Vista Rose

NOISE IMPACT ANALYSIS

CITY OF PLACENTIA

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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
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
L_{min}	Minimum level measured over the time interval
mph	Miles per hour
PPV	Peak Particle Velocity
Project	Vista Rose
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
VdB	Vibration Decibels

EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures for the proposed Vista Rose development, Tentative Tract Map (TTM) 19250 ("Project"). The Project site is located on the north of Alta Vista Street, east of Rose Drive, and west of Placentia Champions Sports complex in the City of Placentia. The City of Placentia previously prepared an initial study/mitigated negative declaration (IS/MND) and approved a vesting tentative subdivision map for 74 single family residences ("Tract 15700 "). The prior property owner recorded a final subdivision map for a total of 62 single-family lots with a remainder parcel covering the existing oil operations area.

The proposed Project (Vesting TTM 19250) adds 26 additional residential units to the originally approved 74-unit subdivision, for a total of 100 lots. The following analysis is based on the proposed 100-unit development and the incremental differences in impacts from the additional 26-units evaluated, where applicable.

This study has been prepared to assess the noise impacts of the Project consistent with applicable City of Placentia noise standards, and significance criteria based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

OFF-SITE TRAFFIC NOISE ANALYSIS

Traffic generated by the operation of the proposed Project will influence the traffic noise levels in surrounding off-site areas. To quantify the traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on seven roadway segments surrounding the Project site were calculated based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in *Vista Rose Traffic Impact Analysis* prepared by Urban Crossroads, Inc. (2) To assess the off-site noise level impacts associated with the proposed Project, noise contour boundaries were developed for Existing and Existing Plus Approved and Pending Projects traffic conditions. The off-site noise impacts of the Project would not be substantially greater than the off-site noise impacts of the original 74-unit development. The additional traffic generated by the Project is anticipated to result in a 0.1 dBA change over the 74-unit development. The analysis shows that the unmitigated Project-related traffic noise level increases under all traffic scenarios will be *less than significant*.

ON-SITE NOISE ANALYSIS

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 Project. It is expected that the primary source of noise impacts to the Project site will be traffic noise from Alta Vista Street. Based on the noise analysis for Tract 15700, the proposed Project would result in similar on-site noise level impacts and would require similar mitigation, and, similar to Tract 15700, the entire 100-unit Project would result in *less than significant* impacts.

EXTERIOR NOISE LEVELS

To satisfy the City of Placentia's 65 dBA CNEL exterior noise level standards for residential land use, the construction of 6-foot high noise barriers is recommended for the outdoor living areas (backyards) of single-family residential lots adjacent Alta Vista Street. With the recommended noise barriers shown on Exhibit ES-A, the mitigated future exterior noise levels at the outdoor living areas (backyards) of single-family residential lots will be reduced to range from 59.0 to 59.6 dBA CNEL. This noise analysis shows that the recommended noise barriers will satisfy the City of Placentia 65 dBA CNEL exterior noise level standards for single-family residential use. The recommendations identify the minimum required noise barrier height to satisfy the City of Placentia exterior noise level standards.

The recommended noise control barriers shall be constructed so that the top of each wall and /or berm combination extends to the planned height above the pad elevation of the lot it is shielding. When the road is elevated above the pad elevation, the barrier shall extend to the recommended height above the highest point between the residential home and the road. The barrier shall provide a weight of at least 4 pounds per square foot of face area with no decorative cutouts or line-of-sight openings between shielded areas and the roadways, or a minimum transmission loss of 20 dBA. (3) The barrier shall consist of a solid face from top to bottom. Unnecessary openings or decorative cutouts shall not be made. All gaps (except for weep holes) should be filled with grout or caulking. The noise barrier shall be constructed using the following materials:

- Masonry block;
- Stucco veneer over wood framing (or foam core), or 1-inch-thick tongue and groove wood of sufficient weight per square foot;
- Glass (1/4-inch-thick), or other transparent material with sufficient weight per square foot capable of providing a minimum transmission loss of 20 dBA;
- Earthen berm;
- Any combination of these construction materials.

INTERIOR NOISE LEVELS

To satisfy the City of Placentia's 45 dBA CNEL interior noise level standard for residential land use, buildings adjacent Alta Vista Street will require a Noise Reduction (NR) of up to 20.7 dBA and a windows-closed condition requiring a means of mechanical ventilation (e.g. air conditioning). The following measures are will be implemented by the Project to reduce interior noise levels:

Residential:

- Windows: All residential lots adjacent to Rose Drive and Alta Vista Street require first and second-floor windows and sliding glass doors that have well-fitted, well-weather-stripped assemblies, with minimum sound transmission class (STC) ratings of 27.
- Walls: At any penetrations of exterior walls by pipes, ducts, or conduits, the space between the wall and pipes, ducts, or conduits shall be caulked or filled with mortar to form an airtight seal.

- Roof: Roof sheathing of wood construction shall be per manufacturer's specification or caulked plywood of at least one-half inch thick. Ceilings shall be per manufacturer's specification or well-sealed gypsum board of at least one-half inch thick. Insulation with at least a rating of R-19 shall be used in the attic space.
- Ventilation: Arrangements for any habitable room shall be such that any exterior door or window can be kept closed when the room is in use and still receive circulated air. A forced air circulation system (e.g. air conditioning) or active ventilation system (e.g. fresh air supply) shall be provided which satisfies the requirements of the Uniform Building Code.

With the interior noise mitigation measures provided in this study, the proposed Project is expected to satisfy the City of Placentia's 45 dBA CNEL interior noise level standard for residential development uses.

OPERATIONAL NOISE ANALYSIS

Using reference noise levels to represent the potential noise sources within the Project site, this analysis estimates the Project-related operational (stationary-source) noise levels at the nearby noise-sensitive receiver locations. The Project-related operational noise sources are expected to include ground-mounted air conditioning units. Based on the analysis of Tract 15700, noise impacts from the operation of the Project would result from similar noise sources and there would be no difference in the impacts calculated for the entire 100-unit Project and those identified in the previous analysis for Tract 15700.

The analysis shows that the unmitigated Project-related operational noise levels will satisfy the City of Placentia's exterior noise level standards at all the off-site receiver locations in the Project study area. Further, this analysis demonstrates that the Project will contribute a *less than significant* operational noise level increase to the existing ambient noise environment at all the nearby sensitive receiver locations during the daytime and nighttime hours. Therefore, the operational noise level impacts associated with the increase in 26 units associated with the entire 100-unit Project activities, such as the ground-mounted air conditioning units will be *less than significant*.

CONSTRUCTION NOISE ANALYSIS

On-site construction noise represents a short-term increase on the ambient noise levels associated with the development of the Project on nearby receivers. Construction-related noise impacts are expected to create temporary and intermittent high-level noise conditions at receivers surrounding the Project site when certain activities occur at the Project site boundary. Using sample reference noise levels to represent the planned construction activities of Vista Rose site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. Since the City of Placentia General Plan and Municipal Codes do not identify specific construction noise level limits, this analysis relies on the 80 dBA L_{eq} threshold identified by the Federal Transit Administration (FTA) to quantify and determine potential construction noise level impacts. This analysis shows that the Project-related short-term construction noise levels are estimated to range from 60.9 to 69.5 dBA L_{eq} and will satisfy the 80 dBA L_{eq} threshold identified by the FTA (4) and therefore, the noise level impacts at the nearby sensitive receiver

locations are considered *less than significant*. Based on the analysis of Tract 15700, noise impacts from the construction of the Project would result from similar noise sources and there would be no difference in the impacts from the entire 100-unit Project and those identified in the previous analysis for Tract 15700.

CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. Ground-borne vibration levels resulting from typical construction activities occurring within the Project site were estimated by data published by the FTA and the California Department of Transportation (Caltrans) (4) (5). At the nearest receivers Project construction vibration velocity levels are estimated to range from 0.00 to 0.03 in/sec PPV. Based on maximum acceptable continuous vibration threshold of 0.30 PPV (in/sec), the typical Project construction vibration levels will not exceed the City of Placentia thresholds at properties located adjacent to the Project site and vibration impacts would be *less than significant*. Based on the analysis of Tract 15700, vibration impacts from the operation of the Project would result from similar vibration sources and there would be no difference in the impacts from the entire 100-unit Project and those identified in the previous analysis for Tract 15700.

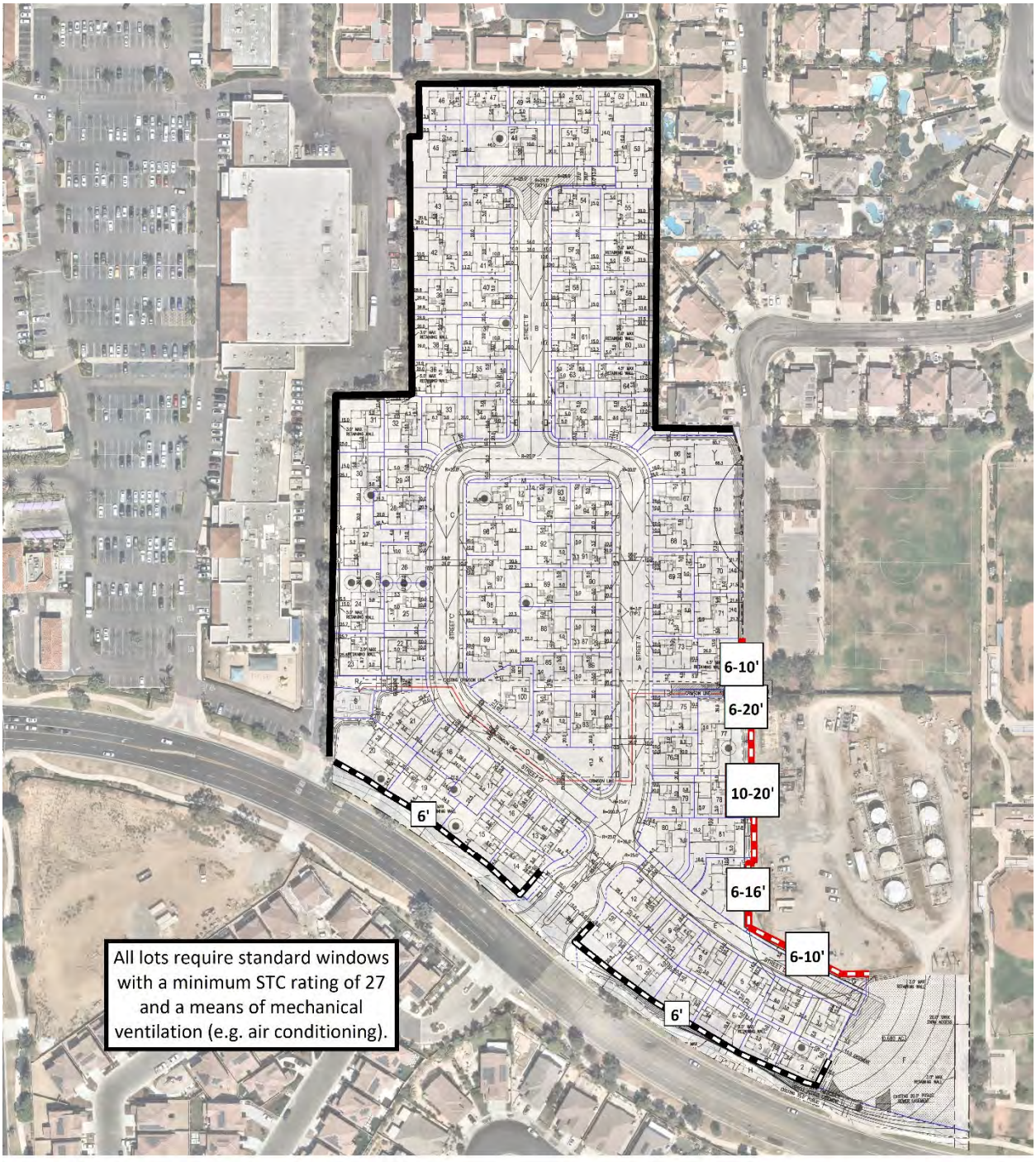
SUMMARY OF CEQA SIGNIFICANCE FINDINGS

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

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-Site Traffic Noise	7	*Less Than Significant*	*n/a*
On-Site Traffic Noise	8	*Significant*	*Less Than Significant*
Operational Noise	10	*Less Than Significant*	*n/a*
Long-Term Operational Noise Level Increases		*Less Than Significant*	*n/a*
Construction Noise Level Compliance	11	*Less Than Significant*	*n/a*
Construction Vibration		*Less Than Significant*	*n/a*

EXHIBIT ES-A: SUMMARY OF ON-SITE RECOMMENDATIONS



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1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed Vista Rose, TTM 19250 ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, describes the local regulatory setting, provides the study methods and procedures for traffic noise analysis, and evaluates the future exterior noise environment. In addition, this study includes an analysis of the potential Project-related long-term operational and short-term construction noise impacts.

1.1 SITE LOCATION

The proposed Project is located north of Alta Vista Street, east of Rose Drive, and west of Jefferson Drive in the City of Placentia, as shown on Exhibit 1-A. The proposed Project is located approximately 2.2 miles east of State Route 57, and roughly 7.7 miles east of the Fullerton Municipal Airport.

The Project site is currently vacant. Existing single-family residential uses in the Project study area are located adjacent to the eastern and southern Project site boundaries, and west across Rose Drive. Existing commercial uses and Bridgemark Corporation oil drilling facilities are located east and adjacent to the Project site. Existing land uses to the west, north and east are shielded from the Project site by an 6-8-foot-high masonry wall as shown in Exhibit ES-A. The Village Center of Rose is located adjacent to and west of the Project site at the corner of Alta Vista Street and Rose Drive.

1.2 PROJECT DESCRIPTION

The City of Placentia previously prepared an initial study/mitigated negative declaration (IS/MND) and approved a vesting tentative subdivision map for 74 single family residences, Tract 15700. The prior property owner recorded a final subdivision map for a total of 62 single-family lots with a remainder parcel covering the existing oil operations area. The proposed Project (Vesting TTM 19250) adds 26 additional residential units to the original approved 74-unit subdivision, for a total of 100 lots. Additionally, the Project includes a noise barrier along the eastern Project boundary with the adjacent existing oil field. The barrier will range in height from 6 feet to 20 feet. The final height of the barriers shall be determined in consultation with the adjacent oil field operator. A preliminary site plan can be found in Exhibit 1-B. This noise analysis evaluates the noise impacts associated with the 26-lot increase compared to the prior IS/MND analysis and approved Tract 15700 and the cumulative impacts associated with the entire 100-unit Project.

EXHIBIT 1-A: LOCATION MAP

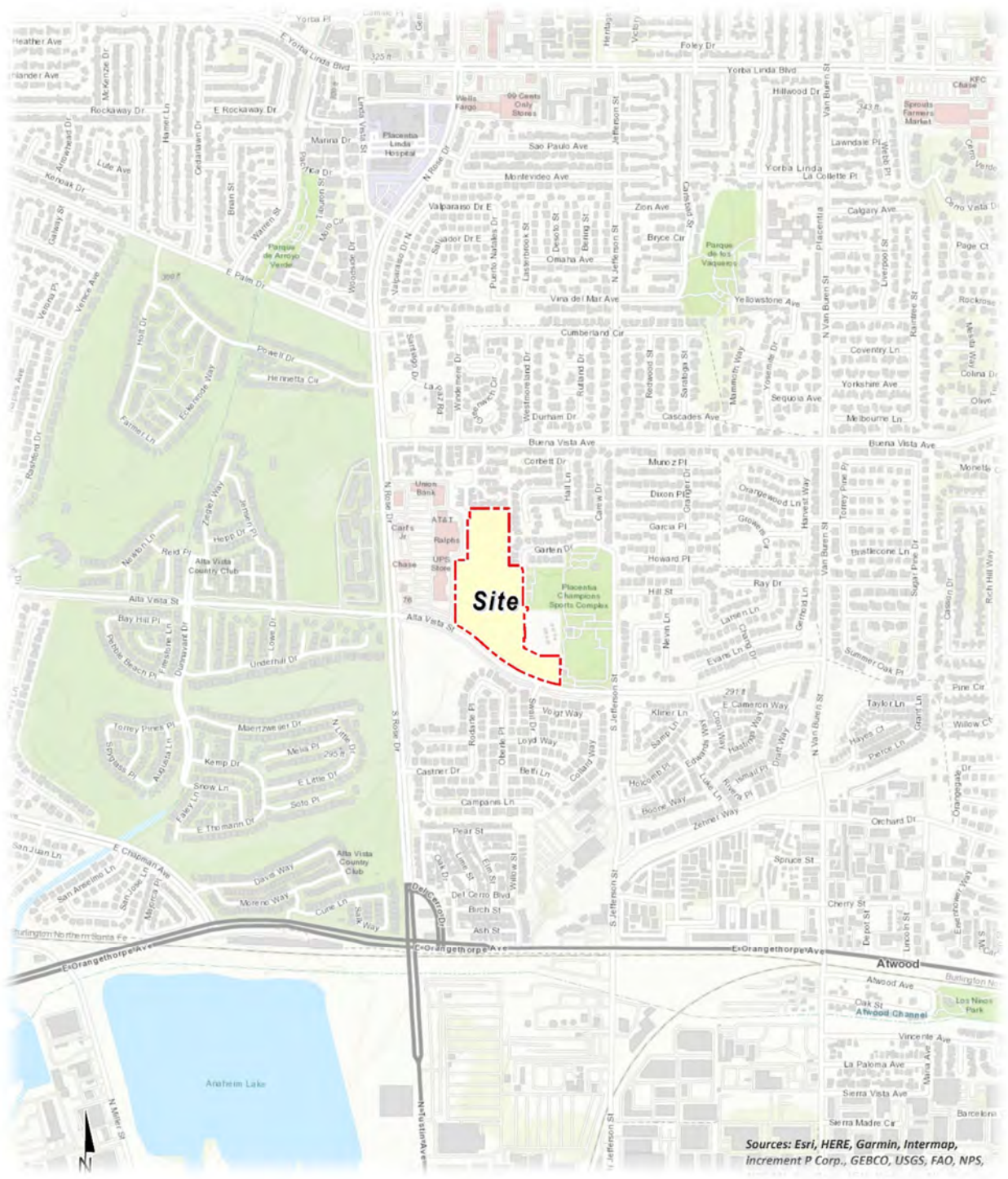
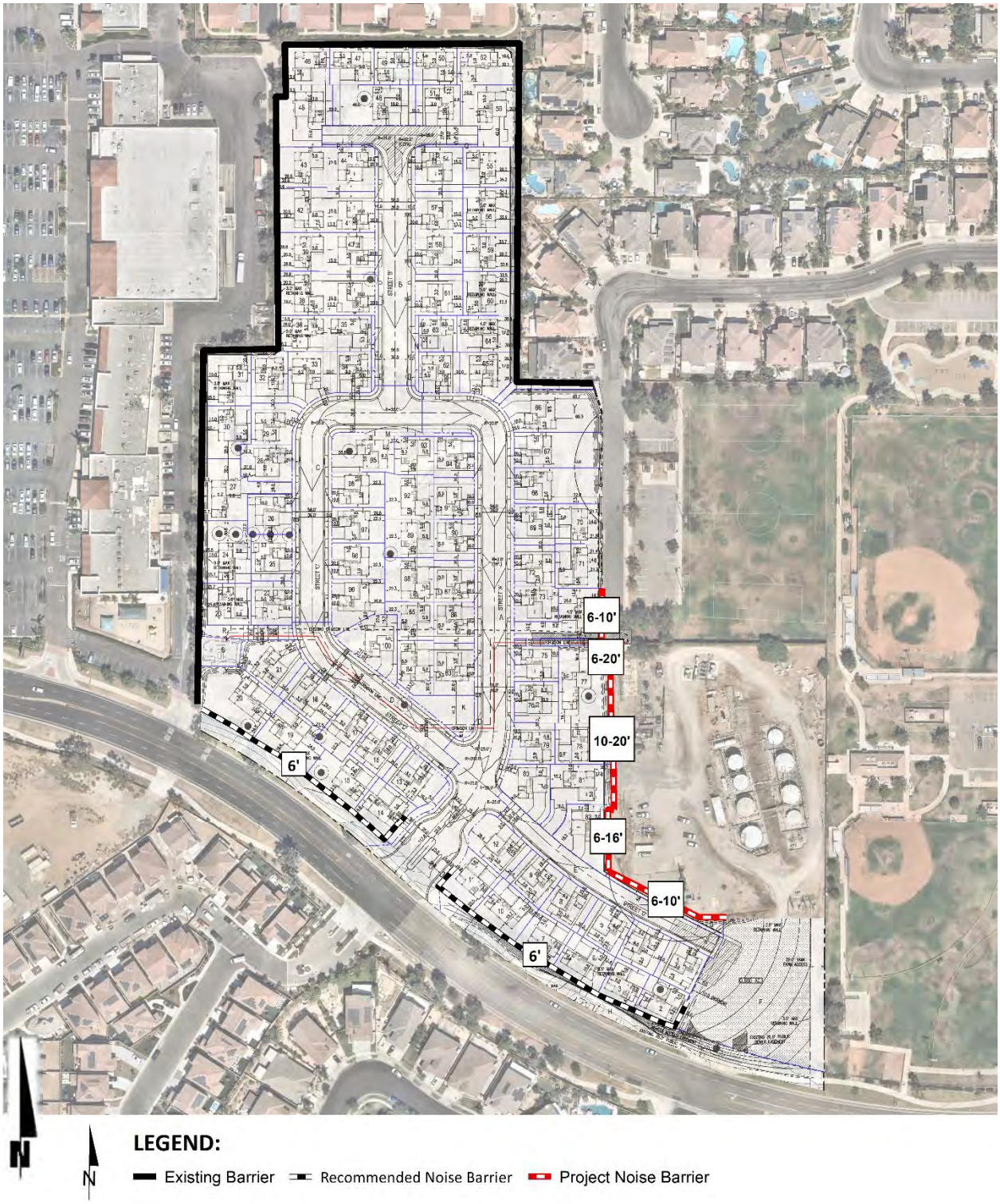


EXHIBIT 1-B: SITE PLAN



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2 FUNDAMENTALS

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

EXHIBIT 2-A: TYPICAL NOISE LEVELS

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

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

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (6) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 100 feet, which can cause serious discomfort. (7) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

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

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the 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 Placentia relies on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources.

2.3 SOUND PROPAGATION

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

2.3.1 GEOMETRIC SPREADING

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

2.3.2 GROUND ABSORPTION

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

sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receptor, 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 receptor such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source. (8)

2.3.3 ATMOSPHERIC EFFECTS

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects. (6)

2.3.4 SHIELDING

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an "out of sight, out of mind" effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearby resident. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The FHWA does not consider the planting of vegetation to be a noise abatement measure. (8)

2.4 NOISE CONTROL

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

2.5 NOISE BARRIER ATTENUATION

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

2.6 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. (9)

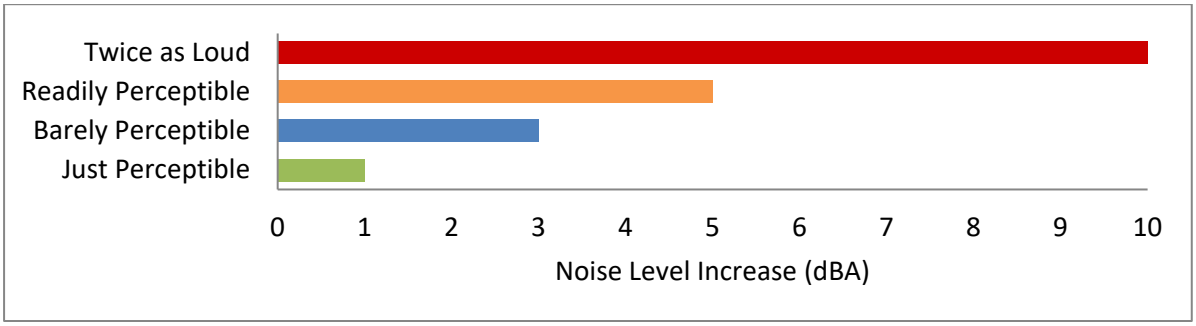
2.7 COMMUNITY RESPONSE TO NOISE

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

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

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Another twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (10) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (10) Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. An increase or decrease of 1 dBA cannot be perceived except in carefully controlled laboratory experiments, a change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (8)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



2.8 EXPOSURE TO HIGH NOISE LEVELS

The Occupational Safety and Health Administration (OSHA) sets legal limits on noise exposure in the workplace. The permissible exposure limit (PEL) for a worker over an eight-hour day is 90 dBA. The OSHA standard uses a 5 dBA exchange rate. This means that when the noise level is increased by 5 dBA, the amount of time a person can be exposed to a certain noise level to receive the same dose is cut in half. The National Institute for Occupational Safety and Health (NIOSH) has recommended that all worker exposures to noise should be controlled below a level equivalent to 85 dBA for eight hours to minimize occupational noise induced hearing loss. NIOSH also recommends a 3 dBA exchange rate so that every increase by 3 dBA doubles the amount of the noise and halves the recommended amount of exposure time. (11)

OSHA has implemented requirements to protect all workers in general industry (e.g. the manufacturing and the service sectors) for employers to implement a Hearing Conservation Program where workers are exposed to a time weighted average noise level of 85 dBA or higher over an eight-hour work shift. Hearing Conservation Programs require employers to measure noise levels, provide free annual hearing exams and free hearing protection, provide training, and conduct evaluations of the adequacy of the hearing protectors in use unless changes to tools, equipment and schedules are made so that they are less noisy and worker exposure to noise is less than the 85 dBA. This noise study does not evaluate the noise exposure of workers within a project or construction site based on CEQA requirements, and instead, evaluates Project-related operational and construction noise levels at the nearby sensitive receiver locations in the Project study area. Further, periodic exposure to high noise levels in short duration, such as Project construction, is typically considered an annoyance and not impactful to human health. It would take several years of exposure to high noise levels to result in hearing impairment. (12)

2.9 VIBRATION

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

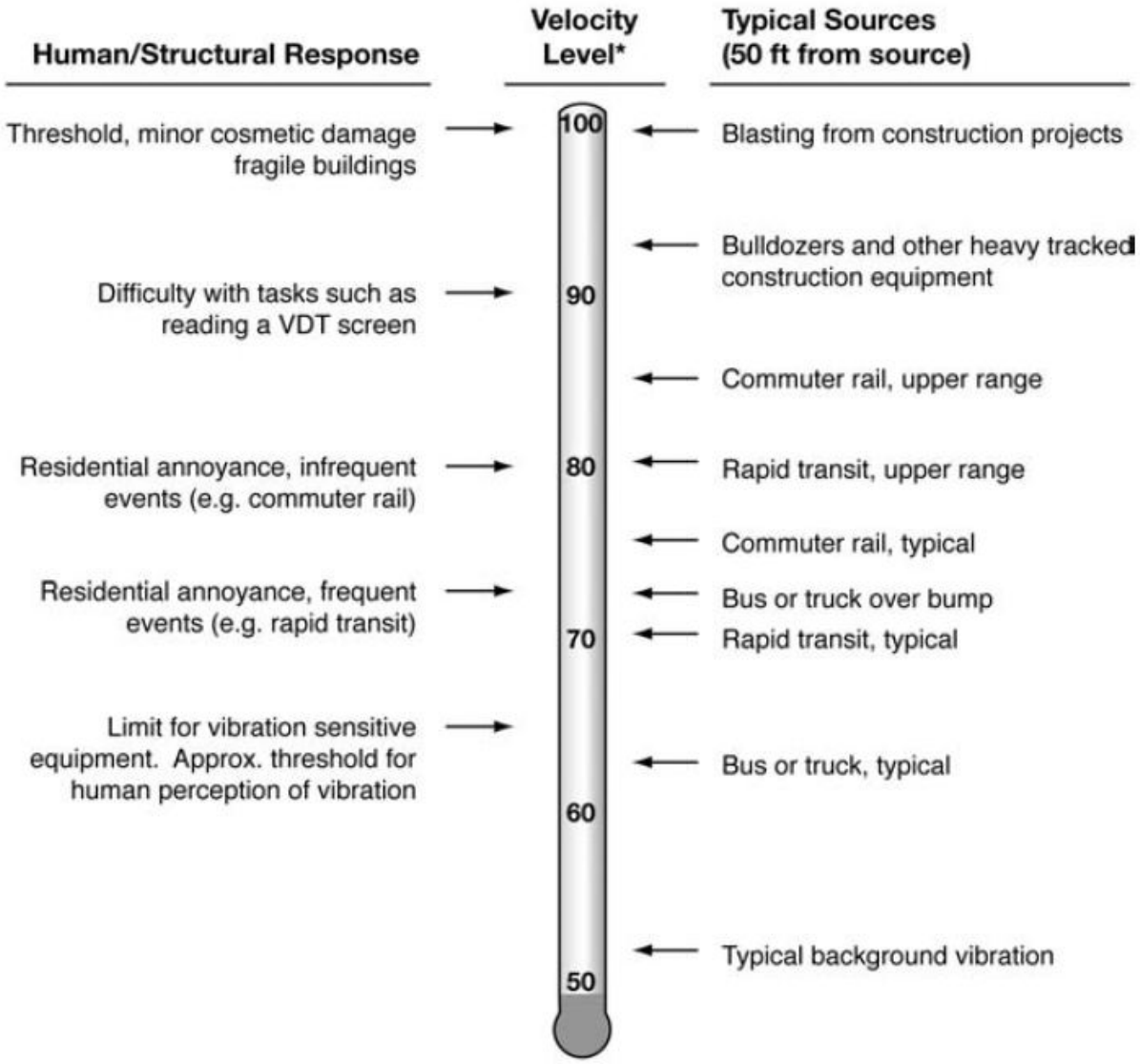
Additionally, in contrast to airborne noise, ground-borne vibration outdoors is not a common environmental problem and annoyance from ground-borne vibration is almost exclusively an indoor phenomenon (4). Therefore, the effects of vibrations should only be evaluated at a structure and the effects of the building structure on the vibration should be considered. Wood-frame buildings, such as typical residential structures, are more easily excited by ground vibration than heavier buildings. In contrast, large masonry buildings with spread footings have a low response to ground vibration (4). In general, the heavier a building is, the lower the response will be to the incident vibration energy. However, all structurers reduce vibration levels due to the coupling of the building to the soil.

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 (4). 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 (4). However, the RMS amplitude and PPV are related mathematically, and the RMS amplitude of equipment is typically calculated from the PPV reference level. The RMS amplitude is approximately 70% of the PPV (5). Thus, either can be used on the description of vibration impacts.

While not universally accepted, vibration decibel notation (VdB) is another vibration notation developed and used by the FTA in their guidance manual to describe vibration levels and provide a background of common vibration levels and set vibration limits (13). Decibel notation (VdB) serves to reduce the range of numbers used to describe vibration levels and is used in this report to describe vibration levels.

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

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



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

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

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3 REGULATORY SETTING

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

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research. (14) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

3.2 STATE OF CALIFORNIA BUILDING STANDARDS

The State of California's noise insulation standards for all residential units are codified in the California Code of Regulations (CCR), Title 24, Building Standards Administrative Code, Chapter 12, Section 1206. These noise standards are applied to new construction that contains dwelling units or sleeping units, such as residential and hotel or motel uses, in California for controlling interior noise levels resulting from exterior noise sources. For new buildings, the acceptable interior noise limit is 45 dBA CNEL in habitable rooms (15).

3.3 TRANSPORTATION NOISE STANDARDS

The City of Placentia updated their Noise Element of the General Plan in 2019. The General Plan Noise Element refers to the City of Placentia Municipal Code with regard to noise regulations. Chapter 26.76 (Noise Control), also known as the noise ordinance establishes noise limits for residential, commercial, and industrial uses (Noise Zone 1 through 3) within the City.

Based on the Office of Planning and Research noise criteria, shown in the Noise Element Table 4.14-3, this noise study has been prepared to satisfy an exterior noise level of less than 65 dBA CNEL and an interior noise level of less than 45 dBA CNEL for residential uses. The 65 dBA CNEL residential exterior noise standards typically apply to outdoor living areas where people congregate. In the case of residential projects, the standards apply to private yards of single-family homes

3.4 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Vista Rose, stationary-source (operational) noise such as the expected ground-mounted air conditioning units are typically evaluated against standards established under a City's Municipal Code. The City of Placentia Municipal Code, Section 23.76.050 establishes the permissible noise level that may be received at nearby sensitive uses (e.g., residential). It should be noted that in the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by 5 dBA. Noise ordinance limits generally apply to "stationary" sources such as mechanical equipment or vehicles operating on private property. The City of Placentia noise level limits are presented in Table 3-1 and included in Appendix 3.1.

TABLE 3-1: CITY OF PLACENTIA NOISE LEVEL LIMITS

Noise Zone	Noise Level Limits dBA L_{eq}-1-Hour average	Time Period
Exterior Noise Standard		
1	55	7:00 a.m. – 10:00 p.m.
	50	10:00 p.m. – 7:00 a.m.
2	65	Anytime
3	70	Anytime
Interior Noise Standard		
1	55	7:00 a.m. – 10:00 p.m.
	45	10:00 p.m. – 7:00 a.m.
Noise Zone 1: All Residential Property Noise Zone 2: All Commercial Property Noise Zone 3: All Industrial Property		

Source: City of Placentia, City of Placentia Municipal Code Sections 23.76.050 and 23.76.060, March 2018.

For noise-sensitive residential properties, the exterior noise level shall not exceed 55 dBA L_{50} during daytime hours (7:00 a.m. to 10:00 p.m.) and shall not exceed 50 dBA L_{50} during the nighttime hours (10:00 p.m. to 7:00 a.m.), as defined by the Municipal Code. (16) These standards shall apply for a cumulative period of 30 minutes in any hour (L_{50}), as well as plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes in any hour (L_{25}), or the standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour (L_8), or the standard plus 15 dBA for a cumulative period of more than 1 minute in any hour (L_2), or the standard plus 20 dBA for any period of time (L_{max}). The City of Placentia Municipal Code noise limits are shown on Table 3-1 and included in Appendix 3.1.

3.5 CONSTRUCTION NOISE STANDARDS

To analyze noise impacts originating from the construction of the Vista Rose, noise from construction activities are typically evaluated against standards established under a City's Municipal Code. The Municipal Code noise standards for construction are described below for the City of Placentia.

3.5.1 CITY OF PLACENTIA CONSTRUCTION NOISE STANDARDS

To control noise impacts associated with the construction of the proposed Project, the City has established limits to the hours of operation. Section 23.81.170 of the City's Municipal Code indicates that construction activity is limited to the hours of 7:00 a.m. and 7:00 p.m. Monday to Friday; 9:00 a.m. to 6:00 p.m. on Saturdays; with no activity allowed on Sundays or holidays. (16) Neither the City's General Plan nor Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers for CEQA analysis purposes. Therefore, a numerical construction threshold based on Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* is used for analysis of daytime construction impacts, as discussed below.

According to the FTA, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should account for the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. Due to the lack of standardized construction noise thresholds, the FTA provides guidelines that can be considered reasonable criteria for construction noise assessment. The FTA considers a daytime exterior construction noise level of 80 dBA L_{eq} as a reasonable threshold for noise sensitive residential land use. (17 p. 179)

3.6 CONSTRUCTION VIBRATION STANDARDS

Construction activity can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. (18).

To analyze vibration impacts originating from the operation and construction of the Vista Rose, vibration-generating activities are appropriately evaluated against standards established under a City's Municipal Code, if such standards exist. However, the City of Placentia does not identify specific vibration level limits. Therefore, for analysis purposes, the Caltrans *Transportation and Construction Vibration Guidance Manual*, (5 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. (7 p. 182) Table 3-2 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).

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. (19) For the purposes of this report, impacts would be potentially significant if the Project results in or causes:

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

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

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

4.1 NOISE LEVEL INCREASES (THRESHOLD A)

Noise level increases resulting from the revised 100-unit Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing baseline ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach *recognizes that there is no single noise increase that renders the noise impact significant.* (20) 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) (21) 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}).

The FICON guidance provides an established source of criteria to assess the impacts of substantial temporary or permanent increase in baseline ambient noise levels. Based on the FICON criteria, the amount to which a given noise level increase is considered acceptable is reduced when the without Project (baseline) noise levels are already shown to exceed certain land-use specific exterior noise level criteria. The specific levels are based on typical responses to noise level increases of 5 dBA or *readily perceptible*, 3 dBA or *barely perceptible*, and 1.5 dBA depending on the underlying without Project noise levels for noise-sensitive uses. These levels of increases and

their perceived acceptance are consistent with guidance provided by both the Federal Highway Administration (22 p. 9) and Caltrans (23 p. 2_48).

4.2 VIBRATION (THRESHOLD B)

As described in Section 3.6 the vibration impacts originating from the construction of the Vista Rose, vibration-generating activities are appropriately evaluated the thresholds of significance outlined in the Caltrans *Transportation and Construction Vibration Guidance Manual*, (5 p. 38). These guidelines identify the maximum acceptable continuous vibration building damage threshold of 0.3 PPV (in/sec) for "older residential structures" which is used in this noise study to assess potential impacts due to Project construction vibration levels.

4.3 CEQA GUIDELINES NOT FURTHER ANALYZED (THRESHOLD C)

CEQA Noise Threshold C applies when there are nearby public and private airports and/or air strips and focuses on land use compatibility of the Project to nearby airports and airstrips. The Project site is not located within two miles of an airport or airstrip. The closest major airport is the Fullerton Municipal Airport located roughly 7.7 miles east of the Project site. As such, the Project site would not be exposed to excessive noise levels from airport operations, and therefore, impacts are considered *less than significant,* and no further noise analysis is conducted in relation to Appendix G to the CEQA Guidelines, Noise Threshold C. The noise impacts from airports for the proposed Project are the same as for Tract 15700, and the Revised Project would not result in a substantial increase in the severity of noise impacts due to the 26-unit increase compared to the original project evaluated in the IS/MND.

4.4 SIGNIFICANCE CRITERIA SUMMARY

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

ON-SITE TRAFFIC NOISE

- If the on-site noise levels exceed:
    - the exterior 65 dBA CNEL or interior 45 dBA CNEL noise level standards for residential development (Based on the County of Orange General Plan Noise Element); or
    - the interior 50 dBA CNEL noise level threshold for commercial uses (Based on the California Green Building Standards Code, Section 5.507.4.2).

OFF-SITE TRAFFIC NOISE

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

- already exceed 65 dBA CNEL, and the Project creates a community noise level impact of greater than 1.5 dBA CNEL (FICON, 1992).

OPERATIONAL NOISE

- If Project-related operational (stationary-source) noise levels exceed the exterior 55 dBA L_{50} during daytime hours (7:00 a.m. to 10:00 p.m.) and 50 dBA L_{50} during nighttime hours (10:00 p.m. to 7:00 a.m.). These standards shall apply for a cumulative period of 30 minutes in any hour (L_{50}), as well as plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes in any hour (L_{25}), or the standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour (L_8), or the standard plus 15 dBA for a cumulative period of more than 1 minute in any hour (L_2), or the standard plus 20 dBA for any period of time (L_{max}). (Section 23.76.050 of the City of Placentia Municipal Code).
- If the existing ambient noise levels at the nearby noise-sensitive receivers near the Project site:
  - are less than 60 dBA L_{50} and the Project creates a *readily perceptible* 5 dBA L_{50} or greater Project-related noise level increase; or
  - range from 60 to 65 dBA L_{50} and the Project creates a *barely perceptible* 3 dBA L_{50} or greater Project-related noise level increase; or
  - already exceed 65 dBA L_{50}, and the Project creates a community noise level impact of greater than 1.5 dBA L_{50} (FICON, 1992).

CONSTRUCTION NOISE AND VIBRATION

- If Project-related construction activities:
  - occur at any time other than the permitted hours of 7:00 a.m. and 7:00 p.m. Monday to Friday; 9:00 a.m. to 6:00 p.m. Saturdays; with no activity on Sundays and holidays (City of Placentia Municipal Code, Section 23.81.170);
  - create noise levels which exceed the 80 dBA L_{eq} acceptable noise level threshold at the nearby sensitive receiver locations in the City of Placentia (FTA; Transit Noise and Vibration Impact Assessment Manual (4)); or
- If short-term Project generated construction vibration levels exceed the FTA vibration level threshold of 0.03 in/sec PPV at sensitive receiver locations (Caltrans; Transportation and Construction Vibration Guidance Manual (5).

TABLE 4-2: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site Traffic Noise	Noise-Sensitive[1]	if ambient is < 60 dBA CNEL	≥ 5 dBA CNEL Project increase	
		if ambient is 60 - 65 dBA CNEL	≥ 3 dBA CNEL Project increase[1]	
		if ambient is > 65 dBA CNEL	≥ 1.5 dBA CNEL Project increase[1]	
On-Site Traffic Noise	Residential[2]	Exterior Noise Level Criteria	65 dBA CNEL[2]	
		Interior Noise Level Standard	45 dBA CNEL[2]	
	Commercial[2]	Interior Noise Level Standard	50 dBA CNEL[2]	
Operational Noise	Noise-Sensitive	Exterior Noise Level Standards	See Table 3-1[3]	
		if ambient is < 60 dBA	≥ 5 dBA Project increase	
		if ambient is 60 - 65 dBA	≥ 3 dBA Project increase[1]	
		if ambient is > 65 dBA	≥ 1.5 dBA Project increase[1]	
Construction Noise & Vibration	Noise-Sensitive	Permitted hours of 7:00 a.m. and 7:00 p.m. Monday to Friday; 9:00 a.m. to 6:00 p.m. Saturday; with no activity on Sundays or holidays.[4]		
		Noise Level Threshold	80 dBA L_{eq}[5]	n/a
		Vibration Level Threshold[7]	0.30 in/sec PPV[6]	n/a

[1] Source: FICON, 1992.
[2] Sources: City of Placentia General Plan Noise Element, County of Orange General Plan Noise Element (Tables VIII-2 & VIII-3)
[3] Source: Section 23.76.050 of the City of Placentia Municipal Code (Appendix 3.1).
[4] Source: Section 23.81.170 of the City of Placentia Municipal Code.
[5] Source: FTA Transit Noise and Vibration Impact Assessment, September 2018..
[6] Source: Caltrans Traffic Noise Analysis Protocol, May 2011.
[7] Source: Transportation and Construction Vibration Guidance Manual, April 2020.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.; "n/a" = No nighttime construction activity is permitted, so no nighttime construction noise level limits are identified.

5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, five 24-hour noise level measurements were taken at sensitive receiver locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Wednesday, July 25th, 2022. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate longer term metrics, such as the 24-hour CNEL. The noise levels 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. (24)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent any part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (6) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (25)

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. (25) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby

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

5.3 NOISE MEASUREMENT RESULTS

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

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

The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with the arterial roadway network. The 24-hour existing noise level measurements shown on Table 5-1 present the existing ambient noise conditions.

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

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]	
		Daytime	Nighttime
L1	Located north of the Project site near an existing 8-foot-high barrier for residential homes on Antiqua Circle.	61.2	48.8
L2	Located north of the Project site near an existing 8-foot-high barrier for residential homes on Antiqua Circle.	61.5	44.0
L3	Located east of the Project site in the Placentia Champions Sports park on Blankenship Circle.	57.7	51.4
L4	Located east of the Project site at the Placentia Champions Sports Complex on the northwest corner of Alta Vista Street and Jefferson Street.	59.7	58.4
L5	Located at the south of the Project site on Alta Vista Street near an existing 8-foot high barrier for residential homes on Providence Loop.	61.5	60.1

[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.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

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6 TRAFFIC NOISE METHODS AND PROCEDURES

The following section outlines the methods and procedures used to estimate and analyze the future traffic noise environment. Consistent with the City of Placentia General Plan Policies for single-family residential land use, all transportation related noise levels are presented in terms of the 24-hour CNEL's.

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The estimated roadway noise impacts from vehicular traffic were calculated using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (26) 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. (27) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period.

6.2 ON-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

The on-site roadway parameters including the ADT volumes used for this analysis are presented on Table 6-1 Based on the City of Placentia General Plan Circulation Element, Alta Vista Street is classified as a 4-lane Secondary. (28). To predict the future on-site noise environment at the Project site, the City of Placentia General Plan were used.

TABLE 6-1: ON-SITE ROADWAY PARAMETERS

Roadway Segment	Lanes	Classification[1]	Roadway Capacity Volume[1]	Speed Limit (mph)[2]	Site Conditions
Alta Vista St.	4	Secondary	14,800	45	Soft

[1] Source: *Alta Vista Residential Traffic Analysis* Urban Crossroads, Inc. August 2022.
[2] Posted speed limits.

The traffic volume shown on Table 6-1 reflect future traffic conditions needed to assess the future on-site traffic noise environment. For the purposes of this analysis, soft site conditions were used to analyze the on-site traffic noise impacts for the Project study area. Soft site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. 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. (29) Table 6-2 presents the time-of-day vehicle splits by vehicle type used to develop the 24-hour CNEL, and Table 6-3 presents the total traffic flow distributions (vehicle mixes) used for this analysis. The information in Tables 6-2 and 6-3 provides the hourly distribution percentages of automobile, medium trucks, and heavy trucks for input into the FHWA Model based on roadway types.

TABLE 6-2: TIME OF DAY VEHICLE SPLITS

Time Period	Vehicle Type		
	Autos	Medium Trucks	Heavy Trucks
Daytime (7:00 a.m. - 7:00 p.m.)	77.5%	84.8%	86.5%
Evening (7:00 p.m. - 10:00 p.m.)	12.9%	4.9%	2.7%
Nighttime (10:00 p.m. - 7:00 a.m.)	9.6%	10.3%	10.8%
Total:	100.0%	100.0%	100.0%

Source: Typical Southern California vehicle mix.

TABLE 6-3: DISTRIBUTION OF TRAFFIC FLOW BY VEHICLE TYPE (VEHICLE MIX)

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

Source: Typical Southern California vehicle mix.

The site plan is used to identify the relationship between the roadway centerline elevation, the pad elevation and the centerline distance to any intervening noise barriers, and the building façade. The exterior noise level impacts were placed five feet above the pad elevation at the proposed building façade for first-floor level analysis. Second through fifth floor receivers were placed nine feet above each floor level (i.e., 14 feet, 23 feet, 32 feet, etc.).

6.3 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-4 identifies the seven off-site study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of Placentia General Plan Connected City Element, and the posted vehicle speeds. Consistent with the Traffic Analysis prepared by Urban Crossroads, Inc. (30) the off-site traffic noise analysis includes the following traffic scenarios.

- Existing (2022)
- Existing Plus Approved and Pending Projects (EPAP)
- Existing Plus Approved and Pending Projects Plus Project (EPAP+P)

The average daily traffic (ADT) volumes used for this study are presented on Table 6-5. Table 6-2 and Table 6-3 provides the time of day (daytime, evening, and nighttime) vehicle splits used for calculating CNEL values.

TABLE 6-4: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Adjacent Land Use[1]	Distance from Centerline to Nearest Adjacent Land Use (Feet)[2]	Vehicle Speed (mph)[3]
1	Rose Dr.	n/o Alta Vista St.	Residential	60'	45
2	Rose Dr.	s/o Alta Vista St.	Residential	60'	45
3	Jefferson St.	n/o Alta Vista St.	Residential	40'	35
4	Jefferson St.	s/o Alta Vista St.	Residential	40'	40
5	Alta Vista St.	w/o Rose Dr.	Residential/Park	40'	45
6	Alta Vista St.	e/o Rose Dr.	Residential	40'	45
7	Alta Vista St.	e/o Providence Loop	Residential	40'	45
8	Alta Vista St.	e/o Jefferson St.	Residential	40'	40

[1] Source: City of Placentia General Plan Land Use Element, Exhibit 5.
[2] Distance to adjacent land use is based upon the right-of-way distances for each functional roadway classification provided in the City of Placentia Circulation Element.
[3] Posted speed limits in the Project study area.

TABLE 6-5: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes[1]		
			Existing (2022)	EPAP	
			Without Project	With Project	Without Project
1	Rose Dr.	n/o Alta Vista St.	38,300	39,300	39,500
2	Rose Dr.	s/o Alta Vista St.	33,800	35,500	35,800
3	Jefferson St.	n/o Alta Vista St.	2,000	2,100	2,200
4	Jefferson St.	s/o Alta Vista St.	4,800	4,800	5,000
5	Alta Vista St.	w/o Rose Dr.	18,800	19,100	19,200
6	Alta Vista St.	e/o Rose Dr.	12,500	14,200	14,800
7	Alta Vista St.	e/o Providence Loop	10,300	10,600	11,000
8	Alta Vista St.	e/o Jefferson St.	8,400	8,700	8,800

[1] Source: Alta Vista Residential- North Parcel Traffic Impact Analysis, Urban Crossroads, Inc., August 2022.

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7 ON-SITE NOISE IMPACTS

An on-site exterior noise impact analysis has been completed to determine the traffic noise exposure and to determine if noise abatement measures included in the proposed Vista Rose Project avoid a potential increase in the severity of noise impacts that would otherwise occur. Based on the noise analysis prepared for Tract 15700 and the following analysis, on-site noise levels experienced by the proposed Project would be similar as on-site noise levels evaluated for Tract 15700 and noise level impacts are anticipated to be the same. Thus, the Revised Project does not result in a substantial increase in the severity of the prior noise impacts evaluated in the IS/MND for Tract 15700.

Similar to Tract 15700, it is expected that the primary source of noise impacts to the Project site will be traffic noise from Alta Vista Street. The Project will also experience some background traffic noise impacts 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 beyond of the right-of-way of the roadways, and the revised Project will not result in a new significant impact or in a substantial increase in the severity of the previously identified impacts.

7.1 ON-SITE EXTERIOR NOISE ANALYSIS

Using the FHWA traffic noise prediction model and the parameters outlined in Tables 6-1 through 6-3, the expected future exterior noise levels are calculated for buildings facing Alta Vista Street. Table 7-1 presents a summary of future exterior noise level impacts in the single-family residential outdoor living areas (backyards). The on-site traffic noise level impacts indicate that the outdoor living areas and building façades adjacent to Alta Vista Street will experience unmitigated exterior noise levels ranging from 65.5 to 66.5 dBA CNEL. The on-site traffic noise analysis calculations are provided in Appendix 7.1.

To satisfy the City of Placentia's 65 dBA CNEL exterior noise level standard for residential land use, the construction of 6-foot-high noise barriers is required for the outdoor living areas (backyards) of single-family residential lots adjacent to Alta Vista Street. With the recommended noise barriers shown on Exhibit ES-A incorporated into the revised Project design, the future exterior noise levels at the outdoor living areas (backyards) of single-family residential lots will be reduced to range from 59.0 to 59.6 dBA CNEL and will remain less than significant. This noise analysis shows that the noise barriers included in the Revised Project will satisfy the City of Placentia's 65 dBA CNEL exterior noise level standard for single-family residential use. The following minimum required noise barrier height has been incorporated into the sound walls included in the Revised Project to satisfy the City of Placentia's exterior noise level standards.

TABLE 7-1: EXTERIOR TRANSPORTATION NOISE LEVELS

Lot/ Building	Roadway	Unmitigated Noise Level (dBA CNEL)	Mitigated Noise Level (dBA CNEL)	Barrier Height (Feet)
2 and 3	Alta Vista St.	66.5	59.4	6.0
6 and 7	Alta Vista St.	66.0	59.2	6.0
10 and 11	Alta Vista St.	65.5	59.0	6.0
14 and 15	Alta Vista St.	66.3	59.6	6.0
19 and 20	Alta Vista St.	66.0	59.4	6.0

7.2 ON-SITE INTERIOR NOISE ANALYSIS

To ensure that the Project provides an acceptable interior noise environment, this analysis relies on the City of Placentia's 45 dBA CNEL interior noise limit for new construction.

7.2.1 NOISE REDUCTION METHODOLOGY

The interior noise level is the difference between the predicted exterior noise level at the building façade and the noise reduction of the structure. Typical building construction will provide a Noise Reduction (NR) of approximately 12 dBA with "windows open" and a minimum 25 dBA noise reduction with "windows closed." However, sound leaks, cracks and openings within the window assembly can greatly diminish its effectiveness in reducing noise. Several methods are used to improve interior noise reduction, including: (1) weather-stripped solid core exterior doors; (2) upgraded dual glazed windows; (3) mechanical ventilation/air conditioning; and (4) exterior wall/roof assembles free of cut outs or openings.

7.2.2 INTERIOR NOISE LEVEL ASSESSMENT

Tables 7-2 and 7-3 show that all the residential units adjacent to Alta Vista Street will require a windows-closed condition and a means of mechanical ventilation (e.g., air conditioning). Table 7-2 shows that the future noise levels at the first-floor building façade are estimated to range from 58.5 to 59.1 dBA CNEL. The interior noise levels would range from 35.5 to 34.1 dBA CNEL. The first-floor interior noise level analysis shows that the City of Placentia's 45 dBA CNEL interior noise standard can be satisfied using standard windows with a minimum STC rating of 27 for all first-floor units.

Table 7-3 shows that the future noise levels at the second-floor building façades are expected to range from 65.0 to 65.7 dBA CNEL, and standard windows with a minimum STC rating of 27 are required to satisfy the City of Placentia's 45 dBA CNEL interior noise level standard for residential uses. The interior noise levels would range from 39.0 to 40.7 dBA CNEL. The second-floor interior noise level analysis shows that the City of Placentia's 45 dBA CNEL interior noise standard can be satisfied using standard windows with a minimum STC rating of 27 for all second-floor units.

TABLE 7-2: FIRST-FLOOR INTERIOR NOISE IMPACTS (CNEL)

Lot/ Building	Noise Level at Façade[1]	Required Interior NR[2]	Estimated Minimum Interior NR[3]	Upgraded Windows[4]	Interior Noise Level[5]	Threshold	Threshold Exceeded?
2 and 3	58.8	13.8	25.0	No	33.8	45	No
6 and 7	59.0	14.0	25.0	No	34.0	45	No
10 and 11	58.5	13.5	25.0	No	33.5	45	No
14 and 15	59.1	14.1	25.0	No	34.1	45	No
19 and 20	59.0	14.0	25.0	No	34.0	45	No

[1] Exterior noise level at the facade with a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning).
[2] Noise reduction required to satisfy the 45 dBA CNEL interior noise standard.
[3] Noise reduction to satisfy the interior noise standards: 45 dBA CNEL for residential use (California Code of Regulations, Title 24, Building Standards Administrative Code).
[4] Does the required interior noise reduction trigger upgraded windows with a minimum STC rating of greater than 27?
[5] Estimated interior noise level with minimum STC rating for all windows.
"NR" = Noise reduction

TABLE 7-3: SECOND-FLOOR INTERIOR NOISE IMPACTS (CNEL)

Lot/ Building	Noise Level at Façade[1]	Required Interior NR[2]	Estimated Minimum Interior NR[3]	Upgraded Windows[4]	Interior Noise Level[5]	Threshold	Threshold Exceeded?
2 and 3	65.5	20.5	25.0	No	40.5	45	No
6 and 7	65.7	20.7	25.0	No	40.7	45	No
10 and 11	65.0	20.0	26.0	No	39.0	45	No
14 and 15	65.5	20.5	27.0	No	38.5	45	No
19 and 20	65.4	20.4	25.0	No	40.4	45	No

[1] Exterior noise level at the facade with a windows closed condition requiring a means of mechanical ventilation (e.g. air conditioning).
[2] Noise reduction required to satisfy the 45 dBA CNEL interior noise standard.
[3] Noise reduction to satisfy the interior noise standards: 45 dBA CNEL for residential use (California Code of Regulations, Title 24, Building Standards Administrative Code).
[4] Does the required interior noise reduction trigger upgraded windows with a minimum STC rating of greater than 27?
[5] Estimated interior noise level with minimum STC rating for all windows.
[6] No second floor commercial interior areas are planned as part of the Project.
"NR" = Noise reduction

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8 OFF-SITE TRANSPORTATION NOISE IMPACTS

To assess the off-site transportation CNEL noise level impacts associated with development of the revised 100-unit Project compared to the original 74-unit project, noise contours were developed based on *Vista Rose Traffic Impact Analysis*. (2) Based on the noise analysis prepared for Tract 15700 and the following analysis, off-site noise levels generated by the proposed Project would be similar as off-site noise levels generated by traffic associated with Tract 15700 and noise level impacts are anticipated to be the same.

Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

- Existing Conditions (2022): This scenario refers to the existing present-day noise conditions without the proposed Project.
- Existing Plus Approved and Pending Projects Without / With the Project (EPAP): This scenario refers to future opening year noise conditions without and with the proposed Project. This scenario includes all cumulative projects identified in the Traffic Impact Analysis.

8.1 TRAFFIC NOISE CONTOURS

Noise contours were used to assess the Project's incremental (the additional 26 units in TTM 19250) traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area. Tables 8-1 and 8-3 present a summary of the exterior traffic noise levels, without barrier attenuation, for the seven study area roadway segments analyzed from the without Project to the "with Project" conditions under Existing and EPAP traffic conditions, including the self-mitigating features incorporated into the project. Appendix 8.1 includes a summary of the traffic noise level contours for each of the traffic scenarios.

TABLE 8-1: EXISTING WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Rose Dr.	n/o Alta Vista St.	Non-Sensitive	72.5	89	191	411
2	Rose Dr.	s/o Alta Vista St.	Sensitive	72.0	82	176	378
3	Jefferson St.	s/o Alta Vista St.	Non-Sensitive	64.9	RW	RW	84
4	Alta Vista St.	w/o Rose Dr.	Non-Sensitive	72.1	55	118	255
5	Alta Vista St.	e/o Rose Dr.	Non-Sensitive	70.3	42	90	194
6	Alta Vista St.	e/o Providence Loop	Non-Sensitive	69.4	RW	79	170
7	Alta Vista St.	e/o Jefferson St.	Non-Sensitive	67.3	RW	57	122

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 8-2: EPAP CONDITIONS NOISE CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Rose Dr.	n/o Alta Vista St.	Non-Sensitive	72.7	90	194	418
2	Rose Dr.	s/o Alta Vista St.	Sensitive	72.2	84	181	391
3	Jefferson St.	s/o Alta Vista St.	Non-Sensitive	64.9	RW	RW	84
4	Alta Vista St.	w/o Rose Dr.	Non-Sensitive	72.1	55	119	257
5	Alta Vista St.	e/o Rose Dr.	Non-Sensitive	70.8	45	98	211
6	Alta Vista St.	e/o Providence Loop	Non-Sensitive	69.6	RW	81	174
7	Alta Vista St.	e/o Jefferson St.	Non-Sensitive	67.4	RW	58	125

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 8-3: EPAP WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Rose Dr.	n/o Alta Vista St.	Non-Sensitive	72.7	90	195	420
2	Rose Dr.	s/o Alta Vista St.	Sensitive	72.2	85	183	393
3	Jefferson St.	s/o Alta Vista St.	Non-Sensitive	65.0	RW	40	87
4	Alta Vista St.	w/o Rose Dr.	Non-Sensitive	72.1	56	120	258
5	Alta Vista St.	e/o Rose Dr.	Non-Sensitive	71.0	47	101	217
6	Alta Vista St.	e/o Providence Loop	Non-Sensitive	69.7	RW	83	178
7	Alta Vista St.	e/o Jefferson St.	Non-Sensitive	67.5	RW	59	126

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest receiving land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

8.2 EPAP CONDITION PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

An analysis of EPAP traffic noise levels plus traffic noise generated by the proposed Project (including the original 74-unit subdivision and the 26-unit increase reflected in the 100-unit Project) has been included in this report. However, the analysis of existing traffic noise levels plus traffic noise generated by the proposed Project scenario will not actually occur since the Project would not be fully constructed and operational until EPAP conditions.

Table 8-1 presents the Existing 2022 without Project conditions CNEL noise levels. The without Project exterior noise levels are expected to range from 64.9 to 72.5 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography that have been incorporated into the project design Table 8-2 shows the EPAP conditions will range from 65.0 to 72.7 dBA CNEL. Table 8-3 shows the EPAP with Project conditions will range from 64.9 to 72.7 dBA CNEL. As shown on Table 8-4 the Project will generate a noise level increase of up to 0.2 dBA CNEL on the study area roadway segments. Based on the significance criteria in Section 4, the Project-related noise level increases are considered *less than significant* under Existing conditions at the land uses adjacent to roadways conveying Project traffic and the revised project will not result in a substantial increase in the severity of the original project's noise impacts.

TABLE 8-4: OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]					Incremental Noise Level Increase Threshold[3]	
				Existing	No Project	With Project	Total Increase	Project Addition	Limit	Exceed Limit?
1	Rose Dr.	n/o Alta Vista St.	Sensitive	72.5	72.7	72.7	0.2	0.0	3.0	No
2	Rose Dr.	s/o Alta Vista St.	Sensitive	72.0	72.2	72.2	0.2	0.0	3.0	No
3	Jefferson St.	s/o Alta Vista St.	Sensitive	64.9	64.9	65.0	0.1	0.1	n/a	No
4	Alta Vista St.	w/o Rose Dr.	Sensitive	72.1	72.1	72.1	0.0	0.0	3.0	No
5	Alta Vista St.	e/o Rose Dr.	Sensitive	70.3	70.8	71.0	0.7	0.2	3.0	No
6	Alta Vista St.	e/o Providence Loop	Sensitive	69.4	69.6	69.7	0.3	0.1	n/a	No
7	Alta Vista St.	e/o Jefferson St.	Sensitive	67.3	67.4	67.5	0.2	0.1	n/a	No

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[3] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?

9 RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts to existing noise sensitive locations, the sensitive receiver locations shown on Exhibit 9-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.

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. To describe the potential off-site Project noise levels, five receiver locations in the vicinity of the Project site were identified. All distances are measured from the Project site boundary to the outdoor living areas (e.g., private backyards) or at the building façade, whichever is closer to the Project site.

Sensitive receivers near the Project site include existing residential homes and the Placentia Champions Sports Complex and park, as described below. Other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures.

R1: Located represents the existing outdoor living areas (backyards) of residential homes located roughly 14 feet northwest of the Project site on Antiqua Circle. A 24-hour noise level measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Located represents the existing outdoor living areas (backyards) of residential homes located roughly 12 feet northeast of the Project site on Antiqua Circle. A 24-hour noise level measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents existing Placentia Champions Sports Complex and park located approximately 115 feet east of the Project site on Blankenship Circle. A 24-hour noise

level measurement was taken near this location, L3, to describe the existing ambient noise environment.

R4: Location R4 represents existing Placentia Champions Sports Complex and park located approximately 33 feet east of the southern portion of the Project site near Alta Vista Street. A 24-hour noise level measurement was taken near this location, L4, to describe the existing ambient noise environment.

R5: Location R5 represents the existing outdoor living areas (backyards) of residential homes located roughly 114 feet south of the Project site on Alta Vista Street. A 24-hour noise level measurement was taken near this location, L5, to describe the existing ambient noise environment.

EXHIBIT 9-A: RECEIVER LOCATIONS

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10 OPERATIONAL IMPACTS

This section analyzes the potential stationary-source (i.e., on-site) operational noise impacts at the nearest receiver locations, identified in Section 9, resulting from the operation of the Project.

Based on the noise analysis prepared for Tract 15700 and the following analysis, operational noise sources under the entire 100-unit project would be similar as operational noise sources for Tract 15700 and since no noise level impacts are anticipated with the 26-unit increase impacts would be the same as under Tract 15700, i.e., *less than significant*.

10.1 OPERATIONAL NOISE SOURCES

This operational noise analysis is intended to describe noise level impacts associated with the expected typical of daytime and nighttime activities at the Project site. 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 be ground-mounted air conditioning units.

AIR CONDITIONING UNITS

To assess the noise levels created by the ground-mounted air conditioning units, reference noise levels from a Carrier CH16NA036 are used as representative of the air conditioning units that could be used on the Project and have a range of capacity from 1.5 tons to 5 tons. Based on the estimated square footage of each residence, each residence would require approximately 6 tons of air conditioning. According to the product data sheet a Carrier CH16NA036 with a capacity of 3 tons produces a maximum sound power level of 72 dBA. Each unit will have two 3-ton HVAC units.

While operating at full power air conditioners operate in multiple short cycles up to 30 minutes during the nighttime as compared to the daytime where the units typically operate can operate continuously up to 45 minutes in multiple cycles, depending on the ambient temperature. For purposes of this analysis, it was assumed the air conditioners would operate 45 minutes out of an hour during the daytime (7:00 a.m. to 10:00 p.m.) and 30 minutes out of an hour at nighttime (10:00 p.m. to 7:00 a.m.). The acoustic center of each unit will be located three feet above ground elevation.

10.2 REFERENCE NOISE LEVELS

To estimate the operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. 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 10-A. Each unit shown on Exhibit 10-A represents 2 ground-mounted air conditioning units. The reference Project operational sound power levels are summarized in Table 10-1.

TABLE 10-1: REFERENCE NOISE LEVELS

Noise Source	Noise Source Height (Feet)	Source Type	Min./Hour[1]		Reference Noise Level (dBA L_{eq}) @ 50 Feet	Sound Power Level (dBA)[2]
			Day	Night		
Carrier CH16NA036	3'	Point	45	30	44.4	72.0

[1] 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.

[2] 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.

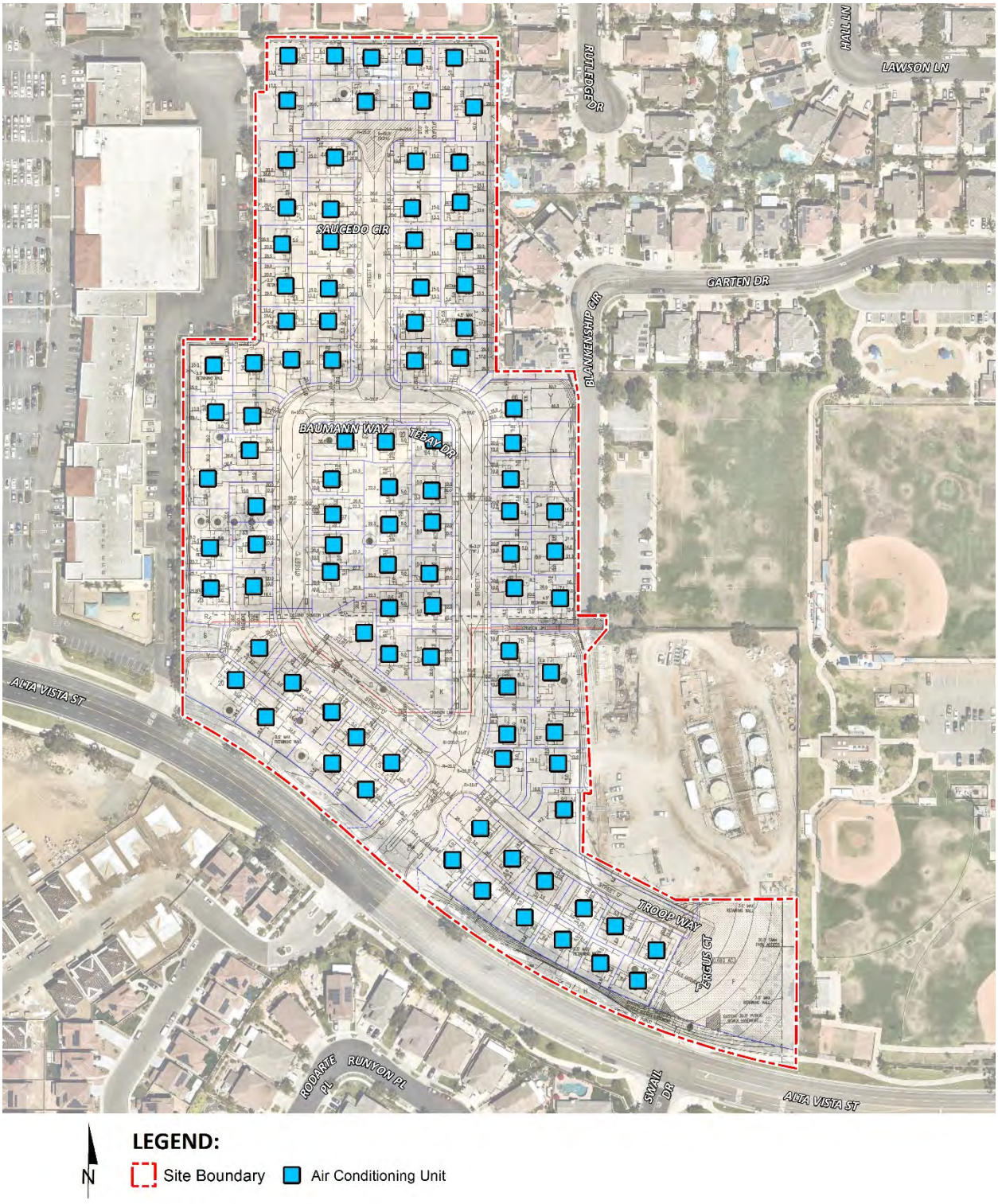
10.3 CADNAA NOISE PREDICTION MODEL

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 10.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section.

EXHIBIT 10-A: OPERATIONAL NOISE SOURCE AND RECEIVER LOCATIONS



10.4 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the Project air conditioning, 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 10-2 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 46.4 dBA L_{eq}. Appendix 10.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section.

TABLE 10-2: PROJECT DAYTIME OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA L_{eq})				
	R1	R2	R3	R4	R5
Air Conditioning Unit	46.4	42.7	39.4	35.6	39.4
Total (All Noise Sources)	**46.4**	**42.7**	**39.4**	**35.6**	**39.4**

[1] See Exhibit 10-A for the noise source locations. CadnaA noise model calculations are included in Appendix 10.1.

Tables 10-3 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 44.7 dBA L_{eq}. Appendix 10.1 includes the detailed noise model inputs including the existing perimeter walls used to estimate the Project operational noise levels presented in this section.

TABLE 10-3: PROJECT NIGHTTIME OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA L_{eq})				
	R1	R2	R3	R4	R5
Air Conditioning Unit	44.7	41.0	37.6	33.8	37.6
Total (All Noise Sources)	**44.7**	**41.0**	**37.6**	**33.8**	**37.6**

[1] See Exhibit 10-A for the noise source locations. CadnaA noise model calculations are included in Appendix 10.1.

10.5 PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

Tables 10-4 shows the Project operational noise levels during the daytime and nighttime hours. The daytime hourly noise levels at the off-site receiver locations are expected to range from 35.6 to 46.4 dBA $L_{eq.}$ The nighttime hourly noise levels at the off-site receiver locations are expected to range from 33.8 to 44.7 dBA L_{eq}. Appendix 10.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section.

TABLE 10-4: OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Project Operational Noise Levels (dBA Leq)[2]		Noise Level Standards (dBA Leq)[3]		Noise Level Standards Exceeded?[4]	
	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
R1	46.4	44.7	50	55	No	No
R2	42.7	41.0	50	55	No	No
R3	39.4	37.6	50	55	No	No
R4	35.6	33.8	50	55	No	No
R5	39.4	37.6	50	55	No	No

10.6 PROJECT OPERATIONAL NOISE LEVEL INCREASES

To describe the Project operational noise level increases, the Project operational noise levels are combined with the existing ambient noise levels measurements for the 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. (6) Instead, they must be logarithmically added using the following base equation:

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

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels 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 10-2 and 10-3, respectively.

As indicated on Tables 10-5 and 10-6, the Project will generate a daytime operational noise level increases ranging from less than 0.0 to 0.1 dBA L_{eq} and nighttime operational noise level increases ranging from less than 0.0 to 1.0 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.* Thus, the revised project will not result in a substantial increase in severity of the noise impacts evaluated in the adopted IS/MND for Tract Map No. 15700.

TABLE 10-5: DAYTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria	Increase Criteria Exceeded?
R1	46.4	L1	61.2	61.3	0.1	3.0	No
R2	42.7	L2	61.5	61.6	0.1	3.0	No
R3	39.4	L2	61.5	61.5	0.0	3.0	No
R4	35.6	L3	57.7	57.7	0.0	5.0	No
R5	39.4	L4	59.7	59.7	0.0	5.0	No

[1] See Exhibit 9-A for the receiver locations.
[2] Total Project daytime operational noise levels as shown on Table 10-2.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.

TABLE 10-6: NIGHTTIME OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria	Increase Criteria Exceeded?
R1	44.7	L1	48.8	50.2	1.4	5.0	No
R2	41.0	L2	44.0	45.8	1.8	5.0	No
R3	37.6	L2	44.0	44.9	0.9	5.0	No
R4	33.8	L3	51.4	51.5	0.1	5.0	No
R5	37.6	L4	58.4	58.4	0.0	5.0	No

[1] See Exhibit 9-A for the receiver locations.
[2] Total Project nighttime operational noise levels as shown on Table 10-3.
[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.

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11 CONSTRUCTION IMPACTS

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

Based on the noise analysis prepared for Tract 15700 and the following analysis, construction activities under the entire 100-unit Project would be similar as construction for Tract 15700 and noise level impacts would be the same.

11.1 CONSTRUCTION NOISE LEVELS

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

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

11.2 CONSTRUCTION REFERENCE NOISE LEVELS

To describe peak construction noise activities, this construction noise analysis was prepared using reference noise level measurements published by the FHWA in the Road Construction Noise Model (RCNM) (31). The FHWA RCNM database provides the most recent and comprehensive source of reference construction noise levels. Table 11-1 provides a summary of the construction reference noise level measurements expressed in hourly average dBA L_{eq} using the estimated FHWA Roadway Construction Noise Model (RCNM) usage factors (32) to describe the typical construction activities for each stage of Project construction.

EXHIBIT 11-A: CONSTRUCTION ACTIVITY AND RECEIVER LOCATIONS

TABLE 11-1: CONSTRUCTION REFERENCE NOISE LEVELS

Construction Stage	Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})	Highest Reference Noise Level (dBA L_{eq})
Demolition	Loaders	71	71
	Demolition Equipment	69	
	Excavators	64	
Site Preparation	Crawler Tractors	77	77
	Hauling Trucks	71	
	Rubber Tired Dozers	71	
Grading	Graders	79	79
	Excavators	64	
	Compactors	67	
Building Construction	Cranes	67	72
	Tractors	72	
	Welders	65	
Paving	Pavers	70	70
	Paving Equipment	69	
	Rollers	69	
Architectural Coating	Cranes	67	67
	Air Compressors	67	
	Generator Sets	67	

[1] Update of noise database for prediction of noise on construction and open site expressed in hourly average L_{eq} based on estimated usage factor.

11.3 CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearby sensitive receiver locations were completed. To assess a reasonable worst-case construction scenario and account for the dynamic nature of construction activities, the Project construction noise analysis models the equipment combination with the highest reference level as a moving point within the construction area (Project site boundary). Construction impacts are based on the highest noise level calculated at each receiver location. As shown on Table 11-2, the highest construction noise levels are expected to range from 56.7 to 68.1 dBA L_{eq} at the nearest receiver locations. Appendix 11.1 includes the detailed CadnaA construction noise model inputs.

TABLE 11-2: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})					
	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Highest Levels[2]
R1	51.7	64.9	46.7	44.7	41.7	64.9
R2	53.7	64.2	48.7	46.7	43.7	64.2
R3	52.7	60.9	47.7	45.7	42.7	60.9
R4	69.5	63.5	64.5	62.5	59.5	69.5
R5	62.1	61.4	57.1	55.1	52.1	62.1

[1] Construction noise source and receiver locations are shown on Exhibit 11-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 11.1.

11.4 CONSTRUCTION NOISE LEVEL COMPLIANCE

To evaluate whether the Project will generate potentially significant short-term noise levels at nearest receiver locations, a construction-related daytime noise level threshold of 80 dBA L_{eq} is used as a reasonable threshold to assess the daytime construction noise level impacts. The construction noise analysis shows that the nearest receiver locations will satisfy the reasonable daytime 80 dBA L_{eq} significance threshold during Project construction activities as shown on Table 11-3. Therefore, the noise impacts due to Project construction noise are considered *less than significant* at all receiver locations, and the revised project would not result in a new significant impact or a substantial increase in the severity of the project construction noise impacts.

TABLE 11-3: CONSTRUCTION NOISE LEVEL COMPLIANCE

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})		
	Highest Construction Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	64.9	80	No
R2	64.2	80	No
R3	60.9	80	No
R4	69.5	80	No
R5	62.1	80	No

[1] Noise receiver locations are shown on Exhibit 11-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?

11.5 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. Ground-borne vibration levels resulting from typical construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration (FTA). (18) However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 11-4. 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 Caltrans. To describe vibration levels at various distances Caltrans provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 11-4: 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

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

Using the vibration source level of construction equipment provided on Table 11-4 and the construction vibration assessment methodology published by Caltrans, it is possible to estimate the Project vibration impacts. Table 11-5 presents the expected Project related vibration levels at the nearby receiver locations. At distances ranging from 12 to 115 feet from the Project construction activities, construction vibration velocity levels are estimated to range from 0.01 to 0.27 in/sec PPV. Based on maximum acceptable continuous vibration threshold of 0.30 PPV (in/sec), the typical Project construction vibration levels will satisfy the thresholds at all receiver locations. Therefore, the Project-related vibration impacts are considered less than significant during the construction activities at the Project site, and the revised project would not result in a substantial increase in the severity of noise impacts.

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

TABLE 11-5: PROJECT CONSTRUCTION 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	12'	0.01	0.11	0.23	0.27	0.27	0.30	No
R2	14'	0.01	0.08	0.18	0.21	0.21	0.30	No
R3	115'	0.00	0.00	0.01	0.01	0.01	0.30	No
R4	33'	0.00	0.02	0.05	0.06	0.06	0.30	No
R5	114'	0.00	0.00	0.01	0.01	0.01	0.30	No

[1] Construction receiver locations are shown on Exhibit 11-A.
[2] Distance from receiver location to Project construction boundary.
[3] Based on the Vibration Source Levels of Construction Equipment (Table 11-4).
[4] FRTA Transit Noise and Vibration Impact Assessment, September 2018.
[5] Does the peak vibration exceed the acceptable vibration thresholds?
"PPV" = Peak Particle Velocity

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13 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Vista Rose 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) 778-1971.

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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
AEP – Association of Environmental Planners
AWMA – Air and Waste Management Association
INCE – Institute of Noise Control Engineers

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 PLACENTIA MUNICIPAL CODE

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Placentia, California Municipal Code

Title 23 ZONING

Chapter 23.76 NOISE CONTROL

Note

* For provisions regarding music and sound amplifying systems, see Ch. 10.32 of this code.

23.76.010 Declaration of policy.

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

It is determined that certain noise levels are detrimental to the public health, welfare and safety and contrary to public interest, therefore, the city council declares that creating, maintaining, causing or allowing to create, maintain or cause any noise in a manner prohibited by or not in conformity with the provisions of this chapter is a public nuisance and shall be punishable as such. (Ord. 75-O-105 § 1, 1975)

23.76.020 Definitions.

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

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

(2) “Commercial property” means a parcel of real property which is zoned for or developed and used either in part or in whole for commercial purposes including but not limited to retail and wholesale businesses and professional offices.

(3) “Cumulative period” means an additive period of time composed of individual time segments which may be continuous or interrupted.

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

(5) “Dwelling unit” means a single unit providing complete independent living facilities for one (1) or more persons including permanent provisions for living, sleeping, eating, cooking and sanitation.

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

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

(8) “Grading” means any excavating or filling of earth material, or any combination thereof, conducted at a site to prepare said site for construction or other improvements thereon.

(9) “Impact noise” means the noise produced by the collision of one (1) mass in motion with a second mass which may be either in motion or at rest.

(10) “Industrial property” means a parcel of real property which is zoned for or developed and used either in part or in whole for manufacturing purposes.

(11) “Mobile noise source” means any noise source other than a fixed noise source.

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

(13) “Noise variance board” means an administrative board of five (5) members appointed by the city council of the city of Placentia.

(14) “Person” means a person, firm, association, copartnership, joint venture, corporation of any entity, public or private in nature.

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

(16) “Simple tone noise” means a noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished.

(17) “Sound level meter” means an instrument meeting American National Standard Institute’s Standard S1.4-1971 for Type 1 or Type 2 sound level meters or an instrument and the associated recording and analyzing equipment which will provide equivalent data.

(18) “Sound pressure level” of a sound, in decibels, means twenty (20) times the logarithm to the base ten (10) of the ratio of the pressure of the sound to a reference pressure, which reference pressure shall be explicitly stated. (Ord. 75-O-105 § 2, 1975)

23.76.030 Noise level measurement criteria.

Any noise level measurements made pursuant to the provisions of this chapter shall be performed using a sound level meter as defined in Section 23.76.020(17). (Ord. 75-O-105 § 3, 1975)

23.76.040 Designated noise zones.

The properties hereinafter described, whether incorporated or unincorporated, are assigned to the following noise zones:

Noise Zone 1	All residential property
Noise Zone 2	All commercial property
Noise Zone 3	All industrial property.

(Ord. 75-O-105 § 4, 1975)

23.76.050 Exterior noise standards.

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

Noise Standards

Noise Zone	Noise Level	Time Period
1	55 dB(A)	7:00 a.m.—10:00 p.m.
	50 dB(A)	10:00 p.m.—7:00 a.m.
2	65 dB(A)	Anytime
3	70 dB(A)	Anytime

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

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

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

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

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

(4) The noise standard plus fifteen (15) dB(A) for a cumulative period of more than one (1) minute in any hour; or

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

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

(d) In the event that the noise source and the affected property are within different noise zones, the noise standard applicable to the affected property shall apply. (Ord. 75-O-105 § 5, 1975)

23.76.060 Interior noise standards.

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

Interior Noise Standards

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

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

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

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

(2) The interior noise standard plus five (5) dB(A) for a cumulative period of more than one (1) minute in any hour; or

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

(c) In the event the ambient noise level exceeds either of the first two (2) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level. (Ord. 75-O-105 § 6, 1975)

23.76.070 Activities—Special provisions.

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

(1) Regularly scheduled school bands, school athletic and school entertainment events between the hours of seven a.m. and eleven p.m., provided a parade permit is also submitted from the police department for band activities on city streets, applying the standards of Sections 13.60.010 through 13.60.130 of this code;

(2) Outdoor gatherings, including outdoor public dances and outdoor entertainment events, provided said events are conducted pursuant to an activity permit issued by the city recreation division pursuant to Chapters 6.52 and 6.56 of this code and are limited to between the hours of nine-thirty a.m. and eleven p.m.;

(3) Regularly scheduled activities conducted on public parks, public playgrounds, and public or private school grounds. However, the use of public address or amplified music systems is not permitted to exceed the exterior noise standard of adjacent property at the property line;

(4) Any mechanical devices, apparatus or equipment used, related to or connected with emergency machinery, vehicle or work;

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

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

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

(8) Noise sources associated with grading, construction and the maintenance of real property shall not be subject to the provisions of this chapter. However, grading, construction and maintenance activities are prohibited at all times other than the permitted hours indicated in Section 23.81.170 of this code;

(9) Any activity to the extent regulation thereof has been preempted by state or federal law. (Ord. 94-O-141 § 1, 1994; Ord. 94-O-119 § 1, 1994; Ord. 75-O-105 § 7, 1975)

23.76.080 Schools, hospitals and churches—Special provisions.

It is unlawful for any person to create any noise which causes the noise level at any school, hospital or church while the same is in use to exceed the noise limits as specified in Section 23.76.050 prescribed for the assigned noise zone in which the school, hospital or church is located, or which noise level unreasonably interferes with the use of such institutions or which unreasonably disturbs or annoys patients in the hospital; provided conspicuous signs are displayed in three (3) separate locations within one-tenth (1/10) of a mile of the institution indicating the presence of a school, church, or hospital. (Ord. 75-O-105 § 8, 1975)

23.76.085 Use of locomotive whistle.

Generally. The use of locomotive bell, air siren, steam or air whistle within the city at all gate-protected grade crossings shall be prohibited.

Exception. Any locomotive engineer shall be permitted to use his bell, air siren, steam or air whistle, if, in his opinion, it is necessary to avert an immediate threat to life or property. (Ord. 76-O-120 § 1, 1976)

23.76.090 Air conditioning and refrigeration—Special provisions.

Until January 19, 1979, the noise standards enumerated in Sections 23.76.050 and 23.76.060 shall be increased eight (8) dB(A) where the alleged offensive noise source is an air-conditioning or refrigeration system or associated equipment which was installed prior to the effective date of the ordinance codified in this chapter. (Ord. 75-O-105 § 9, 1975)

23.76.100 Noise level measurement.

The location selected for measuring exterior noise levels shall be at any point on the affected residential, commercial or industrial property. Interior noise measurements shall be made within the affected residential unit. The measurement shall be made at a point at least four (4) feet from the wall, ceiling or floor nearest the noise source and may be made with the windows of the affected dwelling unit open. (Ord. 75-O-105 § 10, 1975)

23.76.110 Manner of enforcement.

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

No person shall interfere with, oppose or resist any authorized person charged with enforcement of this chapter while such person is engaged in the performance of his duty. (Ord. 75-O-105 § 11, 1975)

23.76.120 Variance procedure.

The owner or operator of a noise source which violates any of the provisions of this chapter may file an application with the city's authorized agent for a variance from the provisions thereof wherein said owner or operator shall set forth all actions taken to comply with said provisions, the reasons why immediate compliance cannot be achieved, a proposed method of achieving compliance, and a proposed time schedule for its accomplishment. Said application shall be accompanied by a fee in the amount of seventy-five dollars ($75.00). 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 (1) application. Upon receipt of said application fee, the city's authorized agent shall refer it with his recommendation thereon within thirty (30) days to the noise variance board for action thereon in accordance with the provisions of this chapter.

An applicant for a variance shall remain subject to prosecution under the terms of this chapter until a variance is granted. (Ord. 75-O-105 § 12, 1975)

23.76.130 Noise variance board.

The noise variance board shall evaluate all applications for variance from the requirements of this chapter and may grant said variances with respect to time for compliance, subject to such terms, conditions and requirements as it may deem reasonable to achieve maximum compliance with the provisions of this chapter. Said terms, conditions and requirements may include, but shall not be limited to limitations on noise levels and operating hours. Each such variance shall set forth in detail the approved method of achieving maximum compliance and a time schedule for its accomplishment.

In its determinations, said board shall consider the magnitude of nuisance caused by the offensive noise; the uses of property within the area of impingement by the noise; the time factors related to study, design, financing and construction of remedial work; the economic factors related to age and useful life of equipment; and the general public interest and welfare. Any variance granted by said board shall be by resolution and shall be transmitted to the city's authorized agent for enforcement. Any violation of the terms of said variance shall be unlawful. (Ord. 75-O-105 § 13, 1975)

23.76.140 Appeals.

Within fifteen (15) calendar days following the decision of the variance board on an application, the applicant, the city's authorized agent, or any member of the city council, may appeal the decision to the city council, by filing a notice of appeal with the secretary of the variance board. In the case of an appeal by the applicant for a variance, the notice of appeal shall be accompanied by a fee to be computed by the secretary on the basis of the estimated cost of preparing the materials required to be forwarded to the city council as discussed hereafter. If the actual cost of such preparation differs from the estimated cost, appropriate payments shall be made either to or by the secretary.

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

Within sixty (60) days following its receipt of the notice of the appeal, the city council shall either affirm, modify or reverse the decision of the variance board. Such decision shall be based upon the city council's evaluation of the matters submitted to the city council in light of the powers conferred on the variance board and the factors to be considered. Both as enumerated in Sections 23.76.120 and 23.76.130.

As part of its decision, the council may direct the variance board to conduct further proceedings on said application. Failure of the city council to affirm, modify or reverse the decision of the variance board within said sixty (60) day period shall constitute an affirmance of the decision. (Ord. 75-O-105 § 14, 1975)

23.76.150 Violations—Misdemeanors.

Any person violating any of the provisions of this chapter is guilty of a misdemeanor. Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such. The provisions of this chapter shall not be construed as permitting conduct not prescribed herein and shall not affect the enforcement of any other applicable provisions of law. (Ord. 75-O-105 § 15, 1975)

Contact:

City Clerk: 714-993-8231

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APPENDIX 5.1:

STUDY AREA PHOTOS

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JN: 14919 Alta Vista Residential

14919_L1_W 1.North
33, 52' 41.330000"117, 50' 28.680000"

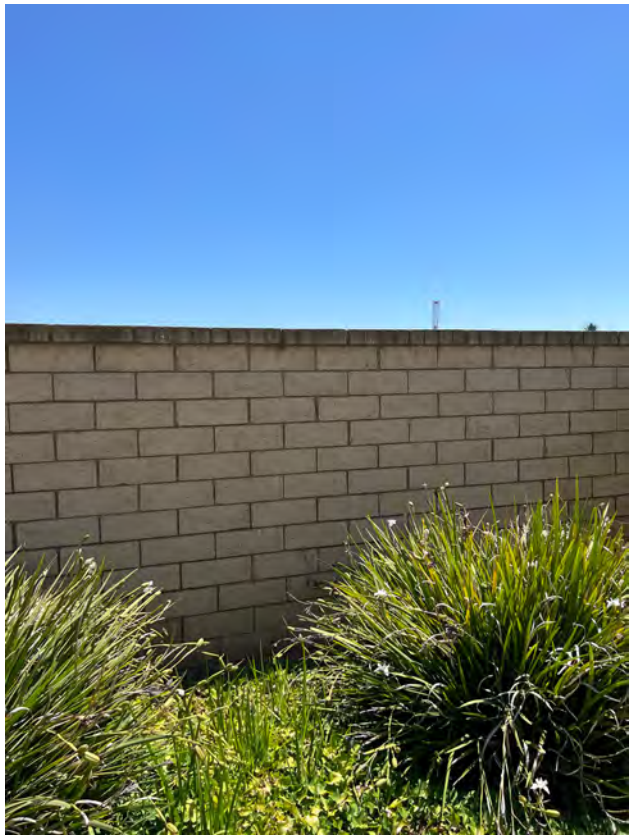
14919_L1_W 2.South
33, 52' 41.230000"117, 50' 28.570000"

14919_L1_W 3.East
33, 52' 41.430000"117, 50' 28.630000"

14919_L1_W 4.West
33, 52' 41.320000"117, 50' 28.990000"

JN: 14919 Alta Vista Residential

14919_L2_I 1.North
33, 52' 41.870000"117, 50' 24.780000"



14919_L2_I 2.South
33, 52' 41.820000"117, 50' 24.760000"

14919_L2_I 3.East
33, 52' 41.820000"117, 50' 24.780000"

14919_L2_I 4.West
33, 52' 41.880000"117, 50' 24.700000"

JN: 14919 Alta Vista Residential

14919_L3_H 1.North
33, 52' 37.250000"117, 50' 22.640000"

14919_L3_H 2.South
33, 52' 37.200000"117, 50' 22.590000"

14919_L3_H 3.East
33, 52' 37.170000"117, 50' 22.700000"

14919_L3_H 4.West
33, 52' 37.110000"117, 50' 22.780000"

JN: 14919 Alta Vista Residential

14919_L4_U 1.North
33, 52' 34.680000"117, 50' 22.610000"

14919_L4_U 2.South
33, 52' 34.770000"117, 50' 22.530000"

14919_L4_U 3.East
33, 52' 34.780000"117, 50' 22.200000"

14919_L4_U 4.West
33, 52' 34.770000"117, 50' 22.230000"

JN: 14919 Alta Vista Residential

14949_L5_Y 1.North
33, 52' 30.660000"117, 50' 28.900000"

14949_L5_Y 2.South
33, 52' 30.630000"117, 50' 28.550000"

14949_L5_Y 3.East
33, 52' 30.630000"117, 50' 28.550000"

14949_L5_Y 4.West
33, 52' 30.670000"117, 50' 28.740000"

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APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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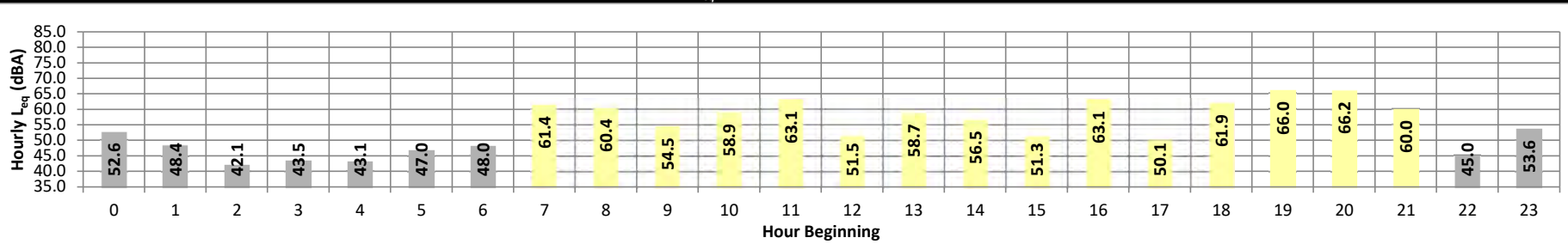
24-Hour Noise Level Measurement Summary

Date: Tuesday, July 26, 2022 | *Location:* L1 - Near 800 Martintique Way | *Meter:* Piccolo II | *JN:* 149919

Project: Alta Vista | *Source:* | *Analyst:* B. Maddux

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	52.6	61.5	46.4	61.2	60.7	59.0	57.0	52.3	49.8	47.0	46.8	46.4	52.6	10.0	62.6
	1	48.4	54.8	41.7	54.4	54.0	52.5	52.0	49.9	46.6	42.3	42.0	41.8	48.4	10.0	58.4
	2	42.1	46.2	41.0	45.5	44.9	43.8	43.2	42.3	41.7	41.2	41.2	41.1	42.1	10.0	52.1
	3	43.5	45.5	42.5	45.2	45.1	44.7	44.5	43.7	43.3	42.8	42.7	42.6	43.5	10.0	53.5
	4	43.1	45.9	41.9	45.6	45.3	44.7	44.3	43.3	42.8	42.2	42.1	42.0	43.1	10.0	53.1
	5	47.0	54.9	43.3	53.9	53.1	51.5	50.4	47.2	45.3	43.7	43.5	43.3	47.0	10.0	57.0
	6	48.0	54.6	43.6	54.3	53.9	52.9	52.2	48.7	45.6	44.0	43.9	43.7	48.0	10.0	58.0
Day	7	61.4	67.9	52.0	67.4	66.7	65.3	64.7	62.8	60.4	55.5	54.3	52.5	61.4	0.0	61.4
	8	60.4	66.8	51.1	66.1	65.7	65.0	64.5	62.7	57.0	52.6	51.8	51.2	60.4	0.0	60.4
	9	54.5	64.7	49.4	63.1	61.4	58.5	57.2	54.5	53.2	50.0	49.8	49.5	54.5	0.0	54.5
	10	58.9	65.8	53.3	65.1	64.0	62.0	61.5	60.2	58.3	54.2	53.7	53.4	58.9	0.0	58.9
	11	63.1	73.7	55.5	72.4	72.0	69.9	68.0	61.4	57.8	56.1	55.8	55.6	63.1	0.0	63.1
	12	51.5	59.1	47.5	58.5	57.8	56.2	55.1	51.6	49.8	48.1	47.8	47.6	51.5	0.0	51.5
	13	58.7	61.2	52.5	60.9	60.7	60.5	60.3	59.8	59.2	53.4	52.8	52.6	58.7	0.0	58.7
	14	56.5	61.3	51.6	60.4	59.6	58.3	58.1	57.3	56.6	52.7	52.0	51.7	56.5	0.0	56.5
	15	51.3	57.6	47.5	57.2	56.8	55.4	54.8	51.9	49.7	48.1	47.9	47.6	51.3	0.0	51.3
	16	63.1	65.4	62.3	65.1	64.7	64.1	63.8	63.2	62.9	62.5	62.5	62.4	63.1	0.0	63.1
	17	50.1	55.5	47.3	55.1	54.8	53.8	53.1	50.5	49.1	47.8	47.6	47.4	50.1	0.0	50.1
	18	61.9	69.0	60.2	68.4	67.5	65.7	64.3	61.3	60.9	60.4	60.3	60.2	61.9	0.0	61.9
	19	66.0	66.5	65.6	66.4	66.3	66.2	66.2	66.0	65.9	65.7	65.7	65.6	66.0	5.0	71.0
	20	66.2	66.6	65.8	66.6	66.5	66.5	66.4	66.3	66.1	65.9	65.9	65.8	66.2	5.0	71.2
	21	60.0	62.9	58.4	62.6	62.4	62.0	61.5	60.3	59.6	58.7	58.5	58.4	60.0	5.0	65.0
Night	22	45.0	48.2	43.6	47.9	47.5	46.8	46.3	45.3	44.6	43.9	43.8	43.7	45.0	10.0	55.0
	23	53.6	63.0	48.7	62.2	61.0	58.4	57.0	53.0	51.8	49.5	49.1	48.8	53.6	10.0	63.6

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	50.1	55.5	47.3	55.1	54.8	53.8	53.1	50.5	49.1	47.8	47.6	47.4
	Max	66.2	73.7	65.8	72.4	72.0	69.9	68.0	66.3	66.1	65.9	65.9	65.8
Energy Average		61.2	Average:		63.7	63.1	62.0	61.3	59.3	57.8	55.4	55.1	54.8
Night	Min	42.1	45.5	41.0	45.2	44.9	43.8	43.2	42.3	41.7	41.2	41.2	41.1
	Max	53.6	63.0	48.7	62.2	61.0	59.0	57.0	53.0	51.8	49.5	49.1	48.8
Energy Average		48.8	Average:		52.2	51.7	50.5	49.6	47.3	45.7	44.1	43.9	43.7

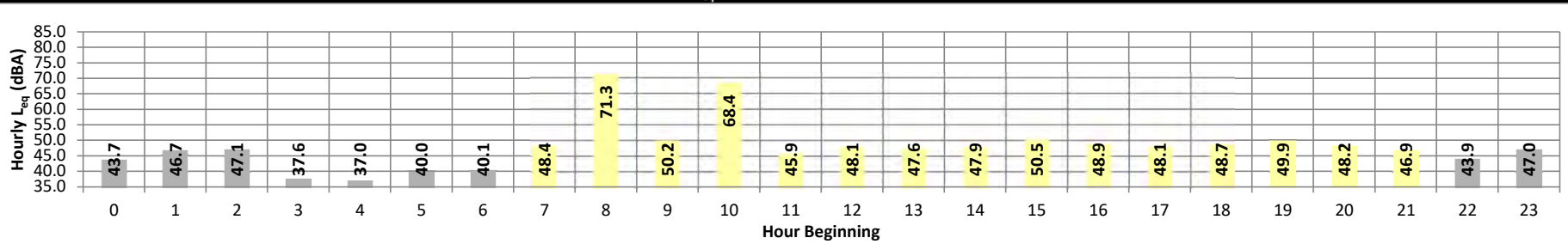
L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
59.3	**61.2**	**48.8**

24-Hour Noise Level Measurement Summary

Date: Tuesday, July 26, 2022 | *Location:* L2 - Near 1292 Antigua Circle | *Meter:* Piccolo II | *JN:* 149919

Project: Alta Vista | *Source:* | *Analyst:* B. Maddux

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	43.7	46.5	42.8	46.2	45.8	45.0	44.6	44.0	43.6	43.0	42.9	42.8	43.7	10.0	53.7
	1	46.7	52.6	36.2	52.3	52.1	51.8	51.6	48.2	44.3	36.6	36.5	36.3	46.7	10.0	56.7
	2	47.1	51.7	45.0	51.4	51.1	50.8	50.2	47.4	45.8	45.4	45.2	45.0	47.1	10.0	57.1
	3	37.6	39.5	36.6	39.3	39.1	38.7	38.5	37.9	37.5	36.9	36.8	36.7	37.6	10.0	47.6
	4	37.0	39.7	35.8	39.5	39.1	38.4	38.1	37.3	36.8	36.1	36.0	35.9	37.0	10.0	47.0
	5	40.0	45.1	37.6	44.4	43.8	42.4	41.8	40.4	39.5	38.2	38.0	37.8	40.0	10.0	50.0
	6	40.1	44.2	38.2	43.7	43.2	42.2	41.8	40.6	39.7	38.6	38.4	38.3	40.1	10.0	50.1
Day	7	48.4	53.2	41.5	52.8	52.4	51.8	51.4	50.0	47.5	43.3	42.5	41.7	48.4	0.0	48.4
	8	71.3	80.1	56.9	79.9	79.6	78.1	76.3	70.8	68.4	60.2	59.8	57.8	71.3	0.0	71.3
	9	50.2	55.7	46.2	55.2	54.7	53.8	53.3	50.8	49.0	46.9	46.6	46.3	50.2	0.0	50.2
	10	68.4	78.4	48.8	78.1	77.9	76.4	74.8	67.3	59.0	50.2	49.7	49.0	68.4	0.0	68.4
	11	45.9	51.7	41.8	51.5	50.9	50.0	49.1	46.7	44.7	42.4	42.1	41.9	45.9	0.0	45.9
	12	48.1	53.6	44.4	53.2	52.7	51.7	51.2	48.9	46.9	45.2	44.9	44.5	48.1	0.0	48.1
	13	47.6	50.9	44.7	50.7	50.4	49.9	49.5	48.4	47.2	45.5	45.2	44.8	47.6	0.0	47.6
	14	47.9	53.2	44.9	52.7	52.4	51.9	51.1	48.1	46.8	45.4	45.1	44.9	47.9	0.0	47.9
	15	50.5	56.4	46.8	56.2	55.9	55.2	54.9	50.6	48.5	47.3	47.2	46.9	50.5	0.0	50.5
	16	48.9	51.8	47.6	51.6	51.3	50.8	50.5	49.3	48.5	47.9	47.8	47.6	48.9	0.0	48.9
	17	48.1	51.0	46.4	50.8	50.5	49.9	49.6	48.6	47.8	46.9	46.7	46.5	48.1	0.0	48.1
	18	48.7	53.0	46.9	52.5	52.0	51.1	50.5	49.0	48.2	47.4	47.2	47.0	48.7	0.0	48.7
	19	49.9	55.1	47.7	54.5	54.1	53.4	52.7	50.4	48.9	48.0	47.9	47.7	49.9	5.0	54.9
	20	48.2	53.0	45.8	52.5	52.3	51.6	51.1	49.0	47.1	46.3	46.1	45.9	48.2	5.0	53.2
	21	46.9	51.1	44.9	50.8	50.5	49.9	49.3	47.1	46.3	45.2	45.1	44.9	46.9	5.0	51.9
Night	22	43.9	46.7	42.6	46.4	46.1	45.4	45.1	44.4	43.8	42.9	42.8	42.7	43.9	10.0	53.9
	23	47.0	51.0	45.3	50.8	50.6	49.9	49.0	47.4	46.5	45.7	45.5	45.4	47.0	10.0	57.0

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	45.9	50.9	41.5	50.7	50.4	49.9	49.1	46.7	44.7	42.4	42.1	41.7
	Max	71.3	80.1	56.9	79.9	79.6	78.1	76.3	70.8	68.4	60.2	59.8	57.8
Energy Average		61.5	Average:		56.2	55.9	55.0	54.3	51.7	49.7	47.2	46.9	46.5
Night	Min	37.0	39.5	35.8	39.3	39.1	38.4	38.1	37.3	36.8	36.1	36.0	35.9
	Max	47.1	52.6	45.3	52.3	52.1	51.8	51.6	48.2	46.5	45.7	45.5	45.4
Energy Average		44.0	Average:		46.0	45.6	45.0	44.5	43.1	41.9	40.4	40.2	40.1

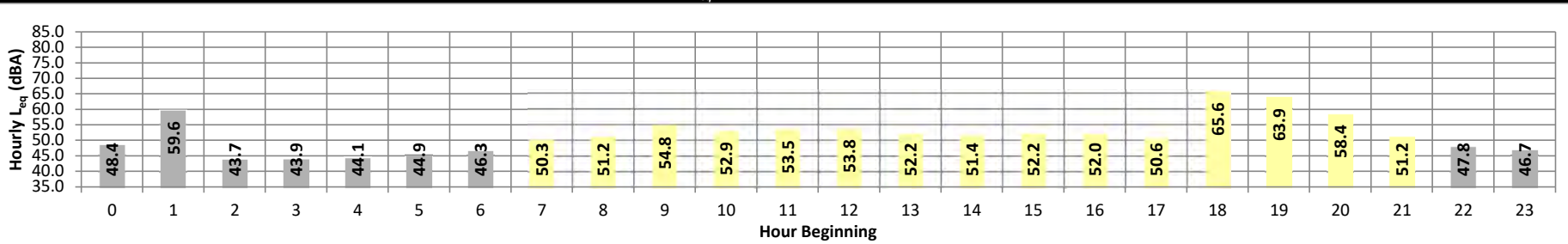
L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
59.5	**61.5**	**44.0**

24-Hour Noise Level Measurement Summary

Date: Tuesday, July 26, 2022 *Location:* L3 - Near 1306 Garten Drive and Plancentia Champions Sports *Meter:* Piccolo II *JN:* 149919

Project: Alta Vista *Source:* Complex Western Parking Lot *Analyst:* B. Maddux

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	48.4	58.5	43.9	58.2	57.6	55.5	53.1	45.3	44.6	44.2	44.1	44.0	48.4	10.0	58.4
	1	59.6	64.3	58.3	63.8	63.2	61.7	61.0	59.5	59.2	58.5	58.4	58.3	59.6	10.0	69.6
	2	43.7	45.3	42.9	45.1	45.0	44.7	44.6	43.9	43.5	43.1	43.0	42.9	43.7	10.0	53.7
	3	43.9	45.4	43.2	45.2	45.0	44.6	44.5	44.1	43.8	43.5	43.4	43.3	43.9	10.0	53.9
	4	44.1	46.1	43.3	45.9	45.8	45.5	45.1	44.2	43.9	43.5	43.5	43.4	44.1	10.0	54.1
	5	44.9	47.6	43.9	47.2	46.7	46.2	46.0	45.2	44.7	44.2	44.1	44.0	44.9	10.0	54.9
	6	46.3	52.7	44.5	51.6	50.6	49.0	48.2	46.4	45.6	44.8	44.7	44.5	46.3	10.0	56.3
Day	7	50.3	58.4	45.9	57.5	56.7	55.0	53.9	50.6	48.5	46.4	46.2	46.0	50.3	0.0	50.3
	8	51.2	57.8	48.6	56.3	55.5	54.2	53.5	51.5	50.3	49.2	48.9	48.7	51.2	0.0	51.2
	9	54.8	59.7	51.1	59.2	58.7	57.7	57.3	55.7	54.0	51.8	51.5	51.2	54.8	0.0	54.8
	10	52.9	59.0	47.9	58.3	57.6	56.8	56.2	53.9	51.7	49.0	48.6	48.1	52.9	0.0	52.9
	11	53.5	66.1	47.1	65.0	63.0	58.3	55.9	52.6	50.3	47.8	47.5	47.2	53.5	0.0	53.5
	12	53.8	59.5	49.8	58.8	58.2	57.4	56.8	54.8	52.6	50.5	50.3	49.9	53.8	0.0	53.8
	13	52.2	57.3	49.6	56.7	56.1	55.0	54.3	52.6	51.6	50.3	50.0	49.7	52.2	0.0	52.2
	14	51.4	57.1	47.8	56.7	56.2	55.4	54.7	51.7	50.2	48.5	48.2	47.9	51.4	0.0	51.4
	15	52.2	58.0	48.4	57.5	57.1	56.2	55.7	52.9	50.7	49.1	48.8	48.5	52.2	0.0	52.2
	16	52.0	59.7	49.0	59.1	58.1	56.1	55.0	51.9	50.7	49.5	49.3	49.0	52.0	0.0	52.0
	17	50.6	57.2	47.5	56.6	56.1	54.9	53.9	50.7	49.3	48.1	47.9	47.6	50.6	0.0	50.6
	18	65.6	73.8	48.4	73.4	73.0	72.1	71.4	68.3	53.0	49.1	48.8	48.5	65.6	0.0	65.6
	19	63.9	73.6	49.5	73.1	72.6	71.6	70.7	57.7	51.7	50.0	49.8	49.6	63.9	5.0	68.9
	20	58.4	69.1	48.5	68.3	67.3	65.5	64.6	53.9	50.1	48.9	48.8	48.6	58.4	5.0	63.4
	21	51.2	60.2	47.5	59.1	58.1	56.3	54.7	50.9	49.1	47.9	47.7	47.6	51.2	5.0	56.2
Night	22	47.8	54.8	45.4	54.4	54.0	52.1	50.5	47.2	46.4	45.7	45.6	45.5	47.8	10.0	57.8
	23	46.7	52.2	45.1	51.7	51.3	50.1	48.8	46.4	45.9	45.4	45.3	45.1	46.7	10.0	56.7

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	50.3	57.1	45.9	56.3	55.5	54.2	53.5	50.6	48.5	46.4	46.2	46.0
	Max	65.6	73.8	51.1	73.4	73.0	72.1	71.4	68.3	54.0	51.8	51.5	51.2
Energy Average		57.7	Average:		61.0	60.3	58.8	57.9	54.0	50.9	49.1	48.8	48.5
Night	Min	43.7	45.3	42.9	45.1	45.0	44.6	44.5	43.9	43.5	43.1	43.0	42.9
	Max	59.6	64.3	58.3	63.8	63.2	61.7	61.0	59.5	59.2	58.5	58.4	58.3
Energy Average		51.4	Average:		51.5	51.0	49.9	49.1	46.9	46.4	45.9	45.8	45.7

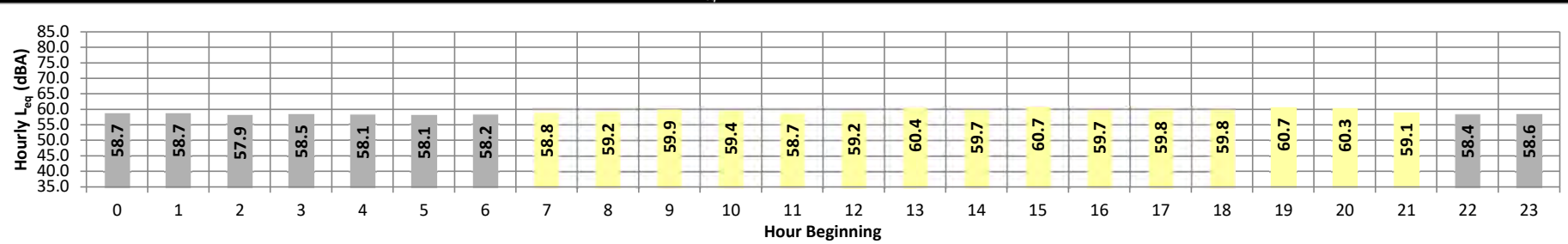
L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
56.2	**57.7**	**51.4**

24-Hour Noise Level Measurement Summary

Date: Tuesday, July 26, 2022 *Location:* L4 - Gazeebo at Southwestern end of Plancentia Champions *Meter:* Piccolo II *JN:* 149919

Project: Alta Vista *Source:* Sports Complex. *Analyst:* B. Maddux

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	58.7	59.8	57.9	59.6	59.5	59.4	59.3	58.9	58.6	58.2	58.1	58.0	58.7	10.0	68.7
	1	58.7	60.8	57.5	60.7	60.6	60.5	60.3	59.0	58.3	57.8	57.7	57.6	58.7	10.0	68.7
	2	57.9	58.7	57.3	58.6	58.5	58.4	58.4	58.1	57.9	57.5	57.4	57.3	57.9	10.0	67.9
	3	58.5	59.2	57.9	59.1	59.1	59.0	58.9	58.7	58.5	58.2	58.1	58.0	58.5	10.0	68.5
	4	58.1	58.8	57.6	58.7	58.6	58.5	58.5	58.3	58.1	57.8	57.7	57.6	58.1	10.0	68.1
	5	58.1	58.7	57.5	58.6	58.5	58.5	58.4	58.2	58.1	57.8	57.7	57.6	58.1	10.0	68.1
	6	58.2	58.9	57.6	58.7	58.7	58.6	58.5	58.3	58.2	57.9	57.8	57.7	58.2	10.0	68.2
Day	7	58.8	60.8	57.7	60.6	60.5	60.3	60.1	59.2	58.5	58.0	57.9	57.8	58.8	0.0	58.8
	8	59.2	60.9	58.3	60.7	60.5	60.2	60.0	59.4	59.0	58.6	58.5	58.3	59.2	0.0	59.2
	9	59.9	63.2	58.2	62.8	62.5	61.8	61.5	60.4	59.5	58.5	58.4	58.2	59.9	0.0	59.9
	10	59.4	62.7	57.4	62.4	62.2	61.7	61.3	60.1	58.9	57.9	57.7	57.5	59.4	0.0	59.4
	11	58.7	61.8	56.9	61.5	61.2	60.7	60.3	59.1	58.3	57.4	57.2	56.9	58.7	0.0	58.7
	12	59.2	63.3	57.0	62.9	62.6	61.8	61.3	59.5	58.6	57.5	57.3	57.0	59.2	0.0	59.2
	13	60.4	66.2	57.4	65.6	65.1	64.0	63.1	60.9	59.4	58.1	57.8	57.5	60.4	0.0	60.4
	14	59.7	66.7	56.9	65.8	64.8	63.1	62.2	60.0	58.7	57.5	57.3	57.0	59.7	0.0	59.7
	15	60.7	66.4	57.3	66.0	65.6	64.8	64.0	61.3	59.3	57.8	57.6	57.3	60.7	0.0	60.7
	16	59.7	64.1	57.2	63.6	63.2	62.4	61.9	60.3	59.1	57.7	57.5	57.3	59.7	0.0	59.7
	17	59.8	66.1	57.6	65.2	64.2	62.3	61.4	59.9	59.2	58.2	58.0	57.7	59.8	0.0	59.8
	18	59.8	64.5	57.4	64.1	63.6	62.6	61.9	60.2	59.2	58.0	57.8	57.5	59.8	0.0	59.8
	19	60.7	66.8	58.4	66.1	65.2	63.4	62.6	60.9	60.0	59.0	58.8	58.5	60.7	5.0	65.7
	20	60.3	66.6	58.5	65.7	64.8	63.0	62.3	60.4	59.6	58.9	58.8	58.6	60.3	5.0	65.3
	21	59.1	60.5	58.1	60.3	60.2	60.0	59.8	59.3	59.0	58.4	58.3	58.1	59.1	5.0	64.1
Night	22	58.4	59.9	57.4	59.7	59.5	59.3	59.1	58.7	58.3	57.8	57.7	57.5	58.4	10.0	68.4
	23	58.6	59.6	57.8	59.5	59.4	59.2	59.1	58.8	58.5	58.1	58.0	57.9	58.6	10.0	68.6

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	58.7	60.5	56.9	60.3	60.2	60.0	59.8	59.1	58.3	57.4	57.2	56.9
	Max	60.7	66.8	58.5	66.1	65.6	64.8	64.0	61.3	60.0	59.0	58.8	58.6
Energy Average		59.7	Average:		63.6	63.1	62.1	61.6	60.1	59.1	58.1	57.9	57.7
Night	Min	57.9	58.7	57.3	58.6	58.5	58.4	58.4	58.1	57.9	57.5	57.4	57.3
	Max	58.7	60.8	57.9	60.7	60.6	60.5	60.3	59.0	58.6	58.2	58.1	58.0
Energy Average		58.4	Average:		59.2	59.2	59.0	58.9	58.5	58.3	57.9	57.8	57.7

L_{eq} (dBA)		
24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
59.3	**59.7**	**58.4**

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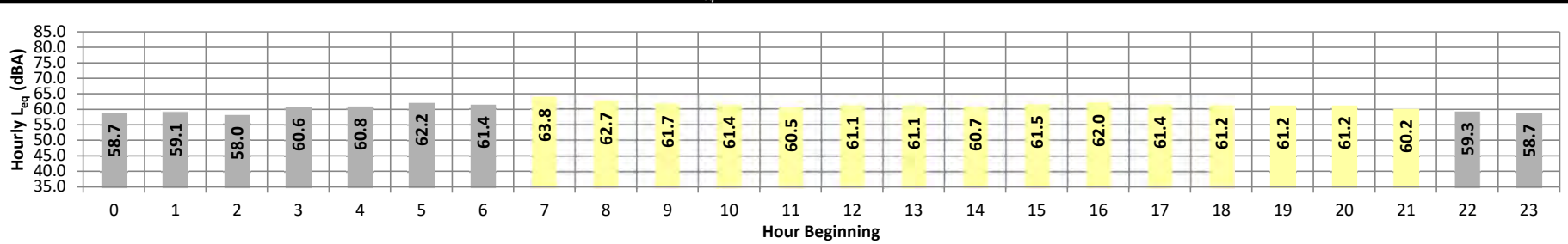
24-Hour Noise Level Measurement Summary

Date: Tuesday, July 26, 2022 | *Location:* L5 - Located at the south of the Project site on Alta Vista Street near an | *Meter:* Piccolo II | *JN:* 149919

Project: Alta Vista | *Source:* existing residential uints on Providence Loop. | *Analyst:* B. Maddux

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	58.7	62.3	55.9	62.1	61.9	61.2	60.7	59.4	58.3	56.6	56.3	56.0	58.7	10.0	68.7
	1	59.1	63.6	56.1	63.4	63.1	62.1	61.3	59.8	58.4	56.8	56.6	56.2	59.1	10.0	69.1
	2	58.0	60.7	55.8	60.6	60.4	59.9	59.6	58.6	57.7	56.5	56.2	55.9	58.0	10.0	68.0
	3	60.6	63.1	58.5	63.0	62.8	62.4	62.0	61.1	60.4	59.2	58.9	58.6	60.6	10.0	70.6
	4	60.8	64.6	58.3	64.4	64.2	63.1	62.5	61.3	60.5	59.0	58.7	58.4	60.8	10.0	70.8
	5	62.2	67.3	59.5	67.1	66.6	65.2	64.3	62.6	61.6	60.2	59.9	59.6	62.2	10.0	72.2
	6	61.4	67.3	58.0	67.0	66.4	64.8	63.9	61.8	60.6	58.9	58.5	58.1	61.4	10.0	71.4
Day	7	63.8	70.1	59.3	69.8	69.4	67.8	66.6	64.3	62.7	60.3	59.8	59.4	63.8	0.0	63.8
	8	62.7	69.2	57.7	69.0	68.5	66.8	65.9	63.3	61.4	58.7	58.2	57.8	62.7	0.0	62.7
	9	61.7	67.7	57.3	67.3	66.7	65.5	64.5	62.4	60.7	58.4	57.9	57.5	61.7	0.0	61.7
	10	61.4	68.1	56.2	67.7	67.2	65.8	64.9	62.0	60.2	57.4	56.9	56.4	61.4	0.0	61.4
	11	60.5	69.5	53.5	69.0	68.2	65.9	64.3	60.6	58.0	54.6	54.0	53.6	60.5	0.0	60.5
	12	61.1	70.0	54.3	69.4	68.7	66.6	65.1	61.5	58.7	55.5	54.9	54.4	61.1	0.0	61.1
	13	61.1	70.2	55.5	69.8	69.0	66.6	64.6	61.0	58.9	56.5	56.1	55.6	61.1	0.0	61.1
	14	60.7	67.7	55.1	67.4	66.9	65.5	64.6	61.1	58.8	55.9	55.5	55.2	60.7	0.0	60.7
	15	61.5	72.5	52.2	71.9	70.9	67.6	65.3	60.9	57.7	53.6	52.9	52.4	61.5	0.0	61.5
	16	62.0	71.8	53.2	71.2	70.7	68.8	66.3	61.6	58.6	54.7	53.9	53.3	62.0	0.0	62.0
	17	61.4	69.5	53.7	68.9	68.3	66.4	65.1	62.1	59.4	55.3	54.5	53.8	61.4	0.0	61.4
	18	61.2	69.8	53.8	69.4	68.7	66.4	65.0	61.5	59.2	55.1	54.5	53.9	61.2	0.0	61.2
	19	61.2	70.4	54.7	69.9	68.9	66.7	64.7	61.1	59.2	56.1	55.5	54.8	61.2	5.0	66.2
	20	61.2	70.4	55.4	69.8	68.9	65.6	64.0	61.4	59.5	56.6	56.0	55.5	61.2	5.0	66.2
	21	60.2	67.2	55.7	66.8	66.1	64.4	63.2	60.8	58.9	56.6	56.2	55.8	60.2	5.0	65.2
Night	22	59.3	64.9	55.7	64.6	64.1	62.8	62.1	59.9	58.4	56.5	56.1	55.8	59.3	10.0	69.3
	23	58.7	64.4	55.2	64.1	63.7	62.3	61.4	59.2	57.7	55.9	55.6	55.3	58.7	10.0	68.7

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	60.2	67.2	52.2	66.8	66.1	64.4	63.2	60.6	57.7	53.6	52.9	52.4
	Max	63.8	72.5	59.3	71.9	70.9	68.8	66.6	64.3	62.7	60.3	59.8	59.4
Energy Average		61.5	Average:		69.1	68.5	66.4	64.9	61.7	59.5	56.3	55.8	55.3
Night	Min	58.0	60.7	55.2	60.6	60.4	59.9	59.6	58.6	57.7	55.9	55.6	55.3
	Max	62.2	67.3	59.5	67.1	66.6	65.2	64.3	62.6	61.6	60.2	59.9	59.6
Energy Average		60.1	Average:		64.0	63.7	62.7	62.0	60.4	59.3	57.7	57.4	57.1

L_{eq} (dBA)	24-Hour	Daytime (7am-10pm)	Nighttime (10pm-7am)
	61.0	**61.5**	**60.1**

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APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE LEVEL CONTOURS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard No Wall
Road Name: Alta Vista St.
Lot No: 2 and 3

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	70.0	feet
Barrier Distance to Observer:	5.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	282.0	feet
Road Elevation:	279.0	feet
Barrier Elevation:	282.0	feet
Road Grade:	1.7%	

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:	279.000		
Medium Trucks:	281.297		
Heavy Trucks:	287.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	66.242
Medium Trucks:	66.004
Heavy Trucks:	65.757

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-1.94	-1.20	*-1.65*	0.000	0.000
Medium Trucks:	77.62	-17.49	-1.91	-1.20	*-1.80*	0.000	0.000
Heavy Trucks:	82.14	-21.44	-1.89	-1.20	*-2.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.0	64.1	62.3	56.2	64.9	65.5
Medium Trucks:	57.0	55.5	49.2	47.6	56.1	56.3
Heavy Trucks:	57.6	56.2	47.2	48.4	56.8	56.9
Vehicle Noise:	67.0	65.2	62.6	57.4	66.0	66.5

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.0	64.1	62.3	56.2	64.9	65.5
Medium Trucks:	57.0	55.5	49.2	47.6	56.1	56.3
Heavy Trucks:	57.6	56.2	47.2	48.4	56.8	56.9
Vehicle Noise:	67.0	65.2	62.6	57.4	66.0	66.5

Centerline Distance to Noise Contour (in feet)	*70 dBA*	*65 dBA*	*60 dBA*	*55 dBA*
CNEL:	41	88	189	407

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard No Wall
Road Name: Alta Vista St.
Lot No: 6 and 7

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	75.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	283.0	feet
Road Elevation:	280.0	feet
Barrier Elevation:	283.0	feet
Road Grade:	1.7%	

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:	280.000		
Medium Trucks:	282.297		
Heavy Trucks:	288.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	71.505
Medium Trucks:	71.285
Heavy Trucks:	71.056

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-2.43	-1.20	*-0.81*	0.000	0.000
Medium Trucks:	77.62	-17.49	-2.41	-1.20	*-0.95*	0.000	0.000
Heavy Trucks:	82.14	-21.44	-2.39	-1.20	*-1.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.5	63.6	61.8	55.7	64.4	65.0
Medium Trucks:	56.5	55.0	48.7	47.1	55.6	55.8
Heavy Trucks:	57.1	55.7	46.6	47.9	56.3	56.4
Vehicle Noise:	66.5	64.7	62.1	56.9	65.5	66.0

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.5	63.6	61.8	55.7	64.4	65.0
Medium Trucks:	56.5	55.0	48.7	47.1	55.6	55.8
Heavy Trucks:	57.1	55.7	46.6	47.9	56.3	56.4
Vehicle Noise:	66.5	64.7	62.1	56.9	65.5	66.0

Centerline Distance to Noise Contour (in feet)	*70 dBA*	*65 dBA*	*60 dBA*	*55 dBA*
CNEL:	40	87	188	404

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard No Wall
Road Name: Alta Vista St.
Lot No: 10 and 11

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	80.0	feet
Barrier Distance to Observer:	15.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	287.0	feet
Road Elevation:	285.0	feet
Barrier Elevation:	287.0	feet
Road Grade:	1.7%	

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:	285.000		
Medium Trucks:	287.297		
Heavy Trucks:	293.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	76.636
Medium Trucks:	76.460
Heavy Trucks:	76.322

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-2.89	-1.20	*-0.52*	0.000	0.000
Medium Trucks:	77.62	-17.49	-2.87	-1.20	*-0.66*	0.000	0.000
Heavy Trucks:	82.14	-21.44	-2.86	-1.20	*-1.06*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.0	63.1	61.3	55.3	63.9	64.5
Medium Trucks:	56.1	54.6	48.2	46.7	55.1	55.3
Heavy Trucks:	56.6	55.2	46.2	47.4	55.8	55.9
Vehicle Noise:	66.1	64.3	61.7	56.4	65.0	65.5

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.0	63.1	61.3	55.3	63.9	64.5
Medium Trucks:	56.1	54.6	48.2	46.7	55.1	55.3
Heavy Trucks:	56.6	55.2	46.2	47.4	55.8	55.9
Vehicle Noise:	66.1	64.3	61.7	56.4	65.0	65.5

Centerline Distance to Noise Contour (in feet)	*70 dBA*	*65 dBA*	*60 dBA*	*55 dBA*
CNEL:	40	87	187	402

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard No Wall
Road Name: Alta Vista St.
Lot No: 14 and 15

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	72.0	feet
Barrier Distance to Observer:	7.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	289.0	feet
Road Elevation:	287.0	feet
Barrier Elevation:	289.0	feet
Road Grade:	1.7%	

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:	287.000		
Medium Trucks:	289.297		
Heavy Trucks:	295.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	68.242
Medium Trucks:	68.045
Heavy Trucks:	67.890

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-2.13	-1.20	*-1.27*	0.000	0.000
Medium Trucks:	77.62	-17.49	-2.11	-1.20	*-1.42*	0.000	0.000
Heavy Trucks:	82.14	-21.44	-2.10	-1.20	*-1.83*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.8	63.9	62.1	56.0	64.7	65.3
Medium Trucks:	56.8	55.3	49.0	47.4	55.9	56.1
Heavy Trucks:	57.4	56.0	46.9	48.2	56.6	56.7
Vehicle Noise:	66.8	65.0	62.4	57.2	65.8	66.3

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.8	63.9	62.1	56.0	64.7	65.3
Medium Trucks:	56.8	55.3	49.0	47.4	55.9	56.1
Heavy Trucks:	57.4	56.0	46.9	48.2	56.6	56.7
Vehicle Noise:	66.8	65.0	62.4	57.2	65.8	66.3

Centerline Distance to Noise Contour (in feet)	*70 dBA*	*65 dBA*	*60 dBA*	*55 dBA*
CNEL:	41	88	189	406

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard No Wall
Road Name: Alta Vista St.
Lot No: 19 and 20

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	75.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	292.0	feet
Road Elevation:	290.0	feet
Barrier Elevation:	292.0	feet
Road Grade:	1.7%	

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:	290.000		
Medium Trucks:	292.297		
Heavy Trucks:	298.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	71.400
Medium Trucks:	71.212
Heavy Trucks:	71.063

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-2.42	-1.20	*-0.87*	0.000	0.000
Medium Trucks:	77.62	-17.49	-2.41	-1.20	*-1.01*	0.000	0.000
Heavy Trucks:	82.14	-21.44	-2.39	-1.20	*-1.42*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.5	63.6	61.8	55.8	64.4	65.0
Medium Trucks:	56.5	55.0	48.7	47.1	55.6	55.8
Heavy Trucks:	57.1	55.7	46.6	47.9	56.3	56.4
Vehicle Noise:	66.5	64.7	62.1	56.9	65.5	66.0

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.5	63.6	61.8	55.8	64.4	65.0
Medium Trucks:	56.5	55.0	48.7	47.1	55.6	55.8
Heavy Trucks:	57.1	55.7	46.6	47.9	56.3	56.4
Vehicle Noise:	66.5	64.7	62.1	56.9	65.5	66.0

Centerline Distance to Noise Contour (in feet)	*70 dBA*	*65 dBA*	*60 dBA*	*55 dBA*
CNEL:	40	87	188	405

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard With Wall
Road Name: Alta Vista St.
Lot No: 2 and 3

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	70.0	feet
Barrier Distance to Observer:	5.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	282.0	feet
Road Elevation:	279.0	feet
Barrier Elevation:	282.0	feet
Road Grade:	1.7%	

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:	279.000		
Medium Trucks:	281.297		
Heavy Trucks:	287.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	66.173
Medium Trucks:	65.877
Heavy Trucks:	65.514

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-1.93	-1.20	*0.26*	-7.220	-10.220
Medium Trucks:	77.62	-17.49	-1.90	-1.20	*0.21*	-6.870	-9.870
Heavy Trucks:	82.14	-21.44	-1.86	-1.20	*0.10*	-6.000	-9.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.0	64.1	62.3	56.2	64.9	65.5
Medium Trucks:	57.0	55.5	49.2	47.6	56.1	56.3
Heavy Trucks:	57.6	56.2	47.2	48.4	56.8	56.9
Vehicle Noise:	67.0	65.2	62.6	57.4	66.0	66.5

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	58.7	56.8	55.1	49.0	57.6	58.3
Medium Trucks:	50.2	48.7	42.3	40.8	49.2	49.4
Heavy Trucks:	51.6	50.2	41.2	42.4	50.8	50.9
Vehicle Noise:	60.0	58.2	55.5	50.4	58.9	59.4

Centerline Distance to Noise Contour (in feet)	*70 dBA*	*65 dBA*	*60 dBA*	*55 dBA*
CNEL:	41	88	189	408

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard With Wall
Road Name: Alta Vista St.
Lot No: 6 and 7

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	75.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	283.0	feet
Road Elevation:	280.0	feet
Barrier Elevation:	283.0	feet
Road Grade:	1.7%	

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:	280.000		
Medium Trucks:	282.297		
Heavy Trucks:	288.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	71.124
Medium Trucks:	70.828
Heavy Trucks:	70.465

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-2.40	-1.20	*0.24*	-7.080	-10.080
Medium Trucks:	77.62	-17.49	-2.37	-1.20	*0.17*	-6.560	-9.560
Heavy Trucks:	82.14	-21.44	-2.34	-1.20	*0.06*	-5.600	-8.600

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.5	63.6	61.8	55.8	64.4	65.0
Medium Trucks:	56.6	55.1	48.7	47.1	55.6	55.8
Heavy Trucks:	57.2	55.7	46.7	48.0	56.3	56.4
Vehicle Noise:	66.6	64.7	62.2	56.9	65.5	66.0

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	58.4	56.5	54.8	48.7	57.3	57.9
Medium Trucks:	50.0	48.5	42.1	40.6	49.1	49.3
Heavy Trucks:	51.6	50.1	41.1	42.4	50.7	50.8
Vehicle Noise:	59.7	57.9	55.2	50.1	58.7	59.2

Centerline Distance to Noise Contour (in feet)	*70 dBA*	*65 dBA*	*60 dBA*	*55 dBA*
CNEL:	41	88	189	406

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard With Wall
Road Name: Alta Vista St.
Lot No: 10 and 11

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	80.0	feet
Barrier Distance to Observer:	15.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	287.0	feet
Road Elevation:	285.0	feet
Barrier Elevation:	287.0	feet
Road Grade:	1.7%	

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:	285.000		
Medium Trucks:	287.297		
Heavy Trucks:	293.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	75.968
Medium Trucks:	75.709
Heavy Trucks:	75.440

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-2.83	-1.20	*0.21*	-6.870	-9.870
Medium Trucks:	77.62	-17.49	-2.81	-1.20	*0.14*	-6.320	-9.320
Heavy Trucks:	82.14	-21.44	-2.78	-1.20	*0.03*	-5.300	-8.300

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.1	63.2	61.4	55.3	64.0	64.6
Medium Trucks:	56.1	54.6	48.3	46.7	55.2	55.4
Heavy Trucks:	56.7	55.3	46.3	47.5	55.9	56.0
Vehicle Noise:	66.1	64.3	61.7	56.5	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:	58.2	56.3	54.5	48.5	57.1	57.7
Medium Trucks:	49.8	48.3	41.9	40.4	48.9	49.1
Heavy Trucks:	51.4	50.0	41.0	42.2	50.6	50.7
Vehicle Noise:	59.5	57.7	54.9	49.9	58.5	59.0

Centerline Distance to Noise Contour (in feet)	*70 dBA*	*65 dBA*	*60 dBA*	*55 dBA*
CNEL:	41	87	188	406

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard With Wall
Road Name: Alta Vista St.
Lot No: 14 and 15

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	72.0	feet
Barrier Distance to Observer:	7.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	289.0	feet
Road Elevation:	287.0	feet
Barrier Elevation:	289.0	feet
Road Grade:	1.7%	

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:	287.000		
Medium Trucks:	289.297		
Heavy Trucks:	295.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	68.005
Medium Trucks:	67.747
Heavy Trucks:	67.478

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-2.11	-1.20	*0.22*	-6.940	-9.940
Medium Trucks:	77.62	-17.49	-2.08	-1.20	*0.16*	-6.480	-9.480
Heavy Trucks:	82.14	-21.44	-2.06	-1.20	*0.06*	-5.600	-8.600

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.8	63.9	62.1	56.1	64.7	65.3
Medium Trucks:	56.9	55.3	49.0	47.4	55.9	56.1
Heavy Trucks:	57.4	56.0	47.0	48.2	56.6	56.7
Vehicle Noise:	66.8	65.0	62.5	57.2	65.8	66.3

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	58.8	57.0	55.2	49.1	57.8	58.4
Medium Trucks:	50.4	48.9	42.5	41.0	49.4	49.7
Heavy Trucks:	51.8	50.4	41.4	42.6	51.0	51.1
Vehicle Noise:	60.1	58.3	55.6	50.5	59.1	59.6

Centerline Distance to Noise Contour (in feet)	*70 dBA*	*65 dBA*	*60 dBA*	*55 dBA*
CNEL:	41	88	189	408

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Backyard With Wall
Road Name: Alta Vista St.
Lot No: 19 and 20

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	75.0	feet
Barrier Distance to Observer:	10.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	292.0	feet
Road Elevation:	290.0	feet
Barrier Elevation:	292.0	feet
Road Grade:	1.7%	

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:	290.000		
Medium Trucks:	292.297		
Heavy Trucks:	298.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	70.984
Medium Trucks:	70.725
Heavy Trucks:	70.457

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-2.39	-1.20	*0.21*	-6.870	-9.870
Medium Trucks:	77.62	-17.49	-2.36	-1.20	*0.15*	-6.400	-9.400
Heavy Trucks:	82.14	-21.44	-2.34	-1.20	*0.04*	-5.400	-8.400

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.5	63.6	61.8	55.8	64.4	65.0
Medium Trucks:	56.6	55.1	48.7	47.2	55.6	55.9
Heavy Trucks:	57.2	55.7	46.7	48.0	56.3	56.4
Vehicle Noise:	66.6	64.8	62.2	56.9	65.5	66.0

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	58.6	56.7	55.0	48.9	57.5	58.1
Medium Trucks:	50.2	48.7	42.3	40.8	49.2	49.5
Heavy Trucks:	51.8	50.3	41.3	42.6	50.9	51.0
Vehicle Noise:	59.9	58.2	55.4	50.3	58.9	59.4

Centerline Distance to Noise Contour (in feet)	*70 dBA*	*65 dBA*	*60 dBA*	*55 dBA*
CNEL:	41	88	189	407

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: First Floor With Wall
Road Name: Alta Vista St.
Lot No: 2 and 3

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	79.0	feet
Barrier Distance to Observer:	14.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	282.0	feet
Road Elevation:	279.0	feet
Barrier Elevation:	282.0	feet
Road Grade:	1.7%	

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:	279.000		
Medium Trucks:	281.297		
Heavy Trucks:	287.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	75.109
Medium Trucks:	74.813
Heavy Trucks:	74.451

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-2.75	-1.20	*0.25*	-7.150	-10.150
Medium Trucks:	77.62	-17.49	-2.73	-1.20	*0.17*	-6.560	-9.560
Heavy Trucks:	82.14	-21.44	-2.70	-1.20	*0.04*	-5.400	-8.400

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.1	63.2	61.5	55.4	64.0	64.6
Medium Trucks:	56.2	54.7	48.3	46.8	55.3	55.5
Heavy Trucks:	56.8	55.4	46.3	47.6	55.9	56.1
Vehicle Noise:	66.2	64.4	61.8	56.6	65.1	65.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	58.0	56.1	54.3	48.3	56.9	57.5
Medium Trucks:	49.6	48.1	41.8	40.2	48.7	48.9
Heavy Trucks:	51.4	50.0	40.9	42.2	50.5	50.7
Vehicle Noise:	59.3	57.6	54.7	49.7	58.3	58.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: First Floor With Wall
Road Name: Alta Vista St.
Lot No: 6 and 7

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	77.0	feet
Barrier Distance to Observer:	12.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	283.0	feet
Road Elevation:	280.0	feet
Barrier Elevation:	283.0	feet
Road Grade:	1.7%	

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:	280.000		
Medium Trucks:	282.297		
Heavy Trucks:	288.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	73.115
Medium Trucks:	72.819
Heavy Trucks:	72.457

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-2.58	-1.20	*0.24*	-7.080	-10.080
Medium Trucks:	77.62	-17.49	-2.55	-1.20	*0.17*	-6.560	-9.560
Heavy Trucks:	82.14	-21.44	-2.52	-1.20	*0.05*	-5.500	-8.500

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:	56.4	54.9	48.5	47.0	55.4	55.7
Heavy Trucks:	57.0	55.6	46.5	47.8	56.1	56.3
Vehicle Noise:	66.4	64.6	62.0	56.7	65.3	65.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	58.2	56.3	54.6	48.5	57.1	57.7
Medium Trucks:	49.8	48.3	42.0	40.4	48.9	49.1
Heavy Trucks:	51.5	50.1	41.0	42.3	50.6	50.8
Vehicle Noise:	59.6	57.8	55.0	50.0	58.5	59.0

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: First Floor With Wall
Road Name: Alta Vista St.
Lot No: 10 and 11

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	85.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	287.0	feet
Road Elevation:	285.0	feet
Barrier Elevation:	287.0	feet
Road Grade:	1.7%	

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:	285.000		
Medium Trucks:	287.297		
Heavy Trucks:	293.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	80.959
Medium Trucks:	80.701
Heavy Trucks:	80.432

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-3.24	-1.20	*0.22*	-6.940	-9.940
Medium Trucks:	77.62	-17.49	-3.22	-1.20	*0.14*	-6.320	-9.320
Heavy Trucks:	82.14	-21.44	-3.20	-1.20	*0.02*	-5.200	-8.200

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.7	62.8	61.0	54.9	63.6	64.2
Medium Trucks:	55.7	54.2	47.8	46.3	54.8	55.0
Heavy Trucks:	56.3	54.9	45.8	47.1	55.4	55.6
Vehicle Noise:	65.7	63.9	61.3	56.1	64.6	65.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	57.7	55.8	54.0	48.0	56.6	57.2
Medium Trucks:	49.4	47.9	41.5	40.0	48.4	48.7
Heavy Trucks:	51.1	49.7	40.6	41.9	50.2	50.4
Vehicle Noise:	59.1	57.3	54.5	49.5	58.0	58.5

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: First Floor With Wall
Road Name: Alta Vista St.
Lot No: 14 and 15

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	79.0	feet
Barrier Distance to Observer:	14.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	289.0	feet
Road Elevation:	287.0	feet
Barrier Elevation:	289.0	feet
Road Grade:	1.7%	

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:	287.000		
Medium Trucks:	289.297		
Heavy Trucks:	295.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	74.970
Medium Trucks:	74.711
Heavy Trucks:	74.443

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-2.74	-1.20	*0.21*	-6.870	-9.870
Medium Trucks:	77.62	-17.49	-2.72	-1.20	*0.14*	-6.320	-9.320
Heavy Trucks:	82.14	-21.44	-2.70	-1.20	*0.03*	-5.300	-8.300

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.2	63.3	61.5	55.4	64.1	64.7
Medium Trucks:	56.2	54.7	48.3	46.8	55.3	55.5
Heavy Trucks:	56.8	55.4	46.3	47.6	55.9	56.1
Vehicle Noise:	66.2	64.4	61.8	56.6	65.2	65.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	58.3	56.4	54.6	48.6	57.2	57.8
Medium Trucks:	49.9	48.4	42.0	40.5	48.9	49.2
Heavy Trucks:	51.5	50.1	41.0	42.3	50.6	50.8
Vehicle Noise:	59.6	57.8	55.0	50.0	58.6	59.1

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: First Floor With Wall
Road Name: Alta Vista St.
Lot No: 19 and 20

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	80.0	feet
Barrier Distance to Observer:	15.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	292.0	feet
Road Elevation:	290.0	feet
Barrier Elevation:	292.0	feet
Road Grade:	1.7%	

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:	290.000		
Medium Trucks:	292.297		
Heavy Trucks:	298.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	75.968
Medium Trucks:	75.709
Heavy Trucks:	75.440

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-2.83	-1.20	*0.21*	-6.870	-9.870
Medium Trucks:	77.62	-17.49	-2.81	-1.20	*0.14*	-6.320	-9.320
Heavy Trucks:	82.14	-21.44	-2.78	-1.20	*0.03*	-5.300	-8.300

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.1	63.2	61.4	55.3	64.0	64.6
Medium Trucks:	56.1	54.6	48.3	46.7	55.2	55.4
Heavy Trucks:	56.7	55.3	46.3	47.5	55.9	56.0
Vehicle Noise:	66.1	64.3	61.7	56.5	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:	58.2	56.3	54.5	48.5	57.1	57.7
Medium Trucks:	49.8	48.3	41.9	40.4	48.9	49.1
Heavy Trucks:	51.4	50.0	41.0	42.2	50.6	50.7
Vehicle Noise:	59.5	57.7	54.9	49.9	58.5	59.0

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Second Floor With Wall
Road Name: Alta Vista St.
Lot No: 2 and 3

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	79.0	feet
Barrier Distance to Observer:	14.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	282.0	feet
Road Elevation:	279.0	feet
Barrier Elevation:	282.0	feet
Road Grade:	1.7%	

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:	279.000		
Medium Trucks:	281.297		
Heavy Trucks:	287.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	77.162
Medium Trucks:	76.689
Heavy Trucks:	75.802

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-2.93	-1.20	*-0.92*	0.000	0.000
Medium Trucks:	77.62	-17.49	-2.89	-1.20	*-1.09*	0.000	0.000
Heavy Trucks:	82.14	-21.44	-2.81	-1.20	*-1.59*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.0	63.1	61.3	55.2	63.9	64.5
Medium Trucks:	56.0	54.5	48.2	46.6	55.1	55.3
Heavy Trucks:	56.7	55.3	46.2	47.5	55.8	56.0
Vehicle Noise:	66.0	64.2	61.6	56.4	65.0	65.5

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.0	63.1	61.3	55.2	63.9	64.5
Medium Trucks:	56.0	54.5	48.2	46.6	55.1	55.3
Heavy Trucks:	56.7	55.3	46.2	47.5	55.8	56.0
Vehicle Noise:	66.0	64.2	61.6	56.4	65.0	65.5

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Second Floor With Wall
Road Name: Alta Vista St.
Lot No: 6 and 7

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	77.0	feet
Barrier Distance to Observer:	12.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	283.0	feet
Road Elevation:	280.0	feet
Barrier Elevation:	283.0	feet
Road Grade:	1.7%	

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:	280.000		
Medium Trucks:	282.297		
Heavy Trucks:	288.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	75.113
Medium Trucks:	74.627
Heavy Trucks:	73.715

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-2.75	-1.20	*-1.16*	0.000	0.000
Medium Trucks:	77.62	-17.49	-2.71	-1.20	*-1.35*	0.000	0.000
Heavy Trucks:	82.14	-21.44	-2.63	-1.20	*-1.87*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.1	63.2	61.5	55.4	64.0	64.6
Medium Trucks:	56.2	54.7	48.4	46.8	55.3	55.5
Heavy Trucks:	56.9	55.4	46.4	47.7	56.0	56.1
Vehicle Noise:	66.2	64.4	61.8	56.6	65.1	65.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.1	63.2	61.5	55.4	64.0	64.6
Medium Trucks:	56.2	54.7	48.4	46.8	55.3	55.5
Heavy Trucks:	56.9	55.4	46.4	47.7	56.0	56.1
Vehicle Noise:	66.2	64.4	61.8	56.6	65.1	65.7

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Second Floor With Wall
Road Name: Alta Vista St.
Lot No: 10 and 11

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	85.0	feet
Barrier Distance to Observer:	20.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	287.0	feet
Road Elevation:	285.0	feet
Barrier Elevation:	287.0	feet
Road Grade:	1.7%	

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:	285.000		
Medium Trucks:	287.297		
Heavy Trucks:	293.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	83.096
Medium Trucks:	82.685
Heavy Trucks:	81.932

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-3.41	-1.20	*-0.53*	0.000	0.000
Medium Trucks:	77.62	-17.49	-3.38	-1.20	*-0.68*	0.000	0.000
Heavy Trucks:	82.14	-21.44	-3.32	-1.20	*-1.14*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.5	62.6	60.8	54.8	63.4	64.0
Medium Trucks:	55.6	54.0	47.7	46.1	54.6	54.8
Heavy Trucks:	56.2	54.8	45.7	47.0	55.3	55.5
Vehicle Noise:	65.5	63.7	61.2	55.9	64.5	65.0

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.5	62.6	60.8	54.8	63.4	64.0
Medium Trucks:	55.6	54.0	47.7	46.1	54.6	54.8
Heavy Trucks:	56.2	54.8	45.7	47.0	55.3	55.5
Vehicle Noise:	65.5	63.7	61.2	55.9	64.5	65.0

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Second Floor With Wall
Road Name: Alta Vista St.
Lot No: 14 and 15

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	79.0	feet
Barrier Distance to Observer:	14.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	289.0	feet
Road Elevation:	287.0	feet
Barrier Elevation:	289.0	feet
Road Grade:	1.7%	

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:	287.000		
Medium Trucks:	289.297		
Heavy Trucks:	295.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	76.948
Medium Trucks:	76.503
Heavy Trucks:	75.690

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-2.91	-1.20	*-0.99*	0.000	0.000
Medium Trucks:	77.62	-17.49	-2.87	-1.20	*-1.17*	0.000	0.000
Heavy Trucks:	82.14	-21.44	-2.80	-1.20	*-1.68*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.0	63.1	61.3	55.3	63.9	64.5
Medium Trucks:	56.1	54.6	48.2	46.6	55.1	55.3
Heavy Trucks:	56.7	55.3	46.2	47.5	55.8	56.0
Vehicle Noise:	66.0	64.2	61.7	56.4	65.0	65.5

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.0	63.1	61.3	55.3	63.9	64.5
Medium Trucks:	56.1	54.6	48.2	46.6	55.1	55.3
Heavy Trucks:	56.7	55.3	46.2	47.5	55.8	56.0
Vehicle Noise:	66.0	64.2	61.7	56.4	65.0	65.5

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 6/2/2013

Scenario: Second Floor With Wall
Road Name: Alta Vista St.
Lot No: 19 and 20

Project Name: Alta Vista Residential
Job Number: 14919
Analyst: B. Maddux

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**6.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	65.0	feet
Centerline Dist. to Observer:	80.0	feet
Barrier Distance to Observer:	15.0	feet
Observer Height (Above Pad):	14.0	feet
Pad Elevation:	292.0	feet
Road Elevation:	290.0	feet
Barrier Elevation:	292.0	feet
Road Grade:	1.7%	

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:	290.000		
Medium Trucks:	292.297		
Heavy Trucks:	298.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	77.974
Medium Trucks:	77.536
Heavy Trucks:	76.733

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-0.25	-3.00	-1.20	*-0.89*	0.000	0.000
Medium Trucks:	77.62	-17.49	-2.96	-1.20	*-1.06*	0.000	0.000
Heavy Trucks:	82.14	-21.44	-2.89	-1.20	*-1.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.9	63.0	61.2	55.2	63.8	64.4
Medium Trucks:	56.0	54.5	48.1	46.6	55.0	55.3
Heavy Trucks:	56.6	55.2	46.1	47.4	55.8	55.9
Vehicle Noise:	66.0	64.2	61.6	56.3	64.9	65.4

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:	56.0	54.5	48.1	46.6	55.0	55.3
Heavy Trucks:	56.6	55.2	46.1	47.4	55.8	55.9
Vehicle Noise:	66.0	64.2	61.6	56.3	64.9	65.4

APPENDIX 8.1:

ON-SITE TRAFFIC NOISE LEVEL CALCULATIONS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2022)
Road Name: Rose Dr.
Road Segment: n/o Alta Vista St.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,300	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,830	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.88	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-13.36	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-17.31	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.3	69.4	67.6	61.5	70.2	70.8
Medium Trucks:	65.0	63.5	57.2	55.6	64.1	64.3
Heavy Trucks:	65.9	64.5	55.4	56.7	65.0	65.2
Vehicle Noise:	73.1	71.4	68.2	63.5	72.1	72.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	83	178	383	826
CNEL:	89	191	411	886

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2022)
Road Name: Rose Dr.
Road Segment: s/o Alta Vista St.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,380	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.34	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-13.90	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-17.86	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.7	68.8	67.1	61.0	69.6	70.2
Medium Trucks:	64.5	63.0	56.6	55.1	63.5	63.8
Heavy Trucks:	65.3	63.9	54.9	56.1	64.5	64.6
Vehicle Noise:	72.6	70.8	67.7	63.0	71.5	72.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	76	164	353	760
CNEL:	82	176	378	815

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2022)
Road Name: Jefferson St.
Road Segment: s/o Alta Vista St.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	480 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-4.63	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-21.87	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-25.82	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	63.4	61.5	59.7	53.7	62.3	62.9
Medium Trucks:	57.4	55.9	49.6	48.0	56.5	56.7
Heavy Trucks:	58.7	57.3	48.3	49.5	57.9	58.0
Vehicle Noise:	65.4	63.7	60.4	55.9	64.4	64.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	17	37	79	170
CNEL:	18	39	84	182

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2022)
Road Name: Alta Vista St.
Road Segment: w/o Rose Dr.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,880	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.79	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	79.45	-16.45	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-20.40	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.8	68.9	67.1	61.1	69.7	70.3
Medium Trucks:	64.6	63.1	56.7	55.2	63.6	63.9
Heavy Trucks:	65.4	64.0	55.0	56.2	64.6	64.7
Vehicle Noise:	72.6	70.9	67.7	63.1	71.6	72.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	51	110	237	511
CNEL:	55	118	255	549

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2022)
Road Name: Alta Vista St.
Road Segment: e/o Rose Dr.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,500	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,250	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.98	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	79.45	-18.22	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-22.18	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.0	67.1	65.3	59.3	67.9	68.5
Medium Trucks:	62.8	61.3	54.9	53.4	61.9	62.1
Heavy Trucks:	63.7	62.2	53.2	54.4	62.8	62.9
Vehicle Noise:	70.9	69.1	66.0	61.3	69.8	70.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	39	84	181	390
CNEL:	42	90	194	418

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2022)
Road Name: Alta Vista St.
Road Segment: e/o Providence Loop

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,300	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,030	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.82	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	79.45	-19.06	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-23.02	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.2	66.3	64.5	58.4	67.1	67.7
Medium Trucks:	62.0	60.5	54.1	52.6	61.0	61.2
Heavy Trucks:	62.8	61.4	52.4	53.6	62.0	62.1
Vehicle Noise:	70.0	68.3	65.1	60.4	69.0	69.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	34	74	159	342
CNEL:	37	79	170	367

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2022)
Road Name: Alta Vista St.
Road Segment: e/o Jefferson St.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	840 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-2.20	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-19.44	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-23.39	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.8	63.9	62.2	56.1	64.7	65.3
Medium Trucks:	59.9	58.4	52.0	50.4	58.9	59.1
Heavy Trucks:	61.2	59.8	50.7	52.0	60.3	60.5
Vehicle Noise:	67.9	66.1	62.8	58.3	66.8	67.3

Centerline Distance to Noise Contour (in feet)

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

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EPAP
Road Name: Rose Dr.
Road Segment: n/o Alta Vista St.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	39,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,930 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.99	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-13.25	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-17.20	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.4	69.5	67.7	61.7	70.3	70.9
Medium Trucks:	65.2	63.6	57.3	55.7	64.2	64.4
Heavy Trucks:	66.0	64.6	55.5	56.8	65.1	65.3
Vehicle Noise:	73.2	71.5	68.3	63.7	72.2	72.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	84	181	390	840
CNEL:	90	194	418	901

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EPAP
Road Name: Rose Dr.
Road Segment: s/o Alta Vista St.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,550 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.55	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-13.69	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-17.64	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.9	69.0	67.3	61.2	69.8	70.4
Medium Trucks:	64.7	63.2	56.8	55.3	63.8	64.0
Heavy Trucks:	65.6	64.1	55.1	56.4	64.7	64.8
Vehicle Noise:	72.8	71.0	67.9	63.2	71.8	72.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	79	169	365	785
CNEL:	84	181	391	842

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EPAP
Road Name: Jefferson St.
Road Segment: s/o Alta Vista St.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	480 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-4.63	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-21.87	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-25.82	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	63.4	61.5	59.7	53.7	62.3	62.9
Medium Trucks:	57.4	55.9	49.6	48.0	56.5	56.7
Heavy Trucks:	58.7	57.3	48.3	49.5	57.9	58.0
Vehicle Noise:	65.4	63.7	60.4	55.9	64.4	64.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	17	37	79	170
CNEL:	18	39	84	182

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EPAP
Road Name: Alta Vista St.
Road Segment: w/o Rose Dr.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,910 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.86	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	79.45	-16.38	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-20.33	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.8	68.9	67.2	61.1	69.7	70.4
Medium Trucks:	64.7	63.1	56.8	55.2	63.7	63.9
Heavy Trucks:	65.5	64.1	55.0	56.3	64.6	64.8
Vehicle Noise:	72.7	71.0	67.8	63.1	71.7	72.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	52	111	240	517
CNEL:	55	119	257	554

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EPAP
Road Name: Alta Vista St.
Road Segment: e/o Rose Dr.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,420	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.43	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	79.45	-17.67	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-21.62	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.6	67.7	65.9	59.8	68.5	69.1
Medium Trucks:	63.4	61.9	55.5	53.9	62.4	62.6
Heavy Trucks:	64.2	62.8	53.7	55.0	63.4	63.5
Vehicle Noise:	71.4	69.7	66.5	61.8	70.4	70.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	42	91	197	424
CNEL:	45	98	211	455

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EPAP
Road Name: Alta Vista St.
Road Segment: e/o Providence Loop

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,600	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,060	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.70	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	79.45	-18.94	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-22.89	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.3	66.4	64.6	58.6	67.2	67.8
Medium Trucks:	62.1	60.6	54.2	52.7	61.1	61.4
Heavy Trucks:	62.9	61.5	52.5	53.7	62.1	62.2
Vehicle Noise:	70.1	68.4	65.2	60.6	69.1	69.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	35	75	162	349
CNEL:	37	81	174	374

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EPAP
Road Name: Alta Vista St.
Road Segment: e/o Jefferson St.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	870	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-2.04	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-19.28	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-23.24	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.0	64.1	62.3	56.3	64.9	65.5
Medium Trucks:	60.0	58.5	52.1	50.6	59.1	59.3
Heavy Trucks:	61.3	59.9	50.9	52.1	60.5	60.6
Vehicle Noise:	68.0	66.3	63.0	58.5	67.0	67.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	25	54	117	252
CNEL:	27	58	125	270

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EPAP+P
Road Name: Rose Dr.
Road Segment: n/o Alta Vista St.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	39,500	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,950	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	4.01	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-13.22	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-17.18	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.4	69.5	67.7	61.7	70.3	70.9
Medium Trucks:	65.2	63.7	57.3	55.8	64.2	64.5
Heavy Trucks:	66.0	64.6	55.6	56.8	65.2	65.3
Vehicle Noise:	73.2	71.5	68.3	63.7	72.2	72.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	84	182	391	843
CNEL:	90	195	420	905

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EPAP+P
Road Name: Rose Dr.
Road Segment: s/o Alta Vista St.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,580	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	72	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.59	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-13.65	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-17.61	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.0	69.1	67.3	61.3	69.9	70.5
Medium Trucks:	64.8	63.2	56.9	55.3	63.8	64.0
Heavy Trucks:	65.6	64.2	55.1	56.4	64.7	64.9
Vehicle Noise:	72.8	71.1	67.9	63.2	71.8	72.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	79	170	367	790
CNEL:	85	183	393	847

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EPAP+P
Road Name: Jefferson St.
Road Segment: s/o Alta Vista St.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	500 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-4.45	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-21.69	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-25.64	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	63.6	61.7	59.9	53.9	62.5	63.1
Medium Trucks:	57.6	56.1	49.7	48.2	56.7	56.9
Heavy Trucks:	58.9	57.5	48.5	49.7	58.1	58.2
Vehicle Noise:	65.6	63.9	60.6	56.1	64.6	65.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	17	38	81	174
CNEL:	19	40	87	187

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EPAP+P
Road Name: Alta Vista St.
Road Segment: w/o Rose Dr.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,920	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.88	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	79.45	-16.36	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-20.31	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.9	69.0	67.2	61.1	69.8	70.4
Medium Trucks:	64.7	63.2	56.8	55.3	63.7	64.0
Heavy Trucks:	65.5	64.1	55.1	56.3	64.7	64.8
Vehicle Noise:	72.7	71.0	67.8	63.2	71.7	72.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	52	112	241	519
CNEL:	56	120	258	556

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EPAP+P
Road Name: Alta Vista St.
Road Segment: e/o Rose Dr.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,480	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.25	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	79.45	-17.49	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-21.44	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.7	67.8	66.1	60.0	68.6	69.2
Medium Trucks:	63.5	62.0	55.7	54.1	62.6	62.8
Heavy Trucks:	64.4	63.0	53.9	55.2	63.5	63.7
Vehicle Noise:	71.6	69.8	66.7	62.0	70.6	71.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	44	94	202	436
CNEL:	47	101	217	468

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EPAP+P
Road Name: Alta Vista St.
Road Segment: e/o Providence Loop

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,000	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,100	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	40.0	feet
Centerline Dist. to Observer:	40.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.54	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	79.45	-18.78	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-22.73	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.4	66.6	64.8	58.7	67.4	68.0
Medium Trucks:	62.3	60.7	54.4	52.8	61.3	61.5
Heavy Trucks:	63.1	61.7	52.6	53.9	62.2	62.4
Vehicle Noise:	70.3	68.6	65.4	60.7	69.3	69.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	36	77	166	358
CNEL:	38	83	178	384

Tuesday, August 9, 2022

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EPAP+P
Road Name: Alta Vista St.
Road Segment: e/o Jefferson St.

Project Name: Alta Vista Residential
Job Number: 14919

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	880 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	40.0 feet
Centerline Dist. to Observer:	40.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	32.388
Medium Trucks:	32.114
Heavy Trucks:	32.141

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-1.99	2.73	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-19.23	2.78	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-23.19	2.78	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.0	64.1	62.4	56.3	64.9	65.6
Medium Trucks:	60.1	58.6	52.2	50.6	59.1	59.3
Heavy Trucks:	61.4	60.0	50.9	52.2	60.5	60.7
Vehicle Noise:	68.1	66.3	63.0	58.5	67.0	67.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	25	55	118	254
CNEL:	27	59	126	272

Tuesday, August 9, 2022

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APPENDIX 10.1:

OPERATIONAL NOISE LEVEL CALCULATIONS

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14919 - Alta Vista Residential - Operation

CadnaA Noise Prediction Model: 14919-02_Operation.cna
Date: 10.08.22
Analyst: B. Maddux

Calculation Configuration

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

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
R1		R1	43.4	41.7	48.2	0.0	0.0	0.0		x	Total	5.00	a	6078717.94	2266885.45	5.00
R2		R2	39.7	38.0	44.5	0.0	0.0	0.0		x	Total	5.00	a	6079042.81	2266870.17	5.00
R3		R3	36.4	34.6	41.2	0.0	0.0	0.0		x	Total	5.00	a	6079258.87	2266370.26	5.00
R4		R4	32.6	30.8	37.4	0.0	0.0	0.0		x	Total	5.00	a	6079490.07	2265544.61	5.00
R5		R5	36.4	34.6	41.2	0.0	0.0	0.0		x	Total	5.00	a	6078729.96	2265661.58	5.00

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)		(ft)	(ft)	(ft)
AC001		AC001	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079257.09	2265569.20	3.00
AC002		AC002	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079230.62	2265525.80	3.00
AC003		AC003	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079177.23	2265550.54	3.00
AC004		AC004	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079198.50	2265603.49	3.00
AC005		AC005	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079153.79	2265628.66	3.00
AC006		AC006	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079123.85	2265583.96	3.00
AC007		AC007	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079069.16	2265615.64	3.00
AC008		AC008	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079098.24	2265667.29	3.00
AC009		AC009	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079051.80	2265699.84	3.00
AC010		AC010	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079008.83	2265654.27	3.00
AC011		AC011	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078966.29	2265697.67	3.00
AC012		AC012	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079006.22	2265743.25	3.00
AC013		AC013	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078879.49	2265837.43	3.00

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)		(ft)	(ft)	(ft)
AC014		AC014	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078842.60	2265799.24	3.00
AC015		AC015	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078794.85	2265836.56	3.00
AC016		AC016	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078829.14	2265873.89	3.00
AC017		AC017	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078793.99	2265909.91	3.00
AC018		AC018	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078738.00	2265951.58	3.00
AC019		AC019	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078700.24	2265902.53	3.00
AC020		AC020	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078657.27	2265955.49	3.00
AC021		AC021	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078690.69	2266001.06	3.00
AC022		AC022	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078682.87	2266088.73	3.00
AC023		AC023	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078621.68	2266085.69	3.00
AC024		AC024	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078620.37	2266143.85	3.00
AC025		AC025	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078687.21	2266148.63	3.00
AC026		AC026	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078686.26	2266202.97	3.00
AC027		AC027	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078617.51	2266242.55	3.00
AC028		AC028	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078677.23	2266282.83	3.00
AC029		AC029	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078680.70	2266332.13	3.00
AC030		AC030	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078628.62	2266337.00	3.00
AC031		AC031	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078625.84	2266403.66	3.00
AC032		AC032	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078682.79	2266407.13	3.00
AC033		AC033	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078736.26	2266412.00	3.00
AC034		AC034	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078794.59	2266411.30	3.00
AC035		AC035	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078789.04	2266466.86	3.00
AC036		AC036	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078729.32	2266466.86	3.00
AC037		AC037	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078789.73	2266513.38	3.00
AC038		AC038	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078727.93	2266517.55	3.00
AC039		AC039	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078723.07	2266576.58	3.00
AC040		AC040	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078792.51	2266580.75	3.00
AC041		AC041	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078792.51	2266626.58	3.00
AC042		AC042	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078730.01	2266628.66	3.00
AC043		AC043	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078729.32	2266696.72	3.00
AC044		AC044	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078798.76	2266700.19	3.00
AC045		AC045	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078730.70	2266781.44	3.00
AC046		AC046	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078732.09	2266845.33	3.00
AC047		AC047	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078798.76	2266845.33	3.00
AC048		AC048	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078842.51	2266779.36	3.00
AC049		AC049	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078850.84	2266842.55	3.00
AC050		AC050	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078911.95	2266843.94	3.00
AC051		AC051	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078922.37	2266781.44	3.00
AC052		AC052	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078968.90	2266842.55	3.00
AC053		AC053	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078996.68	2266771.72	3.00
AC054		AC054	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078914.04	2266694.63	3.00
AC055		AC055	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078976.54	2266693.25	3.00
AC056		AC056	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078977.93	2266636.30	3.00
AC057		AC057	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078908.48	2266627.97	3.00
AC058		AC058	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078911.95	2266582.13	3.00
AC059		AC059	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078982.79	2266580.75	3.00
AC060		AC060	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078984.18	2266518.94	3.00
AC061		AC061	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078920.98	2266514.77	3.00
AC062		AC062	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078912.65	2266410.61	3.00
AC063		AC063	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078912.65	2266464.77	3.00
AC064		AC064	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078983.48	2266457.13	3.00
AC065		AC065	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078977.23	2266414.77	3.00
AC066		AC066	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079053.62	2266342.55	3.00
AC067		AC067	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079052.23	2266293.25	3.00
AC068		AC068	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079049.45	2266241.86	3.00
AC069		AC069	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079048.07	2266196.02	3.00
AC070		AC070	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079112.65	2266195.33	3.00
AC071		AC071	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079112.65	2266138.38	3.00
AC072		AC072	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079049.45	2266135.61	3.00
AC073		AC073	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079054.66	2266086.30	3.00
AC074		AC074	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079119.77	2266071.72	3.00
AC075		AC075	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079047.37	2265996.72	3.00
AC076		AC076	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079044.77	2265946.20	3.00
AC077		AC077	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079106.75	2265965.99	3.00
AC078		AC078	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079111.95	2265880.57	3.00
AC079		AC079	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079044.25	2265877.97	3.00
AC080		AC080	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079038.52	2265843.07	3.00
AC081		AC081	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079117.16	2265836.30	3.00
AC082		AC082	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6079125.50	2265770.68	3.00
AC083		AC083	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078935.39	2265988.38	3.00
AC084		AC084	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078876.02	2265992.55	3.00
AC085		AC085	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078876.02	2266057.66	3.00
AC086		AC086	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078938.00	2266061.30	3.00
AC087		AC087	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078933.31	2266107.13	3.00
AC088		AC088	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078873.93	2266119.63	3.00
AC089		AC089	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078876.54	2266176.93	3.00
AC090		AC090	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078936.95	2266180.05	3.00

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)		(ft)	(ft)	(ft)
AC091		AC091	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078936.26	2266225.54	3.00
AC092		AC092	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078875.84	2266230.40	3.00
AC093		AC093	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078870.98	2266294.98	3.00
AC094		AC094	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078939.73	2266297.07	3.00
AC095		AC095	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078813.34	2266295.68	3.00
AC096		AC096	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078793.90	2266241.51	3.00
AC097		AC097	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078795.29	2266191.51	3.00
AC098		AC098	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078796.68	2266147.76	3.00
AC099		AC099	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078792.51	2266109.57	3.00
AC100		AC100	76.0	76.0	76.0	Lw	76		540.00	0.00	270.00	3.00	a	6078840.43	2266022.76	3.00

APPENDIX 11.1:

CONSTRUCTION NOISE LEVEL CALCULATIONS

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14919 - Alta Vista Residential - Construction

CadnaA Noise Prediction Model: 14919-02_Construction.cna
Date: 10.08.22
Analyst: B. Maddux

Calculation Configuration

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

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
R1		R1	64.9	64.9	71.5	0.0	0.0	0.0		x	Total	5.00	a	6078717.94	2266885.45	5.00
R2		R2	64.2	64.2	70.9	0.0	0.0	0.0		x	Total	5.00	a	6079042.81	2266870.17	5.00
R3		R3	60.9	60.9	67.6	0.0	0.0	0.0		x	Total	5.00	a	6079258.87	2266370.26	5.00
R4		R4	63.5	63.5	70.1	0.0	0.0	0.0		x	Total	5.00	a	6079490.07	2265544.61	5.00
R5		R5	61.4	61.4	68.1	0.0	0.0	0.0		x	Total	5.00	a	6078729.96	2265661.58	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)		
Construction Area		Construction001	115.6	115.6	115.6	67.9	67.9	67.9	PWL-Pt	115.6					8	a

Name	Height				Coordinates			
	Begin		End		x	y	z	Ground
	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
Construction Area	8.00	a			6078701.71	2266871.79	8.00	0.00
					6079030.96	2266871.01	8.00	0.00
					6079028.61	2266395.20	8.00	0.00
					6079139.94	2266395.62	8.00	0.00
					6079146.11	2266357.37	8.00	0.00
					6079145.86	2266047.16	8.00	0.00
					6079185.86	2266047.03	8.00	0.00
					6079185.79	2266027.05	8.00	0.00

Name	Height		Coordinates			
	Begin	End	x	y	z	Ground
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
			6079154.96	2265990.83	8.00	0.00
			6079163.82	2265793.43	8.00	0.00
			6079153.92	2265793.96	8.00	0.00
			6079152.11	2265709.55	8.00	0.00
			6079285.17	2265640.83	8.00	0.00
			6079457.55	2265642.07	8.00	0.00
			6079456.37	2265400.66	8.00	0.00
			6079402.99	2265412.15	8.00	0.00
			6079350.18	2265426.00	8.00	0.00
			6079298.03	2265442.19	8.00	0.00
			6079246.65	2265460.68	8.00	0.00
			6079196.15	2265481.44	8.00	0.00
			6079146.62	2265504.43	8.00	0.00
			6079096.68	2265530.44	8.00	0.00
			6079047.97	2265558.69	8.00	0.00
			6079000.60	2265589.13	8.00	0.00
			6078954.66	2265621.69	8.00	0.00
			6078910.25	2265656.31	8.00	0.00
			6078751.11	2265794.59	8.00	0.00
			6078710.76	2265825.39	8.00	0.00
			6078668.96	2265854.17	8.00	0.00
			6078625.80	2265880.88	8.00	0.00
			6078581.39	2265905.46	8.00	0.00
			6078582.67	2266441.20	8.00	0.00
			6078684.67	2266440.95	8.00	0.00
			6078685.52	2266793.38	8.00	0.00
			6078701.52	2266793.34	8.00	0.00