58*	-18.130	-21.130

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.1	62.2	60.5	54.4	63.0	63.6
Medium Trucks:	57.7	56.2	49.8	48.3	56.8	57.0
Heavy Trucks:	57.3	55.9	46.9	48.1	56.5	56.6
Vehicle Noise:	65.7	63.9	61.0	56.1	64.7	65.1

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.1	62.2	60.5	54.4	63.0	63.6
Medium Trucks:	57.7	56.2	49.8	48.3	56.8	57.0
Heavy Trucks:	39.2	37.8	28.7	30.0	38.3	38.5
Vehicle Noise:	65.0	63.2	60.8	55.4	64.0	64.5

Tuesday, December 14, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Third Floor With Wall
Road Name: Comstock Street
Lot No:

Project Name: Whittier Residential
Job Number: 14880
Analyst: A. Khan

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,500 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:	0.0 feet
Centerline Dist. to Observer:	35.0 feet
Barrier Distance to Observer:	35.0 feet
Observer Height (Above Pad):	23.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

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:	0.00		
Medium Trucks:	2.30		
Heavy Trucks:	8.01	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	36.524
Medium Trucks:	35.123
Heavy Trucks:	49.887

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	59.44	2.36	1.94	-1.20	*-10.63*	0.000	0.000
Medium Trucks:	71.09	-14.88	2.20	-1.20	*-12.40*	0.000	0.000
Heavy Trucks:	77.24	-18.83	-0.09	-1.20	*18.82*	-18.158	-21.158

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.5	60.6	58.9	52.8	61.4	62.1
Medium Trucks:	57.2	55.7	49.3	47.8	56.3	56.5
Heavy Trucks:	57.1	55.7	46.7	47.9	56.3	56.4
Vehicle Noise:	64.5	62.8	59.6	55.0	63.5	64.0

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.5	60.6	58.9	52.8	61.4	62.1
Medium Trucks:	57.2	55.7	49.3	47.8	56.3	56.5
Heavy Trucks:	39.0	37.5	28.5	29.8	38.1	38.2
Vehicle Noise:	63.7	61.9	59.3	54.0	62.6	63.1

Tuesday, December 14, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Fourth Floor With Wall
Road Name: Philadelphia Street
Lot No:

Project Name: Whittier Residential
Job Number: 14880
Analyst: A. Khan

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,500 vehicles
Vehicle Speed:	30 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:	0.0 feet
Centerline Dist. to Observer:	40.0 feet
Barrier Distance to Observer:	40.0 feet
Observer Height (Above Pad):	32.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

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:	0.00		
Medium Trucks:	2.30		
Heavy Trucks:	8.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	46.303
Medium Trucks:	44.747
Heavy Trucks:	59.231

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	62.51	1.57	0.40	-1.20	*-10.31*	0.000	0.000
Medium Trucks:	73.11	-15.67	0.62	-1.20	*-12.23*	0.000	0.000
Heavy Trucks:	78.76	-19.62	-1.21	-1.20	*19.19*	-18.203	-21.203

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	53.6	62.2	62.8
Medium Trucks:	56.9	55.4	49.0	47.5	55.9	56.1
Heavy Trucks:	56.7	55.3	46.3	47.5	55.9	56.0
Vehicle Noise:	64.9	63.1	60.2	55.3	63.9	64.3

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	63.3	61.4	59.6	53.6	62.2	62.8
Medium Trucks:	56.9	55.4	49.0	47.5	55.9	56.1
Heavy Trucks:	38.5	37.1	28.1	29.3	37.7	37.8
Vehicle Noise:	64.2	62.4	60.0	54.5	63.1	63.7

Tuesday, December 14, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - v10/31/19

Scenario: Fourth Floor With Wall
Road Name: Comstock Street
Lot No:

Project Name: Whittier Residential
Job Number: 14880
Analyst: A. Khan

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,500 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:	0.0 feet
Centerline Dist. to Observer:	35.0 feet
Barrier Distance to Observer:	35.0 feet
Observer Height (Above Pad):	32.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	1.0%

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:	0.00		
Medium Trucks:	2.30		
Heavy Trucks:	8.01	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	42.767
Medium Trucks:	41.076
Heavy Trucks:	55.430

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	59.44	2.36	0.91	-1.20	*-10.02*	0.000	0.000
Medium Trucks:	71.09	-14.88	1.18	-1.20	*-12.07*	0.000	0.000
Heavy Trucks:	77.24	-18.83	-0.77	-1.20	*19.36*	-18.223	-21.223

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	61.5	59.6	57.9	51.8	60.4	61.0
Medium Trucks:	56.2	54.7	48.3	46.8	55.2	55.5
Heavy Trucks:	56.4	55.0	46.0	47.2	55.6	55.7
Vehicle Noise:	63.6	61.8	58.6	54.0	62.5	63.0

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	61.5	59.6	57.9	51.8	60.4	61.0
Medium Trucks:	56.2	54.7	48.3	46.8	55.2	55.5
Heavy Trucks:	38.2	36.8	27.8	29.0	37.4	37.5
Vehicle Noise:	62.6	60.8	58.3	53.0	61.6	62.1

Tuesday, December 14, 2021

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APPENDIX 9.1:

CADNAA OPERATIONAL NOISE MODEL INPUTS

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14480 - Comstock Residential - Operation

CadnaA Noise Prediction Model: 14480-02_Operation.cna
Date: 12.01.22
Analyst: B. Maddux

Calculation Configuration

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

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R01	38.9	37.2	44.2	60.0	54.0	0.0				5.00	a	6019043.83	2304787.93	5.00
RECEIVERS		R02	35.6	33.8	40.9	63.0	58.0	0.0				5.00	a	6019259.39	2305078.50	5.00
RECEIVERS		R03	41.8	40.0	47.1	68.0	60.0	0.0				5.00	a	6019611.93	2304313.88	5.00
RECEIVERS		R04	40.2	38.4	45.5	61.0	56.0	0.0				5.00	a	6019239.99	2304044.15	5.00
RECEIVERS		R05	48.9	47.1	54.2	61.0	56.0	0.0				5.00	a	6019232.16	2304363.19	5.00

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			K0	Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night				X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(dB)	(ft)		(ft)	(ft)	(ft)
POINTSOURCE		AC01	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019356.14	2304273.38	91.67
POINTSOURCE		AC02	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019356.27	2304277.55	91.67
POINTSOURCE		AC03	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019359.01	2304296.95	91.67
POINTSOURCE		AC04	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019359.14	2304300.72	91.67
POINTSOURCE		AC05	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019359.14	2304304.89	91.67
POINTSOURCE		AC06	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019359.01	2304308.80	91.67
POINTSOURCE		AC07	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019359.14	2304312.83	91.67
POINTSOURCE		AC08	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019359.27	2304316.87	91.67
POINTSOURCE		AC09	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019359.40	2304320.91	91.67
POINTSOURCE		AC10	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019359.27	2304324.81	91.67
POINTSOURCE		AC11	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019359.79	2304328.85	91.67

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			K0	Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night				X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(dB)	(ft)		(ft)	(ft)	(ft)
POINTSOURCE		AC12	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019359.40	2304332.89	91.67
POINTSOURCE		AC13	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019359.53	2304336.79	91.67
POINTSOURCE		AC14	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019359.53	2304340.96	91.67
POINTSOURCE		AC15	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019355.49	2304328.85	91.67
POINTSOURCE		AC16	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019355.49	2304332.63	91.67
POINTSOURCE		AC17	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019355.62	2304336.79	91.67
POINTSOURCE		AC18	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019355.75	2304340.70	91.67
POINTSOURCE		AC19	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019360.63	2304396.00	91.67
POINTSOURCE		AC20	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019360.63	2304399.80	91.67
POINTSOURCE		AC21	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019360.74	2304403.82	91.67
POINTSOURCE		AC22	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019361.06	2304407.61	91.67
POINTSOURCE		AC23	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019356.72	2304407.72	91.67
POINTSOURCE		AC24	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019356.83	2304403.82	91.67
POINTSOURCE		AC25	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019356.83	2304399.80	91.67
POINTSOURCE		AC26	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019356.61	2304396.00	91.67
POINTSOURCE		AC27	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019361.50	2304438.43	91.67
POINTSOURCE		AC28	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019361.60	2304442.44	91.67
POINTSOURCE		AC29	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019361.60	2304446.46	91.67
POINTSOURCE		AC30	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019361.66	2304450.47	91.67
POINTSOURCE		AC31	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019357.70	2304446.46	91.67
POINTSOURCE		AC32	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019357.76	2304450.47	91.67
POINTSOURCE		AC33	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019357.70	2304442.44	91.67
POINTSOURCE		AC34	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019357.59	2304438.43	91.67
POINTSOURCE		AC35	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019357.96	2304462.52	91.67
POINTSOURCE		AC36	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019358.02	2304466.53	91.67
POINTSOURCE		AC37	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019357.85	2304454.49	91.67
POINTSOURCE		AC38	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019357.96	2304458.50	91.67
POINTSOURCE		AC39	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019357.90	2304470.31	91.67
POINTSOURCE		AC40	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019362.93	2304482.47	91.67
POINTSOURCE		AC41	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019362.76	2304486.46	91.67
POINTSOURCE		AC42	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019347.57	2304482.81	91.67
POINTSOURCE		AC43	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019343.66	2304482.73	91.67
POINTSOURCE		AC44	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019339.67	2304482.64	91.67
POINTSOURCE		AC45	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019335.85	2304482.81	91.67
POINTSOURCE		AC46	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019331.77	2304482.81	91.67
POINTSOURCE		AC47	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019327.69	2304482.90	91.67
POINTSOURCE		AC48	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019323.87	2304482.99	91.67
POINTSOURCE		AC49	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019319.96	2304483.07	91.67
POINTSOURCE		AC50	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019315.88	2304483.07	91.67
POINTSOURCE		AC51	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019347.83	2304486.46	91.67
POINTSOURCE		AC52	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019343.75	2304486.55	91.67
POINTSOURCE		AC53	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019339.67	2304486.55	91.67
POINTSOURCE		AC54	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019335.50	2304486.81	91.67
POINTSOURCE		AC55	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019331.94	2304486.72	91.67
POINTSOURCE		AC56	76.0	76.0	76.0	Lw	76		540.00	135.00	270.00	0.0	48.33	g	6019327.95	2304486.89	91.67
POINTSOURCE		Trash1	88.9	88.9	88.9	Lw	88.9		540.00	135.00	270.00	0.0	48.33	g	6019278.80	2304504.27	48.33

Building(s)

Name	M.	ID	RB	Residents	Absorption	Height		Coordinates			
						Begin		x	y	z	Ground
						(ft)		(ft)	(ft)	(ft)	(ft)
BUILDING		B1	x	0		43.33	a	6019383.01	2304225.13	43.33	0.00
								6019328.49	2304226.26	43.33	0.00
								6019332.21	2304434.99	43.33	0.00
								6019337.85	2304434.88	43.33	0.00
								6019338.18	2304459.94	43.33	0.00
								6019291.63	2304460.81	43.33	0.00
								6019291.63	2304463.74	43.33	0.00
								6019281.54	2304463.74	43.33	0.00
								6019281.76	2304473.94	43.33	0.00
								6019279.04	2304473.94	43.33	0.00
								6019279.58	2304509.54	43.33	0.00
								6019282.51	2304509.54	43.33	0.00
								6019282.51	2304515.62	43.33	0.00
								6019359.77	2304514.10	43.33	0.00
								6019359.88	2304512.58	43.33	0.00
								6019374.63	2304512.26	43.33	0.00
								6019374.63	2304503.58	43.33	0.00
								6019387.33	2304503.36	43.33	0.00
								6019387.44	2304500.97	43.33	0.00
								6019389.72	2304500.86	43.33	0.00
								6019388.20	2304445.69	43.33	0.00
								6019385.60	2304445.69	43.33	0.00
								6019385.43	2304433.71	43.33	0.00
								6019386.73	2304433.62	43.33	0.00

Name	M.	ID	RB	Residents	Absorption	Height	Coordinates			
						Begin	x	y	z	Ground
						(ft)	(ft)	(ft)	(ft)	(ft)
							6019385.00	2304335.64	43.33	0.00
							6019377.91	2304335.64	43.33	0.00
							6019377.91	2304325.38	43.33	0.00
							6019384.63	2304325.38	43.33	0.00
							6019384.68	2304312.51	43.33	0.00
							6019383.17	2304312.51	43.33	0.00
							6019383.26	2304302.01	43.33	0.00
							6019384.51	2304302.01	43.33	0.00

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APPENDIX 10.1:

CADNAA CONSTRUCTION NOISE MODEL INPUTS

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14480 - Comstock Residential - Construction

CadnaA Noise Prediction Model: 14480-02_Construction.cna
Date: 12.01.22
Analyst: B. Maddux

Calculation Configuration

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

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R01	57.0	57.0	63.7	80.0	0.0	0.0				5.00	a	6019043.83	2304787.93	5.00
RECEIVERS		R02	54.1	54.1	60.8	80.0	0.0	0.0				5.00	a	6019259.39	2305078.50	5.00
RECEIVERS		R03	61.9	61.9	68.6	80.0	0.0	0.0				5.00	a	6019611.93	2304313.88	5.00
RECEIVERS		R04	62.0	62.0	68.6	80.0	0.0	0.0				5.00	a	6019239.99	2304044.15	5.00
RECEIVERS		R05	72.0	72.0	78.6	80.0	0.0	0.0				5.00	a	6019232.16	2304363.19	5.00

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li			Operating Time			Height
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	(ft)
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	
SITEBOUNDARY		Construction	113.0	113.0	113.0	77.8	77.8	77.8	Lw	113					8

Name	Height				Coordinates			
	Begin		End		x	y	z	Ground
	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
SITEBOUNDARY	8.00	a			6019265.30	2304207.80	8.00	0.00
					6019270.81	2304507.76	8.00	0.00
					6019377.30	2304505.88	8.00	0.00
					6019387.10	2304495.67	8.00	0.00
					6019390.04	2304492.61	8.00	0.00
					6019384.78	2304205.65	8.00	0.00