Stratford Ranch East

(TTM No. 38071) (PLN21-05032/GPA21-05040/ZC21-05039)

Noise Impact Analysis

City of Perris

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
L_{min}	Minimum level measured over the time interval
MARB/IPA	March Air Reserve Base/Inland Port Airport
mph	Miles per hour
OPR	Office of Planning and Research
PPV	Peak particle velocity
Project	Stratford Ranch East
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, if any, for the proposed Stratford Ranch East development ("Project") located on the northeast corner of Evans Road and Ramona Expressway in the City of Perris. The Project is proposed to consist of 197 single family detached residential dwelling units. This study has been prepared to satisfy applicable City of Perris standards and thresholds of significance based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

EXTERIOR NOISE LEVELS

It is expected that the primary source of noise impacts to the Project site will be traffic noise from Ramona Expressway, Evans Road, and Redlands Avenue in the Project study area. The Project will also experience some background traffic noise impacts from the Project's internal local streets, however, due to the distance, topography and low traffic volume/speed, traffic noise from these roads will not make a significant contribution to the noise environment.

The on-site traffic noise level analysis indicates that the first-floor facades will experience exterior noise levels ranging from 65.0 to 69.9 dBA CNEL. With the recommended minimum 6-foot-high noise barriers, shown on Exhibit ES-A, the future exterior noise levels at the lots adjacent to Ramona Expressway, Evans Road, and Redlands Avenue are shown to range from 59.0 to 63.8 dBA CNEL and satisfy the City of Perris General Plan Noise Element 65 dBA CNEL exterior noise level standard for residential uses.

NOISE ABATEMENT MEASURES

To satisfy the City of Perris 45 dBA CNEL interior noise level standard, residential units will require a Noise Reduction (NR) of up to 23.6 dBA and a windows-closed condition requiring a means of mechanical ventilation (e.g., air conditioning). To meet the City of Perris 45 dBA CNEL interior noise standards for residential land use the Project shall provide the following or equivalent noise abatement measures:

- Windows & Glass Doors: All units require windows and glass doors with well-fitted, well-weather-stripped assemblies and shall have minimum sound transmission class (STC) ratings of 27.
- Exterior Doors: All exterior doors shall be well weather-stripped and have minimum STC ratings of 27. Well-sealed perimeter gaps around the doors are essential to achieve the optimal STC rating. (2)
- 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.
- Notices: Occupancy disclosure notices for all future owners of the residential units within the Project site are required. The occupancy disclosure shall state that the unit will be exposed to noise from the auto and truck racing venue which is located to the east of the Project site.

With the interior noise abatement measures provided in this study, the proposed Project is expected to satisfy the City of Perris 45 dBA CNEL interior noise level standards for residential development.

SUMMARY OF CEQA SIGNIFICANCE FINDINGS

The results of this Stratford Ranch East 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*	-
On-Site Traffic Noise	8	*Potentially Significant*	*Less Than Significant*
Construction Noise	11	*Less Than Significant*	-
Construction Vibration		*Less Than Significant*	-

EXHIBIT ES-A: SUMMARY OF 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 Stratford Ranch East ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, sets out the local regulatory setting, presents the study methods and procedures for transportation related CNEL traffic noise analysis, and evaluates the future exterior noise environment. In addition, this study includes an analysis of the short-term construction noise and vibration impacts.

1.1 SITE LOCATION

The proposed Stratford Ranch East site is located on the northeast corner of Evans Road and Ramona Expressway, as shown on Exhibit 1-A. The March Air Reserve Base/Inland Port Airport (MARB/IPA) is located approximately 2.33 miles northwest of the Project site boundary. In addition, the project is located west of the Perris Auto Speedway Racetrack. Noise sensitive residential homes are located to the north, south and southwest of the Project site.

1.2 PROJECT DESCRIPTION

The Project is proposed to consist of 197 single family detached residential dwelling units. The proposed Project land use is consistent with the General Plan, which is Residential.

EXHIBIT 1-A: LOCATION MAP

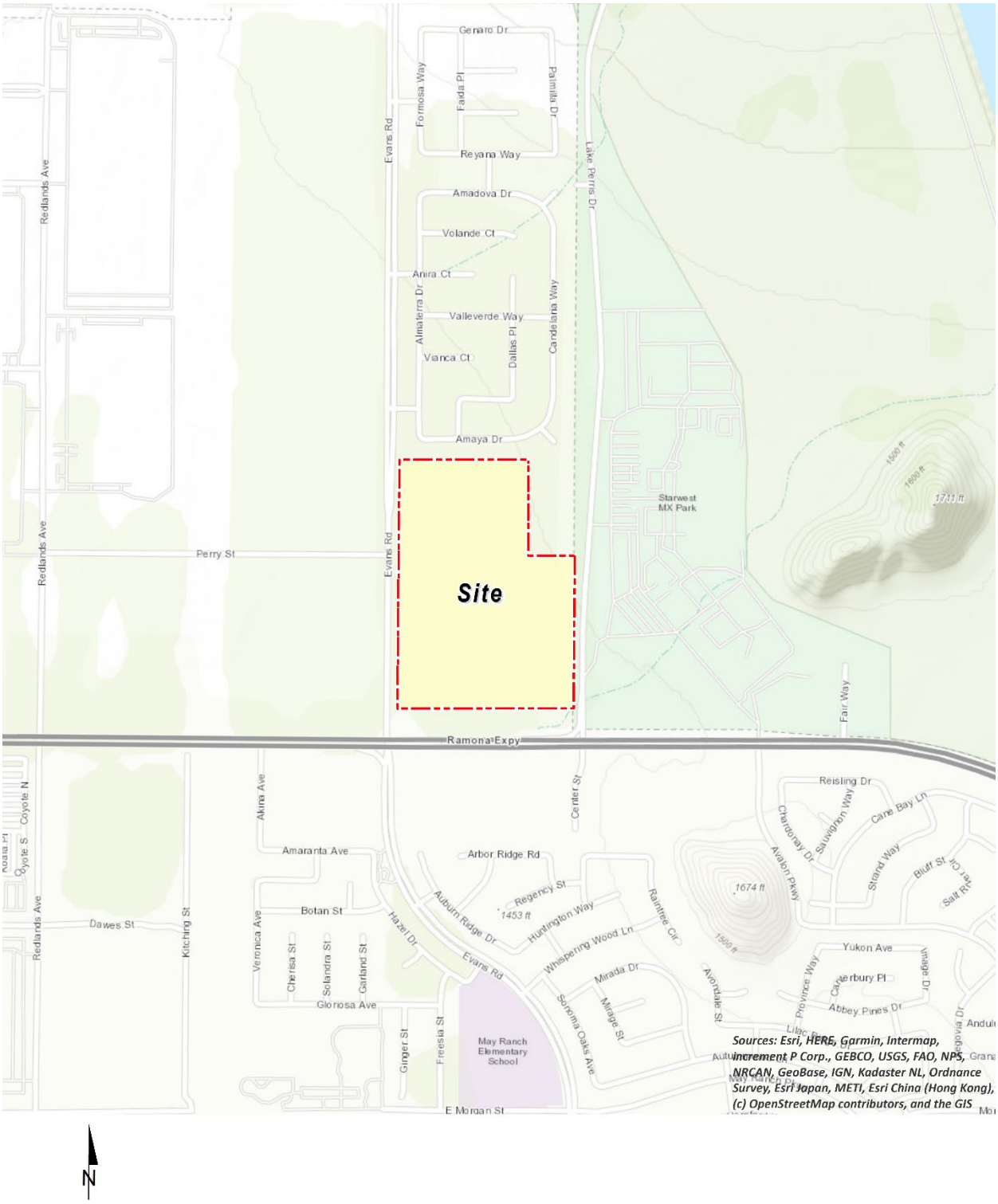
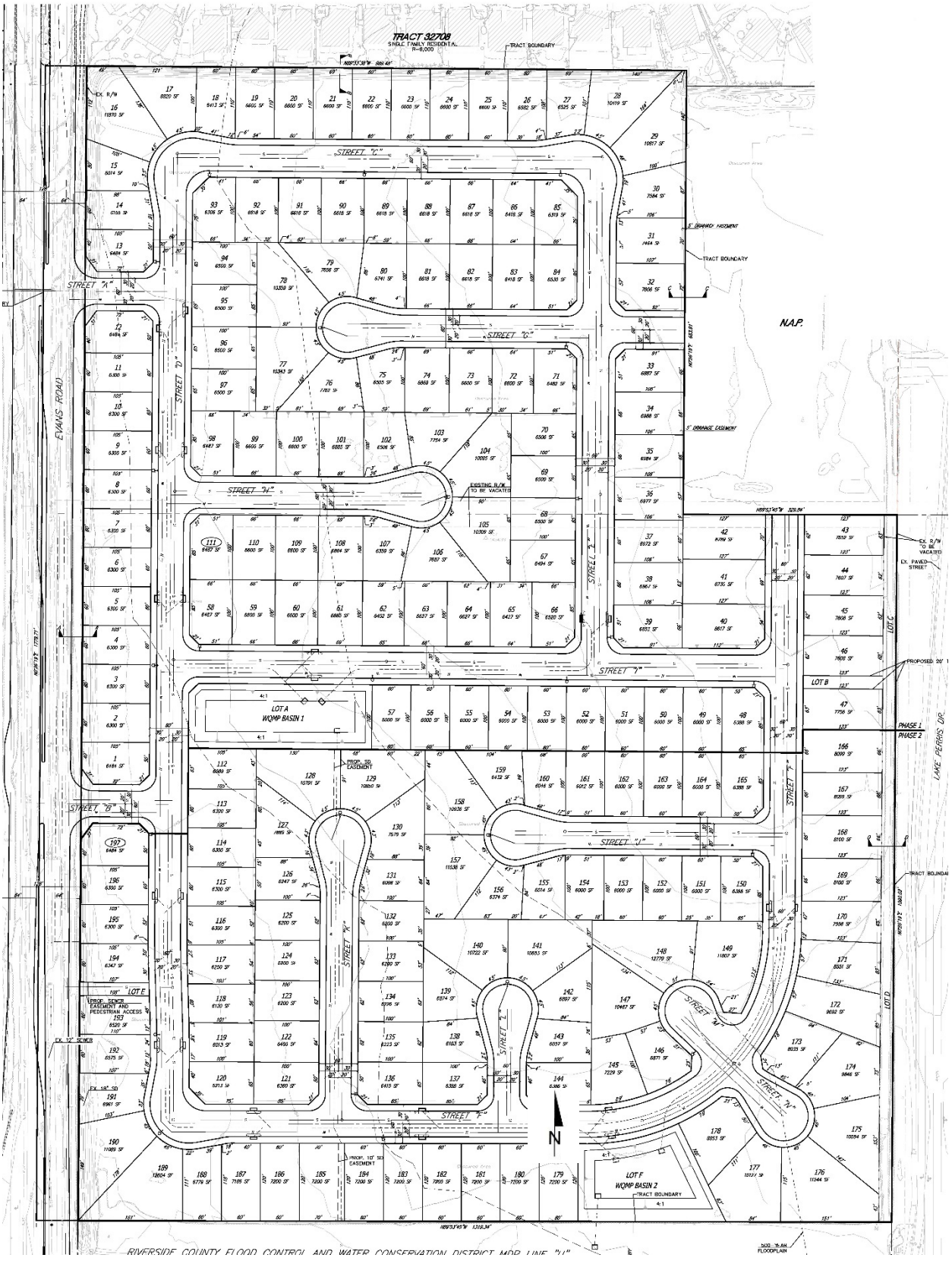


EXHIBIT 1-B: SITE PLAN



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2 FUNDAMENTALS

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

EXHIBIT 2-A: TYPICAL NOISE LEVELS

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

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

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud (3). 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 (4). Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

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

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

2.3 SOUND PROPAGATION

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

2.3.1 GEOMETRIC SPREADING

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

2.3.2 GROUND ABSORPTION

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

associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source (5).

2.3.3 ATMOSPHERIC EFFECTS

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects (3).

2.3.4 SHIELDING

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

2.3.5 REFLECTION

Field studies conducted by the FHWA have shown that the reflection from barriers and buildings does not substantially increase noise levels (5). If all the noise striking a structure was reflected back to a given receiving point, the increase would be theoretically limited to 3 dBA. Further, not all the acoustical energy is reflected back to same point. Some of the energy would go over the structure, some is reflected to points other than the given receiving point, some is scattered by ground coverings (e.g., grass and other plants), and some is blocked by intervening structures and/or obstacles (e.g., the noise source itself). Additionally, some of the reflected energy is lost due to the longer path that the noise must travel. FHWA measurements made to quantify reflective increases in traffic noise have not shown an increase of greater than 1-2 dBA; an increase that is not perceptible to the average human ear.

2.4 NOISE CONTROL

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

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by up to 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receiver. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source (5).

2.6 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, recreation areas or buildings where people normally sleep. Although the West Valley Detention Center is a temporary holding facility, there are beds at this facility for temporary stays. Therefore, as a conservative measure, the individuals held at the West Valley Detention Center are considered sensitive receptors for the purposes of this analysis.

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

2.7 COMMUNITY RESPONSE TO NOISE

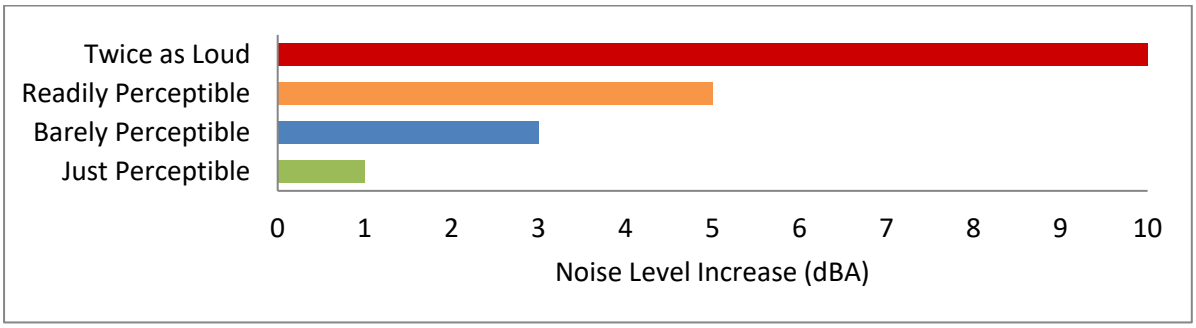
Community responses to noise varies depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

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

- Belief that the noise source can be controlled.

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment (7). 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 (7). Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. A change of 3 dBA is considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (5)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



2.8 VIBRATION

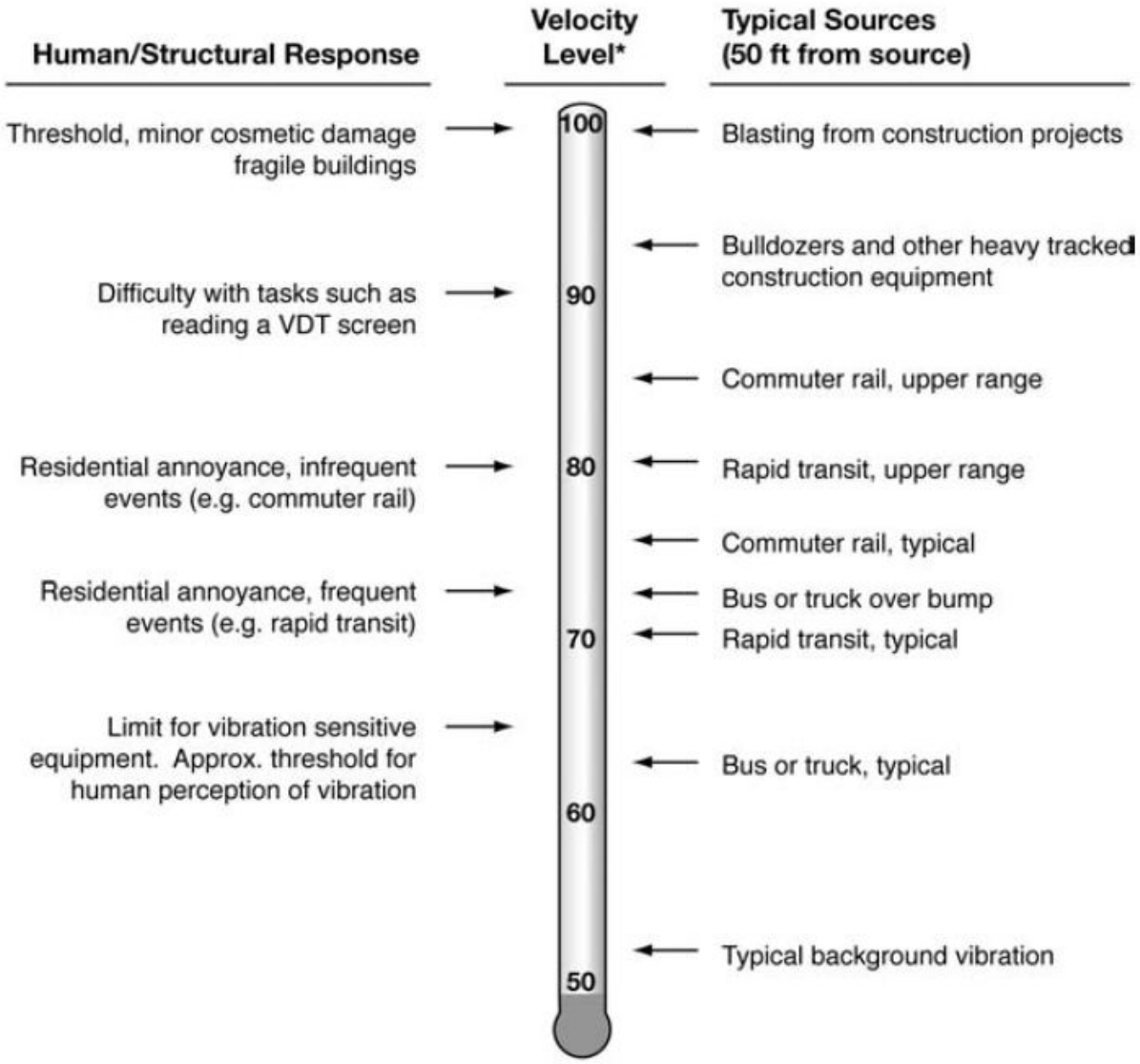
Per the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (8), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include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

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings but is not always suitable for evaluating human response (annoyance) because it takes some time for the human body to respond to vibration signals. Instead, the human body responds to average vibration amplitude often described as the root mean square (RMS). The RMS amplitude is defined as the average of the squared amplitude of the signal and is most frequently used to describe the effect of vibration on the human body. Decibel notation (VdB) is commonly used to measure RMS. Decibel notation

(VdB) serves to reduce the range of numbers used to describe human response to vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receivers for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration-sensitive equipment and/or activities.

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

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



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

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

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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 (OPR). (9) The purpose of the Noise and Safety 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 CODE

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 (9).

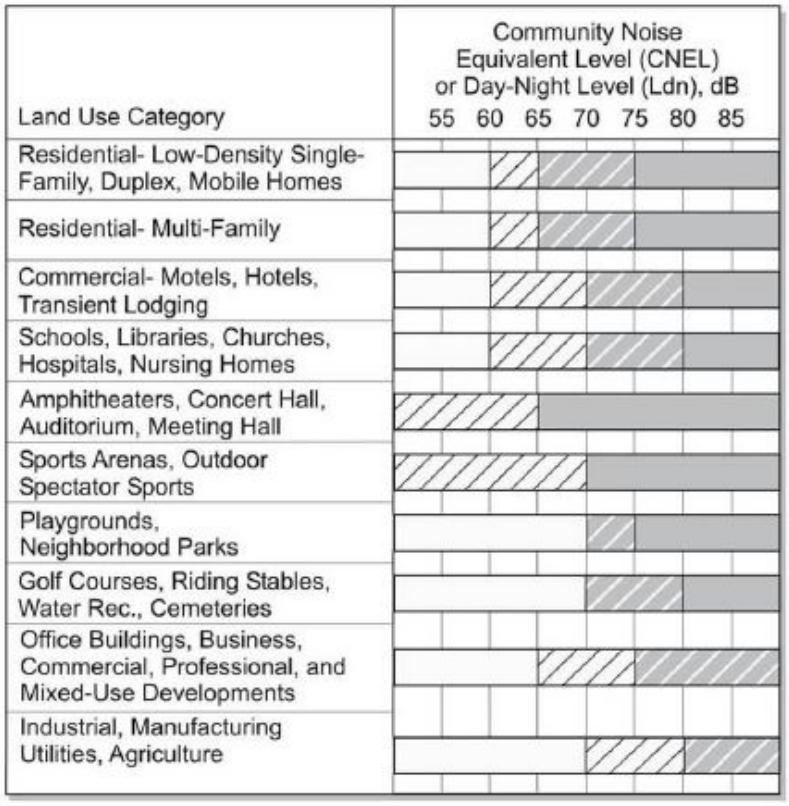
3.3 CITY OF PERRIS GENERAL PLAN NOISE ELEMENT

The City of Perris has adopted a Noise Element of the General Plan (10) to control and abate environmental noise, and to protect the citizens of Perris from excessive exposure to noise. The Noise Element specifies the maximum allowable unmitigated exterior noise levels for new developments impacted by transportation noise sources such as arterial roads, freeways, airports, and railroads. In addition, the Noise Element identifies noise polices and implementation measures designed to protect, create, and maintain an environment free from noise that may jeopardize the health or welfare of sensitive receptors, or degrade quality of life. To protect Perris residents from unacceptable noise levels, the Noise Element contains the following objectives:

Goal I. *Future land uses compatible with projected noise environments.*
Goal II *Roadway improvements compatible with existing noise-sensitive land uses.*

The noise policies specified in the City of Perris Noise Element provide the guidelines necessary to satisfy these objectives. To ensure the appropriate exterior and interior noise levels for existing and new land uses, Exhibit N-1 of the City of Perris General Plan Noise Element, shown on Exhibit 3-A, identifies a maximum allowable exterior noise level of 65 dBA CNEL. Implementation measure II.A.3 states that whenever *exterior living areas in the proposed development plan would be exposed to noise levels of 60 dBA or greater, the plans shall incorporate setbacks and/or building design/noise insulation measures to reduce exterior noise levels to no more than 65 dBA and ensure that interior noise levels do not exceed 45 dBA CNEL*. This sets an interior noise level limit of 45 dBA CNEL for new residential developments impacted by transportation noise sources such as arterial roads, freeways, airports, railroads, and warehousing uses. The Noise Element also provides several policies to reduce noise impacts from transportation (II.A.1, II.A.2) that includes the use of quieter roadway surface materials, roadway alignment, noise barriers, and pavement surface treatments.

EXHIBIT 3-A: CITY OF PERRIS INTERIOR AND EXTERIOR NOISE STANDARDS



Nature of the noise environment where the CNEL or Ldn level is:

Below 55 dB
Relatively quiet suburban or urban areas, no arterial streets within 1 block, no freeways within 1/4 mile.

55-65 dB
Most somewhat noisy urban areas, near but not directly adjacent to high volumes of traffic.

65-75 dB
Very noisy urban areas near arterials, freeways or airports.

75+ dB
Extremely noisy urban areas adjacent to freeways or under airport traffic patterns. Hearing damage with constant exposure outdoors.

Normally Acceptable
Specific land use is satisfactory, based on the assumption that any building is of normal conventional construction, without any special noise insulation requirements

Conditionally Acceptable
New construction or development should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features included in design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

Normally Unacceptable
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in design.

Clearly Unacceptable
New construction or development should generally not be undertaken.

The Community Noise Equivalent Level (CNEL) and Day-Night Noise Level (Ldn) are measures of the 24-hour noise environment. They represent the constant A-weighted noise level that would be measured if all the sound energy received over the day were averaged. In order to account for the greater sensitivity of people to noise at night, the CNEL weighting includes a 5-decibel penalty on noise between 7:00 p.m. and 10:00 p.m. and a 10-decibel penalty on noise between 10:00 p.m. and 7:00 a.m. of the next day. The Ldn includes only the 10-decibel weighting for late-night noise events. For practical purposes, the two measures are equivalent for typical urban noise environments.

City of Perris General Plan Noise Element, Exhibit N-1.

3.4 CONSTRUCTION NOISE STANDARDS

To analyze noise impacts originating from the construction of the Stratford Ranch East site, noise from construction activities is typically evaluated against standards established under a City's Municipal Code. The City of Perris Municipal Code, Section 7.34.060 included in Appendix 3.1, identifies the City's construction noise standards and permitted hours of construction activity (refer to Table 3-1). Further, the City of Perris Municipal Code, Section 7.34.060, states that the noise level standard of 80 dBA L_{max} at residential properties shall apply to the noise-sensitive receiver locations located in the City of Perris. (11)

TABLE 3-1: CONSTRUCTION NOISE STANDARDS

Jurisdiction	Permitted Hours of Construction Activity	Construction Noise Level Standard
City of Perris[1]	7:00 a.m. to 7:00 p.m. on any day except Sundays and legal holidays (with the exception of Columbus Day and Washington's birthday).	80 dBA L_{max}

[1] City of Perris Municipal Code, Section 7.34.060 (Appendix 3.1).

3.5 VIBRATION STANDARDS

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

To analyze vibration impacts originating from the operation and construction of the Stratford Ranch East, vibration-generating activities are appropriately evaluated against standards established under a City's Municipal Code, if such standards exist. However, the City of Perris does not identify specific vibration level limits. Therefore, for analysis purposes, the Caltrans *Transportation and Construction Vibration Guidance Manual*, (12 p. 38) Table 19, vibration damage are used in this noise study to assess potential temporary construction-related impacts at adjacent building locations.

The construction vibration damage potential criteria include consideration of the building conditions. (4 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).

TABLE 3-2: BUILDING DAMAGE VIBRATION CRITERIA

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

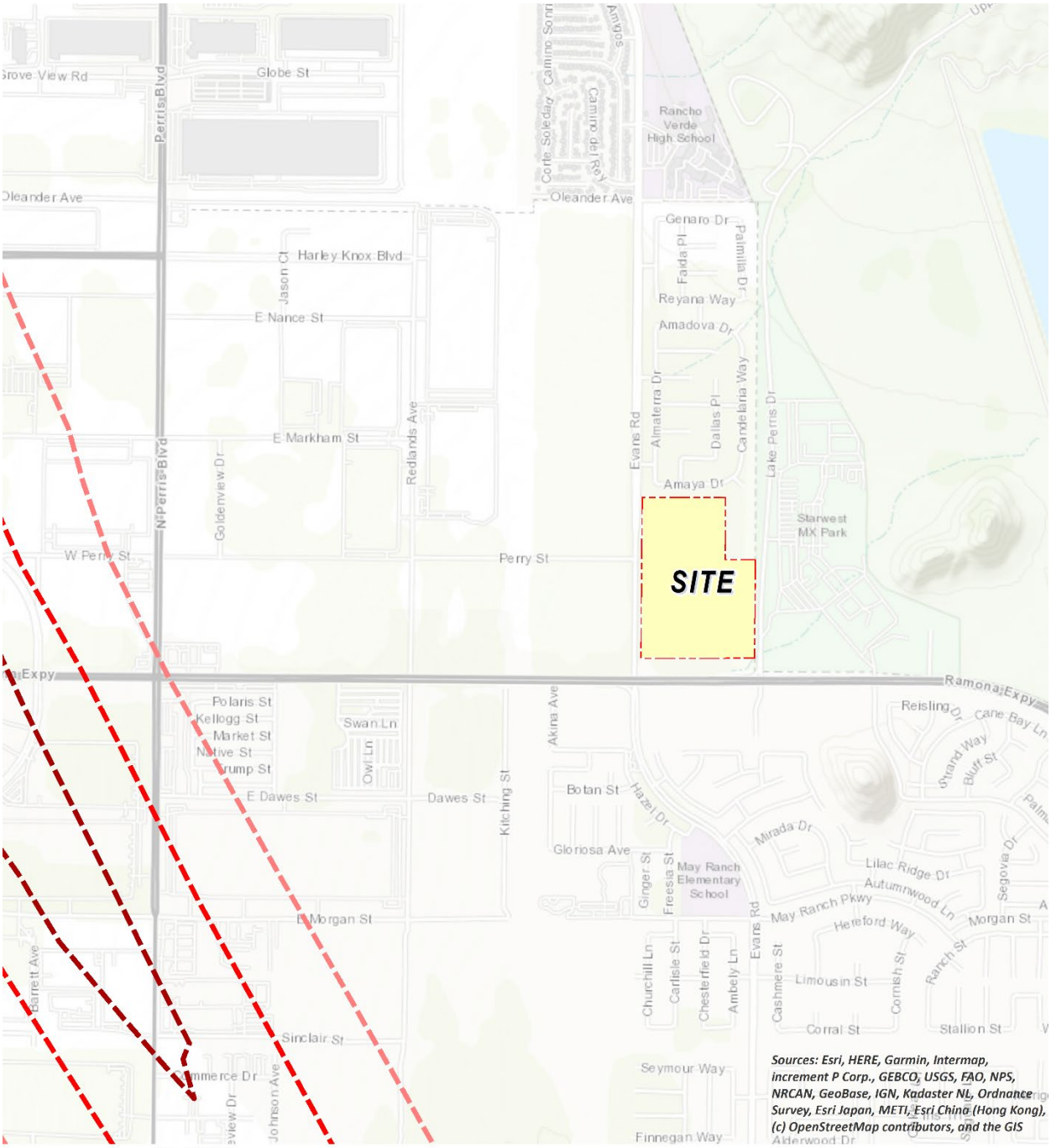
Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, Tables 19, p. 38.

3.6 MARCH AIR RESERVE BASE/INLAND PORT AIRPORT LAND USE COMPATIBILITY

The March Air Reserve Base/Inland Port Airport (MARB/IPA) is located approximately 2.33 miles northwest of the Project site boundary. The *March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan* (MARB/IPA LUCP) includes the policies for determining the land use compatibility of the Project. (13) The MARB/IPA, Map MA-1, indicates that the Project site is located within Compatibility Zone D and E, and the Table MA-1 Compatibility Zone Factors indicates that this area is considered to have a *moderate to low* noise impact, and is outside the 55 dBA CNEL noise level contour boundaries. Consistent with the Basic Compatibility Criteria, listed in Table MA-2 of the MARB/IPA LUCP, noise sensitive outdoor uses are permitted.

The noise contour boundaries of MARB/IPA are presented on Exhibit 3-A of this report and show that the Project is considered *normally acceptable* land use since it is located outside the 65 dBA CNEL noise level contour boundaries.

EXHIBIT 3-A: MARB/IPA FUTURE AIRPORT NOISE CONTOURS



LEGEND:

Unmitigated Airport Noise Contour Boundaries

55 dBA CNEL
60 dBA CNEL
65 dBA CNEL
70 dBA CNEL
75 dBA CNEL

Source: Riverside County Airport Land Use Compatibility Plan, MA-4

4 SIGNIFICANCE CRITERIA

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

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

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

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

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

4.1 CEQA GUIDELINES NOT FURTHER ANALYZED

The closest airport which would require additional noise analysis under CEQA Appendix G Guideline C is the MARB/IPA. As previously described in Section 3.6, the Project is in Compatibility Zone D and E, and the Table MA-1 Compatibility Zone Factors indicates that this area is considered to have a *moderate to low* noise impact. In addition, Table MA-2 indicates that the Project land use satisfies the basic compatibility criteria. Therefore, the potential impacts under CEQA Appendix G Guideline C, are *less than significant* and are not further analyzed in this noise study.

4.2 NOISE-SENSITIVE RECEIVERS

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (14)

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment. In general, the more a new noise exceeds the previously existing

ambient noise level, the less acceptable the new noise will typically be judged. The Federal Interagency Committee on Noise (FICON) (15) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (CNEL) and equivalent continuous noise level (L_{eq}).

As previously stated, the approach used in this noise study recognizes *that there is no single noise increase that renders the noise impact significant*, based on a 2008 California Court of Appeal ruling on Gray v. County of Madera. (14) For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria may be exceeded. Therefore, for this analysis, FICON identifies a *readily perceptible* 5 dBA or greater project-related noise level increase is considered a significant impact when the noise criteria for a given land use is exceeded. Per the FICON, in areas where the without project noise levels range from 60 to 65 dBA, a 3 dBA *barely perceptible* noise level increase appears to be appropriate for most people. When the without project noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance.

The FICON guidance provides an established source of criteria to assess the impacts of substantial temporary or permanent increase in ambient noise levels. Based on the FICON criteria, the amount to which a given noise level increase is considered acceptable is reduced when the without Project noise levels are already shown to exceed certain land-use specific exterior noise level criteria. The specific levels are based on typical responses to noise level increases of 5 dBA or *readily perceptible*, 3 dBA or *barely perceptible*, and 1.5 dBA depending on the underlying without Project noise levels for noise-sensitive uses. These levels of increases and their perceived acceptance are consistent with guidance provided by both the Federal Highway Administration (5 p. 9) and Caltrans (16 p. 2_48).

4.3 SIGNIFICANCE CRITERIA SUMMARY

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

TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Receiving Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site	Noise-Sensitive[1]	if ambient is < 60 dBA CNEL	≥ 5 dBA CNEL Project increase	
		if ambient is 60 - 65 dBA CNEL	≥ 3 dBA CNEL Project increase	
		if ambient is > 65 dBA CNEL	≥ 1.5 dBA CNEL Project increase	
Construction	It is unlawful for any person between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on a legal holiday, with the exception of Columbus Day and Washington's birthday, or on Sundays to erect, construct, demolish, excavate, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise.[2]			
	Noise-Sensitive	Noise Level Threshold[2]	80 dBA L_{max}	n/a
		Vibration Level Threshold[3]	0.3 PPV (in/sec)	n/a

[1] FICON, 1992.
[2] City of Perris Municipal Code, Section 7.34.060 (Appendix 3.1).
[3] Caltrans Transportation and Construction Vibration Manual, April 2020 Table 19.
"Daytime" = 8:00 a.m. - 10:00 p.m.; "Nighttime" = 10:01 p.m. - 7:59 a.m.; "PPV" = Peak Particle Velocity

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at five locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Thursday, March 25th, 2020. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (17)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (3) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (8)

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

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

5.3 NOISE MEASUREMENT RESULTS

The noise measurements presented below focus on the 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 (7:01 a.m. to 10:00 p.m.) and nighttime (10:01 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.

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

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]		CNEL
		Daytime	Nighttime	
L1	Located north of the Project site on Amaya Drive near existing single-family residential home at 4316 Miraluna Drive.	56.0	51.9	59.4
L2	Located by the eastern boundary of the Project site on Lake Perris Drive.	61.0	56.6	64.2
L3	Located east of the Project site by the Perris Auto Speedway at 18700 Lake Perris Drive.	58.4	54.5	62.0
L4	Located south of the Project site on Cameron Glen Road near existing single-family residential home at 3847 Cameron Glen Road.	60.5	51.7	61.6
L5	Located southwest of the Project site on Ramona Expressway and Akina Avenue near existing single-family residential home at 3896 Akina Avenue.	72.3	70.2	77.4

[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" = 7:01 a.m. to 10:00 p.m.; "Nighttime" = 10:01 p.m. to 7:00 a.m.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

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6 TRAFFIC NOISE PREDICTION METHODS AND PROCEDURES

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

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The expected roadway noise level increases from vehicular traffic were calculated by Urban Crossroads, Inc. using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (18) 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. (19) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (20)

6.2 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site dBA CNEL transportation noise impacts. Table 6-1 identifies the six study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of Perris General Plan Circulation Element, and the posted vehicle speeds. The ADT volumes used in this study area presented on Table 6-2 are based on the *Stratford Ranch East Traffic Analysis*, prepared by Urban Crossroads, Inc. for the following traffic scenarios under both Without and With Project alternatives: Existing (2021), Existing Plus Ambient Growth Plus Cumulative Projects (EAC) (2027). (21)

The average daily traffic (ADT) volumes used for this study are presented on Table 6-2. Table 6-3 provides the time of day (daytime, evening, and nighttime) vehicle splits, and Table 6-4 presents the total traffic flow distributions (vehicle mixes) used for this analysis.

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Receiving Land Use[1]	Classification[2]	Centerline Distance to Receiving Land Use (Feet)[3]	Vehicle Speed (mph)
1	Redlands Av.	s/o Ramona Exwy.	Sensitive	Secondary Arterial	47'	40
2	Evans Rd.	n/o Street A	Sensitive	Primary Arterial	64'	45
3	Evans Rd.	s/o Ramona Exwy.	Sensitive	Primary Arterial	64'	45
4	Ramona Exwy.	w/o Redlands Av.	Sensitive	Expressway	92'	55
5	Ramona Exwy.	w/o Evans Rd.	Sensitive	Expressway	92'	55
6	Ramona Exwy.	e/o Evans Rd.	Sensitive	Expressway	92'	55

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] City of Perris General Plan Circulation Element Exhibit CE-4.
[3] Based upon the right-of-way distances for each roadway classification provided in the General Plan Circulation Element.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes[1]			
			Existing		Existing Plus Ambient Growth Plus Cumulative Projects	
			Without Project	With Project	Without Project	With Project
1	Redlands Av.	s/o Ramona Exwy.	1,720	1,720	5,540	5,540
2	Evans Rd.	n/o Street A	25,664	26,036	41,436	41,844
3	Evans Rd.	s/o Ramona Exwy.	19,069	19,441	48,459	48,867
4	Ramona Exwy.	w/o Redlands Av.	32,445	33,283	84,487	85,407
5	Ramona Exwy.	w/o Evans Rd.	37,395	38,233	91,578	92,498
6	Ramona Exwy.	e/o Evans Rd.	25,899	26,179	80,223	80,531

[1] Stratford Ranch East Traffic Analysis, Urban Crossroads, Inc.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

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

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

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

Roadway Classification	Total % Traffic Flow[1]			Total
	Autos	Medium Trucks	Heavy Trucks	
All Roadways	97.42%	1.84%	0.74%	100.00%

[1] Typical Southern California vehicle mix.

6.3 ON-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

The on-site roadway parameters including the average daily traffic (ADT) volumes used for this study are presented on Table 6-5. Based on the City of Perris General Plan Circulation Element Exhibit CE-4, Ramona Expressway is classified as a 6-lane Expressway, Evans Road is classified as a 4-lane Primary Arterial and Redlands Avenue is classified as a 4-lane secondary arterial. (22) To predict the future on-site noise environment at the Project site, parameters including the number of lanes and daily volume thresholds were obtained from the City of Perris General Plan Circulation Element Table CE-2. 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. (20)

TABLE 6-5: ON-SITE ROADWAY PARAMETERS

Roadway	Lanes	Classification[1]	Maximum Daily Traffic Volume[2]	Posted Speed Limit (mph)[3]	Site Conditions
Ramona Expressway	6	Expressway	49,000	55	Soft
Evans Road	4	Primary Arterial	28,700	45	Soft
Redlands Avenue	4	Secondary Arterial	28,700	40	Soft

[1] City of Perris General Plan Circulation Element, Exhibit CE-4, 2008.
[2] City of Perris General Plan Circulation Element, Table CE-2, 2008.
[3] Speed limits

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7 OFF-SITE TRAFFIC NOISE ANALYSIS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed based on the Stratford Ranch East Traffic Analysis. (21) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway.

7.1 TRAFFIC NOISE CONTOURS

Noise contours were used to assess the Project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area. Tables 7-1 to 7-4 present a summary of the exterior traffic noise levels for each traffic condition. Appendix 7.1 includes the traffic noise level contours worksheets for each traffic condition.

TABLE 7-1: EXISTING WITHOUT PROJECT CONTOURS

ID	Road	Segment	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	Redlands Av.	s/o Ramona Exwy.	Sensitive	59.3	RW	RW	RW
2	Evans Rd.	n/o Street A	Sensitive	70.5	70	150	323
3	Evans Rd.	s/o Ramona Exwy.	Sensitive	69.3	RW	123	265
4	Ramona Exwy.	w/o Redlands Av.	Sensitive	71.0	107	231	497
5	Ramona Exwy.	w/o Evans Rd.	Sensitive	71.6	118	254	547
6	Ramona Exwy.	e/o Evans Rd.	Sensitive	70.0	92	199	428

[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 7-2: EXISTING WITH PROJECT 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	Redlands Av.	s/o Ramona Exwy.	Sensitive	59.3	RW	RW	RW
2	Evans Rd.	n/o Street A	Sensitive	70.6	70	151	326
3	Evans Rd.	s/o Ramona Exwy.	Sensitive	69.3	RW	125	268
4	Ramona Exwy.	w/o Redlands Av.	Sensitive	71.1	109	235	506
5	Ramona Exwy.	w/o Evans Rd.	Sensitive	71.7	120	258	555
6	Ramona Exwy.	e/o Evans Rd.	Sensitive	70.1	93	200	431

[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 7-3: EAC WITHOUT PROJECT 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	Redlands Av.	s/o Ramona Exwy.	Sensitive	64.4	RW	RW	93
2	Evans Rd.	n/o Street A	Sensitive	72.6	96	206	444
3	Evans Rd.	s/o Ramona Exwy.	Sensitive	73.3	106	229	493
4	Ramona Exwy.	w/o Redlands Av.	Sensitive	75.2	203	437	942
5	Ramona Exwy.	w/o Evans Rd.	Sensitive	75.5	214	461	994
6	Ramona Exwy.	e/o Evans Rd.	Sensitive	74.9	196	422	910

[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 7-4: EAPC WITH PROJECT 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	Redlands Av.	s/o Ramona Exwy.	Sensitive	64.4	RW	RW	93
2	Evans Rd.	n/o Street A	Sensitive	72.7	96	208	447
3	Evans Rd.	s/o Ramona Exwy.	Sensitive	73.3	107	230	496
4	Ramona Exwy.	w/o Redlands Av.	Sensitive	75.2	204	440	948
5	Ramona Exwy.	w/o Evans Rd.	Sensitive	75.5	216	464	1000
6	Ramona Exwy.	e/o Evans Rd.	Sensitive	74.9	196	423	912

[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.

7.2 EXISTING PROJECT TRAFFIC NOISE LEVEL INCREASES

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project has been included in this report for informational purposes and to fully analyze all the existing traffic scenarios identified in the Traffic Impact Analysis prepared by Urban Crossroads, Inc. However, the analysis of existing off-site traffic noise levels plus traffic noise generated by the proposed Project scenario will not actually occur since the Project would not be fully constructed and operational until Year 2027 conditions. Table 7-1 shows the Existing without Project conditions CNEL noise levels. The Existing without Project exterior noise levels range from 59.3 to 71.6 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions ranging from 59.3 to 71.7 dBA CNEL. Table 7-5 shows that the Project off-site traffic noise level increases range from 0.0 to 0.1 dBA CNEL on the study area roadway segments. Based on the significance criteria for off-site traffic noise presented in Table 4-1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level increases on receiving land uses due to the Project-related traffic.

7.3 EAC TRAFFIC NOISE LEVEL INCREASES

Table 7-3 presents the Existing plus Ambient Growth plus Cumulative Projects without Project conditions CNEL noise levels. The Existing plus Ambient Growth plus Cumulative Projects without Project exterior noise levels range from 64.4 to 75.5 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-4 shows that the Existing plus Ambient Growth plus Cumulative Projects with Project conditions will range from 64.4 to 75.5 dBA CNEL. Table 7-6 shows that the Project off-site traffic noise level increases range from 0.0 to 0.1 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 4-1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level increases on receiving land uses due to the Project-related traffic.

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

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]			Incremental Noise Level Increase Threshold[3]	
				No Project	With Project	Project Addition	Limit	Exceeded?
1	Redlands Av.	s/o Ramona Exwy.	Sensitive	59.3	59.3	0.0	5.0	No
2	Evans Rd.	n/o Street A	Sensitive	70.5	70.6	0.1	1.5	No
3	Evans Rd.	s/o Ramona Exwy.	Sensitive	69.3	69.3	0.0	1.5	No
4	Ramona Exwy.	w/o Redlands Av.	Sensitive	71.0	71.1	0.1	1.5	No
5	Ramona Exwy.	w/o Evans Rd.	Sensitive	71.6	71.7	0.1	1.5	No
6	Ramona Exwy.	e/o Evans Rd.	Sensitive	70.0	70.1	0.1	1.5	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)?

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

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]			Incremental Noise Level Increase Threshold[3]	
				No Project	With Project	Project Addition	Limit	Exceeded?
1	Redlands Av.	s/o Ramona Exwy.	Sensitive	64.4	64.4	0.0	3.0	No
2	Evans Rd.	n/o Street A	Sensitive	72.6	72.7	0.1	1.5	No
3	Evans Rd.	s/o Ramona Exwy.	Sensitive	73.3	73.3	0.0	1.5	No
4	Ramona Exwy.	w/o Redlands Av.	Sensitive	75.2	75.2	0.0	1.5	No
5	Ramona Exwy.	w/o Evans Rd.	Sensitive	75.5	75.5	0.0	1.5	No
6	Ramona Exwy.	e/o Evans Rd.	Sensitive	74.9	74.9	0.0	1.5	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)?

8 ON-SITE TRAFFIC NOISE IMPACTS

An on-site exterior noise impact analysis has been completed to determine the traffic noise exposure and to identify potential necessary noise abatement measures for the proposed Stratford Ranch East Project. It is expected that the primary source of noise impacts to the Project site will be traffic noise from Ramona Expressway, Evans Road, and Redlands Avenue in the Project study area. The Project will also experience some background traffic noise from the Project's internal local streets, however, due to the distance, topography and low traffic volume/speed, traffic noise from these roads will not make a significant contribution to the noise environment.

8.1 ON-SITE EXTERIOR NOISE ANALYSIS

Using the FHWA traffic noise prediction model and the parameters outlined in Section 6, the expected future exterior noise levels for the building façade were calculated. Table 8-1 presents a summary of future exterior noise levels at the building façade within the Project site. The on-site traffic noise level analysis indicates that the building facades adjacent to Ramona Expressway, Evans Road, and Redlands Avenue will experience exterior noise levels ranging from 65.0 to 69.9 dBA CNEL.

With the recommended minimum 6-foot-high noise barriers, shown on Exhibit ES-A, the future exterior noise levels at the lots adjacent to Ramona Expressway, Evans Road, and Redlands Avenue are shown to range from 59.0 to 63.8 dBA CNEL. This noise analysis shows that the recommended noise barriers will satisfy the City of Perris 65 dBA CNEL exterior noise level standards for residential land use. The recommended noise barrier height represents the minimum wall and/or berm combination height required to satisfy the City of Perris exterior noise level standards.

TABLE 8-1: EXTERIOR NOISE LEVELS (CNEL)

Lot	Roadway	Unmitigated Noise Level (dBA CNEL)	Mitigated Noise Level (dBA CNEL)	Barrier Height (Feet)
177	Ramona Expressway	66.0	60.2	6.0
182	Ramona Expressway	66.0	60.2	6.0
1	Evans Road	69.9	63.8	6.0
11	Evans Road	69.6	63.5	6.0
172	Redlands Avenue	66.3	60.2	6.0
46	Redlands Avenue	65.0	59.0	6.0
168	Redlands Avenue	65.8	59.8	6.0

[1] Exterior noise level calculations are included Appendix 8.1.

8.2 ON-SITE INTERIOR NOISE ANALYSIS

The future noise levels were calculated at the first and second-floor building façades to ensure that the interior noise levels comply with the City of Perris 45 dBA CNEL interior noise standards.

8.2.1 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.

8.2.2 INTERIOR NOISE LEVEL ASSESSMENT

Tables 8-2 to 8-3 show that the residential units require a windows-closed condition and a means of mechanical ventilation (e.g., air conditioning). Table 8-2 shows that the future mitigated noise levels at the first-floor building façade are expected to range from 59.0 to 63.8 dBA CNEL. The first-floor interior noise level analysis shows that the City of Perris 45 dBA CNEL with windows-closed interior noise standards can be satisfied using windows with a minimum STC rating of 27 for units adjacent to Ramona Expressway, Evans Road, and Redlands Avenue, based on the minimum interior noise reduction for standard construction.

Table 8-3 shows the future unmitigated noise levels at the second-floor building façade are expected to range from 64.4 to 68.8 dBA CNEL. The second-floor interior noise level analysis shows that the City of Perris 45 dBA CNEL with windows closed interior noise standards can be satisfied using standard windows with a minimum STC rating of 27 for units adjacent to Ramona Expressway, Evans Road, and Redlands Avenue.

TABLE 8-2: FIRST-FLOOR INTERIOR NOISE IMPACTS (CNEL)

Lot	Noise Level at Façade[1]	Required Interior Noise Reduction[2]	Interior Noise Reduction[3]	Upgraded Windows[4]	Interior Noise Level[5]
177	60.2	15.2	25.0	No	35.2
182	60.2	15.2	25.0	No	35.2
1	62.9	17.9	25.0	No	37.9
11	62.7	17.7	25.0	No	37.7
172	59.6	14.6	25.0	No	34.6
46	58.6	13.6	25.0	No	33.6
168	59.2	14.2	25.0	No	34.2

[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 standards.
[3] Minimum interior noise reduction
[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.

TABLE 8-3: SECOND-FLOOR INTERIOR NOISE IMPACTS (CNEL)

Lot	Noise Level at Façade[1]	Required Interior Noise Reduction[2]	Interior Noise Reduction[3]	Upgraded Windows[4]	Interior Noise Level[5]
177	65.7	20.7	25.0	No	40.7
182	65.7	20.7	25.0	No	40.7
1	68.6	23.6	25.0	No	43.6
11	68.4	23.4	25.0	No	43.4
172	65.5	20.5	25.0	No	40.5
46	64.4	19.4	25.0	No	39.4
168	65.1	20.1	25.0	No	40.1

[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 standards.
[3] Minimum interior noise reduction
[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.

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9 SENSITIVE RECEIVER LOCATIONS

To assess the potential short-term construction noise impacts, the following sensitive receiver locations, as 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.

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

R1: Location R1 represents the existing noise sensitive residence at 825 Amaya Drive, approximately 18 feet north of the Project site. Receiver R1 is placed at the private outdoor living area (backyard). A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the existing noise sensitive residence at 914 Arbor Ridge Road, approximately 930 feet south of the Project site. Receiver R2 is placed at the private outdoor living area (backyard). A 24-hour noise measurement was taken near this location, L4, to describe the existing ambient noise environment.

R3: Location R3 represents the existing noise sensitive residence at 3899 Akina Avenue, approximately 951 feet southwest of the Project site. Receiver R3 is placed at the private outdoor living area (backyard). A 24-hour noise measurement was taken near this location, L5, to describe the existing ambient noise environment.

EXHIBIT 9-A: SENSITIVE RECEIVER LOCATIONS

10 PERRIS AUTO SPEEDWAY RACETRACK

This section described the potential noise impacts resulting from the operation of the neighboring Perris Auto Speedway to help identify measures to mitigate exterior and interior noise exposure in accordance with Chapter 16.22 of the Municipal Code, provided in Appendix 3.1.

10.1 PERRIS AUTO SPEEDWAY

According to the General Plan Noise Element, the Perris Auto Speedway is a privately operated auto and truck racing venue located inside the Lake Perris State Recreation Area. It is the only ½ mile clay track in the western United States and it operates from February through November, with racing competition on Saturday nights and open practice on Wednesdays. A variety of racing events are held, including stock cars, super stocks, dwarf cars, sprint cars, light trucks, cruisers, hornets, and midgets.

10.2 SPEEDWAY / TRACK NOISE IMPACTS

To assess the existing noise level environment during peak speedway/track activities, two noise level measurements were identified in the Steeplechase Tract 32707 Final Noise Study prepared by Urban Crossroads, Inc. approximately 200 feet from the racetrack. To identify the worst-case noise condition, exterior noise level measurements were previously collected during combined events at both racetracks in the Perris Auto Speedway.

The special event activities at two of the racetracks at the Perris Auto Speedway represented the primary noise source during the measurement period. Several heats with regular racing were observed throughout the measurement period. Measurements taken at lot 39 of Tract 32707 at five and 14 feet were taken to represent a first and second floor observer. Table 10-1 presents a summary of the first and second floor exterior noise level measurements. During peak events, the exterior noise levels ranged from 56.2 dBA L_{eq} at the first floor (five feet) to 61.0 dBA L_{eq} at the second floor (14 feet).

TABLE 10-1: PERRIS AUTO SPEEDWAY RACETRACK NOISE LEVELS

Location	Noise Level (dBA L_{eq})[1]	
	Average Hourly	Peak 10-Minute
First Floor	54.5	56.2
Second Floor	58.9	61.0

[1] Peak Speedway and Track activity at a distance of 200 feet.
[2] Represents the energy average hourly Leq.
[3] Represent the peak 10-minute Leq.

The reference Perris Auto Speedway noise level measurements are generally consistent with the existing ambient noise levels measurements outlined in Section 5 that do not include any active racing events due to COVID-19. A review of the Auto Speedway Racetrack noise levels shows

that they are not expected to exceed the existing ambient energy average dBA L_{eq} noise levels at the Project site. In addition, the City of Perris municipal code Section 7.30.050 states that

> *It unlawful for any person to willfully make, cause or suffer, or permit to be made or caused, any loud excessive or offensive noises or sounds which unreasonably disturb the peace and quiet of any residential neighborhood or which are physically annoying to persons of ordinary sensitivity or which are so harsh, prolonged or unnatural or unusual in their use, time or place as to occasion physical discomfort to the inhabitants of the city, or any section thereof…*

While the noise levels associated with the Perris Auto Speedway are not expected during the noise sensitive nighttime hours between 7:00 a.m. and 10:00 p.m, it is likely that the residential lots facing the Perris Auto Speedway may perceive noise level impacts during peak noise events. Therefore, occupancy disclosure notices for all future owners of the residential units within the Project site are required.

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 noise source locations in relation to the nearest sensitive receiver locations previously described in Section 9. To prevent high levels of construction noise from impacting noise-sensitive land uses, City of Perris Municipal Code Section 7.34.060 limits construction activities to the hours of 7:00 a.m. to 7:00 p.m. on any day except Sundays and legal holidays (with the exception of Columbus Day and Washington's birthday).

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 are 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 in the *Update of Noise Database for Prediction of Noise on Construction and Open Sites* by the Department for Environment, Food and Rural Affairs (DEFRA). (24). The DEFRA database provides the most recent and comprehensive source of reference construction noise levels. Table 11-1 provides a summary of the DEFRA construction reference noise level measurements expressed in dBA L_{max} using the estimated FHWA Roadway Construction Noise Model (RCNM) usage factors (25) to describe the typical construction activities for each stage of Project construction.

EXHIBIT 11-A: TYPICAL CONSTRUCTION NOISE SOURCE LOCATIONS

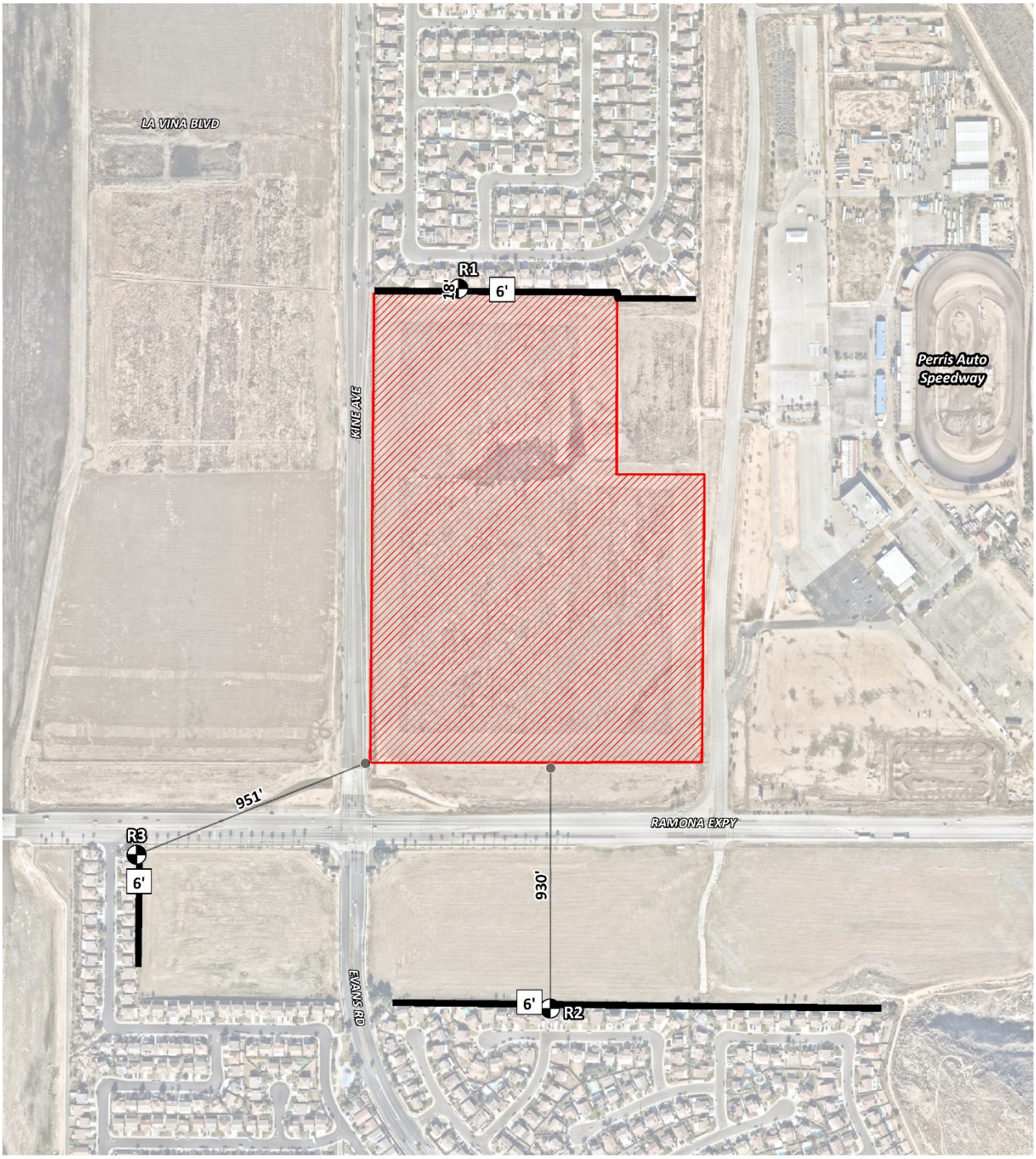

TABLE 11-1: CONSTRUCTION REFERENCE NOISE LEVELS

Construction Stage	Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{max})[1]	Highest Reference Noise Level (dBA L_{max})
Site Preparation	Crawler Tractors	81	81
	Hauling Trucks	75	
	Rubber Tired Dozers	75	
Grading	Graders	83	83
	Excavators	68	
	Compactors	74	
Building Construction	Cranes	75	76
	Tractors	76	
	Welders	69	
Paving	Pavers	73	76
	Paving Equipment	72	
	Rollers	76	
Architectural Coating	Cranes	75	75
	Air Compressors	71	
	Generator Sets	70	

[1] Update of Noise Database for Prediction of Noise on Construction and Open Sites by the Department for Environment, Food and Rural Affairs (DEFRA) expressed in maximum noise levels L_{max} based on estimated usage factors from the FHWA Roadway Construction Noise Model (RCNM).

11.3 TYPICAL CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearest sensitive receiver locations were completed. To assess the worst-case construction noise levels, the Project construction noise analysis relies on the highest noise level impacts when the equipment with the highest reference noise level is operating at the closest point from the edge of primary construction activity (Project site boundary) to each receiver location. As shown on Table 10-2, the construction noise levels are expected to range from 56.0 to 76.8 dBA L_{max}, and the highest construction levels are expected to range from 64.0 to 76.8 dBA L_{max} at the nearest receiver locations. Appendix 11.1 includes the detailed CadnaA construction noise model inputs.

TABLE 11-2: TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Noise Levels (dBA L_{max})					
	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Highest Levels[2]
R1	74.8	76.8	69.8	69.8	68.8	76.8
R2	63.0	65.0	58.0	58.0	57.0	65.0
R3	62.0	64.0	57.0	57.0	56.0	64.0

[1] Noise receiver locations are shown on Exhibit 11-A.
[2] Construction noise level calculations based on distance from the construction activity, which is measured from the Project site boundary to the nearest 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 nearby receiver locations, the City of Perris has identified a construction-related noise level threshold of 80 dBA L_{max}. The construction noise analysis shows that the nearest receiver locations will satisfy the 80 dBA L_{max} significance threshold during Project construction activities as shown on Table 11-3. Therefore, the noise impacts due to Project construction noise is considered *less than significant* at all receiver locations.

TABLE 11-3: TYPICAL CONSTRUCTION NOISE LEVEL COMPLIANCE

Receiver Location[1]	Use	Construction Noise Levels (dBA L_{max})		
		Highest Construction Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	Residential	76.8	80	No
R2	Residential	65.0	80	No
R3	Residential	64.0	80	No

[1] Noise receiver locations are shown on Exhibit 11-A.
[2] Highest construction noise level calculations based on distance from the construction noise source activity to the nearest receiver locations as shown on Table 11-2.
[3] Construction noise level thresholds as shown on Table 3-1.
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

11.5 CONSTRUCTION VIBRATION ANALYSIS

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

TABLE 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

Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual

Table 11-5 presents the expected Project related vibration levels at the nearby receiver locations. At distances ranging from 18 to 951 feet from Project construction activities, construction vibration velocity levels are estimated to range from 0.000 to 0.146 in/sec PPV. Based on maximum acceptable continuous vibration threshold of 0.3 PPV (in/sec) for older residential buildings, the typical Project construction vibration levels will satisfy the building damage thresholds at all receiver locations. 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: CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver[1]	Distance to Const. Activity (Feet)[2]	Typical Construction Vibration Levels PPV (in/sec)[3]					Thresholds PPV (in/sec)[4]	Thresholds Exceeded?[5]
		Small bulldozer	Jackhammer	Loaded Trucks	Large bulldozer	Highest Vibration Level		
R1	18'	0.005	0.057	0.124	0.146	0.146	0.3	No
R2	930'	0.000	0.000	0.000	0.000	0.000	0.3	No
R3	951'	0.000	0.000	0.000	0.000	0.000	0.3	No

[1] Receiver locations are shown on Exhibit 11-A.
[2] Distance from receiver location to Project construction boundary (Project site boundary).
[3] Based on the Vibration Source Levels of Construction Equipment (Table 11-4).
[4] Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, Tables 19, p. 38.
[5] Does the peak vibration exceed the acceptable vibration thresholds?
"PPV" = Peak Particle Velocity

12 REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G.* 2019.
2. **Harris, Cyril M.** *Noise Control in Buildings.* s.l. : McGraw-Hill, Inc., 1994.
3. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
4. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March 1974. EPA/ONAC 550/9/74-004.
5. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* December 2011.
6. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
7. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.
8. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment Manual.* September 2018.
9. **Office of Planning and Research.** *State of California General Plan Guidelines.* 2019.
10. **State of California.** California Code of Regulations, Title 24, Part 2, Volume 1, Chapter 12, Section 1206.4, Allowable Interior Noise Level. *ICC Digital Coes.* [Online] 2019. https://codes.iccsafe.org/content/CABCV12019/chapter-12-interior-environment.
11. **City of Perris.** *General Plan Noise Element.* August 2005.
12. —. *Municipal Code, Chapter 7.34 Noise Control.*
13. **California Department of Transportation.** *Transportation and Construction Vibration Guidance Manual.* April 2020.
14. **Riverside County Airport Land Use Commission.** *March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan.* November 2014.
15. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
16. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.
17. **California Department of Transportation.** *Technical Noise Supplement.* November 2009.
18. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
19. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.
20. **California Department of Transportation Environmental Program, Office of Environmental Engineering.** *Use of California Vehicle Noise Reference Energy Mean Emission Levels (Calveno REMELs) in FHWA Highway Traffic Noise Prediction.* September 1995. TAN 95-03.

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

22. **Urban Crossroads, Inc.** *Stratford Ranch East (TTM No. 38071) (PLN21-05032/GPA21-05040/ZC21-05039).* April 2021.

23. **City of Perris.** *General Plan Circulation Element.* 2008.

24. **Department of Environment, Food and Rural Affiars (Defra).** *Update of Noise Database for Prediction of Noise on Construction and Open Sites.* 2004.

25. **FHWA.** *Roadway Construction Noise Model.* January 2006.

13 CERTIFICATION

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

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EDUCATION

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

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

PROFESSIONAL REGISTRATIONS

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

PROFESSIONAL AFFILIATIONS

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

PROFESSIONAL CERTIFICATIONS

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

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APPENDIX 3.1:

CITY OF PERRIS MUNICIPAL CODE

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CHAPTER 7.34. - NOISE CONTROL

Sec. 7.34.010. - Declaration of policy.

Excessive noise levels are detrimental to the health and safety of individuals. Noise is considered a public nuisance, and the city discourages unnecessary, excessive or annoying noises from all sources. Creating, maintaining, causing, or allowing to be created, caused or maintained, any noise or vibration in a manner prohibited by the provisions of the ordinance codified in this chapter is a public nuisance and shall be punishable as a misdemeanor.

(Code 1972, § 7.34.010; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.020. - Definitions.

(a) *General.* The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Ambient noise means the all-encompassing noise associated with a given environment usually being composed of sounds from many sources near and far. For the purpose of this chapter, ambient noise level is the level obtained when the noise level is averaged over a period of five minutes without inclusion of noise from isolated identifiable sources at the location and time of day near that at which a comparison is to be made.

Decibel (dB) means an intensity unit which denotes the ratio between two quantities which are proportional to power; the number of decibels corresponding to the ratio is ten times the common logarithm of this ratio.

Sound amplifying equipment means any machine or device for the amplification of the human voice, music or any other sound. The term "sound amplifying equipment" does not include standard vehicle radios when used and heard only by the occupants of the vehicle in which the vehicle radio is installed. The term "sound amplifying equipment," as used in this chapter, does not include warning devices on any vehicle used only for traffic safety purposes and shall not include communications equipment used by public or private utilities when restoring utility service following a public emergency or when doing work required to protect person or property from an imminent exposure to danger.

Sound level (noise level) in decibels is the value of a sound measurement using the "A" weighting network of a sound level meter. Slow response of the sound level meter needle shall be used except where the sound is impulsive or rapidly varying in nature, in which case, fast response shall be used.

Sound level meter means an instrument, including a microphone, an amplifier, an output meter and frequency weighting networks, for the measurement of sound levels, which satisfies the pertinent requirements in American National Standards Institute's specification S1.4-1971 or the most recent revision for type S-2A general purpose sound level meters.

(b) *Supplementary definitions of technical terms.* Definitions of technical terms not defined in this section shall be obtained from the American National Standards Institute's Acoustical Terminology S1-1971 or the most recent revision thereof.

(Code 1972, § 7.34.020; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.030. - Measurement methods.

(a) Sound shall be measured with a sound level meter as defined in section 7.34.020.

(b) Unless otherwise provided, outdoor measurements shall be taken with the microphone located at any point on the property line of the noise source but no closer than five feet from any wall or vertical obstruction and three to five feet above ground level whenever possible.

(c) Unless otherwise provided, indoor measurements shall be taken inside the structure with the microphone located at any point as follows:

(1) No less than three feet above floor level;

(2) No less than five feet from any wall or vertical obstruction; and

(3) Not under common possession and control with the building or portion of the building from which the sound is emanating.

(Code 1972, § 7.34.030; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.040. - Sound amplification.

No person shall amplify sound using sound amplifying equipment contrary to any of the following:

(1) The only amplified sound permitted shall be either music or the human voice, or both.

(2) The volume of amplified sound shall not exceed the noise levels set forth in this subsection when measured outdoors at or beyond the property line of the property from which the sound emanates.

Time Period	Maximum Noise Level
10:01 p.m.—7:00 a.m.	60 dBA
7:01 a.m.—10:00 p.m.	80 dBA

(Code 1972, § 7.34.040; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.050. - General prohibition.

(a) It unlawful for any person to willfully make, cause or suffer, or permit to be made or caused, any loud excessive or offensive noises or sounds which unreasonably disturb the peace and quiet of any residential neighborhood or which are physically annoying to persons of ordinary sensitivity or which are so harsh, prolonged or unnatural or unusual in their use, time or place as to occasion physical discomfort to the inhabitants of the city, or any section thereof. The standards for dBA noise level in section 7.34.040 shall apply to this section. To the extent that the noise created causes the noise level at the property line to exceed the ambient noise level by more than 1.0 decibels, it shall be presumed that the noise being created also is in violation of this section.

(b) The characteristics and conditions which should be considered in determining whether a violation of the provisions of this section exists should include, but not be limited to, the following:

(1) The level of the noise;

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

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

(4) The level of the ambient noise;

(5) The proximity of the noise to sleeping facilities;

(6) The nature and zoning of the area from which the noise emanates and the area where it is received;

(7) The time of day or night the noise occurs;

(8) The duration of the noise; and

(9) Whether the noise is recurrent, intermittent or constant.

(Code 1972, § 7.34.050; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.060. - Construction noise.

It is unlawful for any person between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on a legal holiday, with the exception of Columbus Day and Washington's birthday, or on Sundays to erect, construct, demolish, excavate, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise. Construction activity shall not exceed 80 dBA in residential zones in the city.

(Code 1972, § 7.34.060; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.070. - Refuse vehicles and parking lot sweepers.

No person shall operate or permit to be operated a refuse compacting, processing or collection vehicle or parking lot sweeper between the hours of 7:00 p.m. to 7:00 a.m. in any residential area unless a permit has been applied for and granted by the city.

(Code 1972, § 7.34.070; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.080. - Disturbing, excessive, offensive noises; declaration of certain acts constituting.

The following activities, among others, are declared to cause loud, disturbing, excessive or offensive noises in violation of this section and are unlawful, namely:

(1) *Horns, signaling devices, etc.* Unnecessary use or operation of horns, signaling devices or other similar devices on automobiles, motorcycles or any other vehicle.

(2) *Radios, television sets, phonographs, loud speaking amplifiers and similar devices.* The use or operation of any sound production or reproduction device, radio receiving set, musical instrument, drums, phonograph, television set, loudspeakers, sound amplifier, or other similar machine or device for the producing or reproducing of sound, in such a manner as to disturb the peace, quiet or comfort of any reasonable person of normal sensitivity in any area of the city is prohibited. This provision shall not apply to any participant in a licensed parade or to any person who has been otherwise duly authorized by the city to engage in such conduct.

(3) *Animals.*

a. The keeping or maintenance, or the permitting to be kept or maintained, upon any premises owned, occupied or controlled by any person of any animal or animals which by any frequent or long-continued noise shall cause annoyance or discomfort to a reasonable person of normal sensitiveness

in the vicinity.

b. The noise from any such animal or animals that disturbs two or more residents residing in separate residences adjacent to any part of the property on which the subject animal or animals are kept or maintained, or three or more residents residing in separate residences in close proximity to the property on which the subject animal or animals are kept or maintained, shall be prima facie evidence of a violation of this section.

(4) *Hospitals, schools, libraries, rest homes, long-term medical or mental care facilities.* To make loud, disturbing, excessive noises adjacent to a hospital, school, library, rest home or long-term medical or mental care facility, which noise unreasonably interferes with the workings of such institutions or which disturbs or unduly annoys occupants in said institutions.

(5) *Playing of radios on buses and trolleys.* The operation of any radio, phonograph or tape player on an urban transit bus or trolley so as to emit noise that is audible to any other person in the vehicle is prohibited.

(6) *Playing of radios, phonographs and other sound production or reproduction devices in public parks and public parking lots and streets adjacent thereto.* The operation of any radio, phonograph, television set or any other sound production or reproduction device in any public park or any public parking lot, or street adjacent to such park or beach, without the prior written approval of the city manager or the administrator, in such a manner that such radio, phonograph, television set or sound production or reproduction device emits a sound level exceeding those found in the table in section 7.34.040.

(7) *Leaf blowers.*

a. The term "leaf blower" means any portable, hand-held or backpack, engine-powered device with a nozzle that creates a directable airstream which is capable of and intended for moving leaves and light materials.

b. No person shall operate a leaf blower in any residential zoned area between the hours of 7:00 p.m. and 8:00 a.m. on weekdays and 5:00 p.m. and 9:00 a.m. on weekends or on legal holidays.

c. No person may operate any leaf blower at a sound level in excess of 80 decibels measured at a distance of 50 feet or greater from the point of noise origin.

d. Leaf blowers shall be equipped with functional mufflers and an approved sound limiting device required to ensure that the leaf blower is not capable of generating a sound level exceeding any limit prescribed in this section.

(Code 1972, § 7.34.080; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.090. - Burglar alarms.

(a) Audible burglar alarms for structures or motor vehicles are prohibited unless the operation of such burglar alarm can be terminated within 20 minutes of being activated.

(b) Notwithstanding the requirements of this provision, any member of the county sheriff's department, Perris Division, shall have the right to take such steps as may be reasonable and necessary to disconnect any such alarm installed in any building, dwelling or motor vehicle at any time during the period of its activation. On or after 30 days from the effective date of the ordinance codified in this chapter, any building, dwelling or motor vehicle upon which a burglar alarm has been installed shall prominently display the telephone number at which communication may be made with the owner of such building, dwelling or motor vehicle.

(Code 1972, § 7.34.090; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.100. - Motor vehicles.

(a) Off-highway.

(1) Except as otherwise provided for in this chapter, it shall be unlawful to operate any motor vehicle of any type on any site, other than on a public street or highway as defined in the California Vehicle Code, in any manner so as to cause noise in excess of those noise levels permitted for on-highway motor vehicles as specified in the table for "45-mile-per-hour or less speed limits" contained in section 23130 of the California Vehicle Code and as corrected for distances set forth in subsection (a)(2) of this section.

(2) The maximum noise level as the on-highway vehicle passes may be measured at a distance of other than 50 feet from the centerline of travel, provided the measurement is further adjusted by adding algebraically the application correction as follows:

Distance (feet)	Correction (decibels)
25	−6
28	−5
32	−4
35	−3
40	−2
45	−1
50 (preferred distance)	0
56	+1
63	+2
70	+3
80	+4
90	+5

100	+6

(b) Nothing in this section shall apply to authorized emergency vehicles when being used in emergency situations including the blowing of sirens and/or horns.

(Code 1972, § 7.34.100; Ord. No. 1082, § 2(part), 2000)

CHAPTER 16.22. - CONSTRUCTION LOCATED NEAR ARTERIALS, RAILROADS AND AIRPORTS

Sec. 16.22.010. - Purpose.

The purpose of this chapter is to establish standards of insulation against noise for areas in the vicinity of arterials, railroads, and airports where the exterior community noise equivalent level (CNEL) exceeds 60 dB. Residential developments such as noise impacted areas shall be designed and constructed so as to isolate them appropriately from the interior noise exposures produced by arterial traffic, train pass-bys, and aircraft operations.

(Code 1972, § 16.22.010; Ord. No. 684, § 1(part), 1987)

Sec. 16.22.020. - Definitions.

The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Ambient noise means the composite noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

A-weighted sound pressure level, db(A) means the sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter deemphasizes the very low and very high frequency components of the sound in a manner similar to the response to the human ear and gives good correlation with subjective reactions to noise.

Community noise equivalent level (CNEL) means a measure of noise exposure which recognizes that a given level of noise may be more or less tolerable depending on the duration of exposure and the time of day during which the noise is experienced. This measure weights the average noise level for the evening hours (7:00 p.m. to 10:00 p.m.) by five dB, and the late evening and early morning hours (10:00 p.m. to 7:00 a.m.) by ten dB. The unweighted daytime noise levels are combined with these weighted levels and averaged to obtain a CNEL value.

Decibel (dB) means a unit for describing the amplitude of sound, equal to 20 times the logarithm to the base ten of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals.

Maximum noise level means the maximum instantaneous noise level that occurs during a specific time interval. In acoustics, the maximum sound pressure level is understood to be for single events unless some other kind of level is specified.

Noise means annoying, harmful, or unwanted sound.

Noise contour means a line drawn about a noise source indicating constant levels of noise exposure. CNEL is the metric utilized herein to describe community exposure to noise.

Noise impact area means a specific area exposed to significant levels of noise.

Noise level reduction (NLR) means the difference in noise level from outside to inside of the building. NLR is a difference, in decibels, between A-weighted sound level. It depends primarily on the nature of the wall, ceiling, windows, doors, and vents, and to a lesser extent on the amount of sound absorbing material in the room in which the sound is received. It shall be measured, if so required, in a completed and furnished building.

Noise-sensitive land uses include, but are not limited to, residences, schools, libraries, hospitals, churches, offices, hotels, motels, and outdoor recreational areas. Noise-sensitivity factors include interference with speech communication, subjective judgment of noise acceptability and relative noisiness, priced for freedom from noise intrusion, and sleep interference criteria.

Qualified consultant means a person who by reason of his training and experience in the science and technology of acoustical engineering is considered qualified to pass judgment on acoustical design, materials, and methods of construction for the attenuation of noise. The qualifications of the consultant relative to acoustical design must be submitted to and found to be acceptable by the city and the state office of noise control.

Sound absorption means the capacity of the materials and furnishings in a habitable room to absorb sound.

Sound level means, in decibels, the quantity measured by an instrument that satisfies American National Standards Specification for Sound Level Meters 51.4-1971 or the most recent revision thereof. Sound level is understood to be measured with the A-weighted filter and slow response of the instrument.

Sound level meter means a measurement instrument containing a microphone, an amplifier, an output meter, and one or more frequency weighting networks. It is used for the determination of sound levels.

Sound transmission class (STC) of a partition means a single-figure rating of the sound insulating properties of a partition which takes into account the relative importance of the sound transmission loss of the partition at different frequencies. The determination of the sound transmission class of a partition is described in "Determination of Sound Transmission Class," American Society for Testing and Materials Designation E413-73.

Sound transmission loss of a partition means a measure of the sound insulating properties of a wall, floor, ceiling, window, or door that is a characteristic of the partition itself and not the room of which it is a part. The determination of sound transmission loss of a partition of the field is described in "Measurement of Airborne Sound Insulation in Buildings," American Society for Testing and Materials Designation E336-77 or the latest revision thereof.

(Code 1972, § 16.22.020; Ord. No. 684, § 1(part), 1987)

Sec. 16.22.030. - Noise impacted projects.

Residential projects, or portions thereof, which are exposed to a community noise equivalent level (CNEL) of 60 dB or greater are considered to be impacted by excessive noise. Such projects shall be required to include noise isolation design and construction such that the exterior and interior noise standards of the city's noise element of its general plan are not exceeded. Year 2000 CNEL contour maps maintained by the city's planning department shall be used to identify those areas in proximity to arterials, railroads, and/or airfields that are impacted by a CNEL which is 60 dB or greater.

(Code 1972, § 16.22.030; Ord. No. 684, § 1(part), 1987)

Sec. 16.22.040. - Acceptable building construction.

Residential development will be considered acceptable by the city's building official for mitigating interior noise exposures if it incorporates the features described in section 16.22.060. Alternative materials and methods of construction may be permitted provided such alternatives are demonstrated to the satisfaction of the city's building official to be equivalent to those described in this chapter.

(Code 1972, § 16.22.040; Ord. No. 684, § 1(part), 1987)

Sec. 16.22.050. - Acoustical analysis and design report.

An analysis and design report signed by and prepared under the supervision of a qualified architect or engineer shall be submitted with the application for building permits. The report shall comply with the requirements of section 16.22.070 and shall identify the noise sources and characteristics, provide the predicted noise spectra, indicate the basis for the prediction (measured or obtained from published data), and quantify the effectiveness of the proposed building construction to ensure that the CNEL standard of 45 dB is met within the interior living spaces. In the event that the analysis and design report includes a challenge of the AICUZ noise contours for March Air Force Base, it shall also comply with the requirements and procedures for a challenge study, as established by resolution of the city council.

(Code 1972, § 16.22.050; Ord. No. 684, § 1(part), 1987)

Sec. 16.22.060. - Prescription for the control of aircraft noise within residential construction.

(a) All residential buildings located within a CNEL contour of 60 dB or greater shall be designed to cause isolation against exterior noise with at least a noise level reduction (NLR) that will reduce the exterior noise to an acceptable level. Residential buildings shall be constructed with sufficient sound insulation so that in any habitable room, furnished for normal use with doors and windows closed, the noise exposure due to exterior sources does not exceed a community noise equivalent level (CNEL) of 45 dB. The exterior CNEL at the project site shall be obtained from city approved noise contour maps.

(b) The minimum NLR required at any residential unit shall be determined as follows:

Range of Exterior CNEL	Minimum NLR
60—65 dB	20 dB
66—70 dB	25 dB
71—75 dB	30 dB
76 + dB	Not permitted

(c) The following tables specify the construction standards necessary to meet the minimum NLRs indicated above and the interior noise standards specified in the noise element of the city's general plan.

TABLE 1. CONSTRUCTION STANDARDS TO ACHIEVE
A NOISE LEVEL REDUCTION (NLR) OF 20 dB

Assembly	Construction Standards

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. A forced air circulation system shall be provided which will give a minimum of two complete air changes per hour, of which at least 20 percent is fresh air in accordance with the requirements of the Uniform Mechanical Code.
Glazing and Doors	All windows and sliding glass doors shall be doors tightly fitted assemblies, and all entry doors from exterior spaces shall be well weather-stripped. Air gaps and rattling shall not be permitted.

TABLE 2. CONSTRUCTION STANDARDS TO ACHIEVE
A NOISE LEVEL REDUCTION (NLR) OF 25 dB

Assembly	Construction
Exterior Walls	If wood construction is used, exterior walls shall be furnished on the outside with siding-on-sheathing, stucco, or brick veneer. The interior surface shall be at least one-half-inch gypsum board. Insulation having a minimum of R-11 shall be placed between the studs.
	Masonry walls, if used, shall have at least one surface of the wall plastered, painted, or covered with gypsum wallboard or approved materials.
	For mobile home construction, the interior surface shall have a minimum density of two psf and the exterior surface should have a minimum density of three psf. At least R-11 insulation shall be placed between the studs.
	There shall be no direct openings such as mail slots or ventilation units.
Glazing	All windows and sliding glass doors shall be well fitted, well weather-stripped assemblies and shall have a minimum STC of 32. Air gaps and rattling shall not be permitted.
	The total area of glass shall not exceed 20 percent of the floor area in any room.
Doors	All exterior doors shall be well weather-stripped solid core assemblies at least 1¾-inch thick.

Roof	Roof sheathing of wood construction shall be well fitted or caulked plywood of at least one-half inch thick. Ceilings shall be well fitted, 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.
	For mobile home construction, the interior surface shall have a minimum density of two psf and the exterior surface shall have a minimum density of three psf. At least R-11 insulation shall be placed between the studs. Skylights shall have a minimum STC of 32.
Floor	For mobile home construction, the skirt shall extend to the ground and shall be of the same construction as the exterior walls. Any access doors or windows shall be tightly fitted and weather-stripped.
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. A forced air circulation system shall be provided which will give a minimum of two complete air changes per hour, of which at least 20 percent is fresh air per requirements of the Uniform Mechanical Code. Any air duct or connection to an outdoor elevation must contain an interior sound absorbent lining which is at least acoustically equivalent to one-inch thick fiberglassed duct liner. The liner shall be five times greater in length than the diameter of the duct. All such ducts shall contain a bend which eliminates the line-of-sight to the outside. All fireplaces shall be provided with a well-fitted damper.
Furnishings	All rooms, when in use, are expected to contain furniture or other materials that absorb sound equivalent to the absorption provided by wall-to-wall carpeting over a conventional pad.

TABLE 3. CONSTRUCTION STANDARDS TO ACHIEVE
A NOISE LEVEL REDUCTION (NLR) OF 30 dB

Assembly	Construction Standards

Exterior Walls	If wood construction is used, exterior walls shall be finished on the outside with siding-on-sheathing, stucco, or brick veneer. The interior surfaces shall be at least one-half inch gypsum board. Insulation having a minimum value of R-11 shall be placed between the studs.
	Masonry walls, if used, shall have at least one surface of the wall plastered, painted, or covered with gypsum wallboard or approved material.
	The surface weight of the wall should be at least 40 psf. For mobile home construction, the interior surface shall have a minimum density of two psf and the exterior surface shall have a minimum density of five psf. At least R-11 insulation shall be placed between the studs.
	There shall be no direct openings such as mail slots or ventilation units.
Glazing	All windows and sliding glass doors shall be well fitted, well weather-stripped assemblies and shall have a minimum STC of 38. Air gaps and rattling shall not be permitted. The total area of glass shall not exceed 20 percent of the floor area within any room.
Doors	All exterior doors shall be well weather-stripped solid core assemblies at least 1¾-inch thick.
Roof	Roof sheathing of wood construction shall be well fitted or caulked plywood at least one-half-inch thick. Ceiling shall be well fitted, well-sealed gypsum board of at least one-half-inch thick. For mobile home construction, the interior surface shall have a minimum density of five psf. At least R-11 insulation shall be placed between the studs. Insulation with at least a rating of R-19 shall be used in the attic space. Skylights shall have a minimum SW of 38.
Floor	The floor of the lowest occupied room shall be concrete slab or shall be well sealed against the noise intrusion. For mobile home construction, the skirt shall extend to the ground and shall be the same construction as the exterior walls. Any access doors or windows shall be tightly fitted and weather-stripped.

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. A forced air circulation system shall be provided which will give a minimum of two complete air changes per hour, of which at least 20 percent is fresh air in accordance with the requirements of the Uniform Mechanical Code. Any air duct or connection to an outdoor elevation must contain an interior sound absorbent lining which is at least acoustically equivalent to one-inch thick fiberglass duct liner. The liner shall be five times greater in length than the diameter of the duct. All such ducts shall contain a bend which eliminates the line-of-sight to the outside. Fireplaces shall not be permitted.
Furnishings	All rooms, when in use, are expected to contain furniture or other materials that absorb sound equivalent to the absorption provided by wall-to-wall carpeting over a conventional pad.

(Code 1972, § 16.22.060; Ord. No. 684, § 1(part), 1987)

Sec. 16.22.070. - Requirements for acoustical analysis reports.

(a) Acoustical analysis reports shall be prepared for all residential projects for approval by the city's planning department. Such reports shall describe the exterior noise environment in detail and, as necessary, propose measures to satisfy both interior and exterior noise level criteria. The acoustical consultant shall uniquely identify each acoustical report by a report number and certify that the report is true and accurate. Each report shall include the following:

(1) A city-issued project identification number (e.g., use permit, site plan, tentative tract, parcel map, etc.);

(2) A street address if one has been assigned;

(3) A vicinity map clearly showing the site for the development;

(4) The conditions of approval applied to the project by the city, in their entirety. (This will notify the consultant if any special modifications were made in the standard conditions of the approval);

(5) A legible plot plan and floor plan at a scale not less than one inch equals 40 feet, folded in an 8½-inch by 11-inch format. The scale is to ensure that distance can be accurately determined and that the exhibit is legible.

(b) The acoustical report shall also state the methodology used for measurement or prediction of motor vehicular noise levels. The procedures in FHWA-RD-77-108, as modified for CNEL, shall be used for traffic noise prediction, with all variables identified and justified where appropriate (e.g., absorptive (soft) or reflective (hard); gradient; stop-and-go conditions; number and width of travel lanes and medians, etc.).

(1) Vehicle speeds, ADTs and traffic mix, per level of service "C," shall be stated and source of information identified.

(2) Equivalent distance, per the FHWA model for calculations of noise impact shall be used.

(3) The centerline of the roadway shall be used for reference distance to observer, structure, etc., not the cente near travel lane for reference.

(4) No credit shall be given for future quieting of motor vehicle noise sources.

(5) CNEL shall be used.

(6) On-site measurement data, if used to validate the predicted noise levels for an acoustical analysis, shall be adjusted to reflect the annualized ADT for the site prior to determination of existing noise impact levels. The dates, times and exact locations of the measurements shall be stated.

(c) Where applicable a detailed barrier analysis shall be submitted with the report, including:

(1) Locations of barriers, usable outdoor living area, etc.;

(2) Worst-case section view of site, including elevations, either scaled or dimensioned;

(3) Barrier geometry (NOTE: Five-foot observer height above datum and source heights per the FHWA model shall be used.);

(4) Discussion of the structural details required to maintain acoustical integrity of the barrier, including treatment of penetrations, gates, etc.

(d) If railroad or aircraft noise affects the site, measurement of noise impact or the method of prediction shall be stated. Where city developed or approved CNEL contour maps are available, their use may be required by the city. If railroad or aircraft noise does not affect the site, so state.

(e) Each report shall further:

(1) Indicate in tabular form the required sound transmission loss of windows, along with typical thickness and configuration, required to satisfy thickness and configuration, required to satisfy city standards for interior noise levels. When specifying windows of greater than 3/16 -inch thickness, list one or more products by manufacturer's name and model number that will satisfy the acoustical requirements.

(2) Include a summary section on colored paper in which specifications and location of all sound attenuating design features or products shall be listed, preferably in a tabular form.

(3) Include worksheets for composite wall analyses including transmission loss assumptions, unless the prescriptive A-weighted insertion losses of 20 dB (windows closed) or 12 dB (windows open) are used.

(4) Specify in text of report which residential structures and units, if any, require closed windows to meet interior noise standards and in such cases, include the following paragraph:

Where windows are required to be openable or kept closed in order to meet the interior noise standards, mechanical ventilation and cooling, if necessary, shall be provided to maintain a habitable environment. The system shall supply two air changes per hour to each habitable room including 20 percent fresh make-up air obtained directly from the outdoors. The fresh air inlet duct shall be of sound attenuating construction and shall consist of a minimum of ten feet plus one sharp 90-degree bend.

(5) State the requirements for maintaining building shell acoustical integrity and enumerate items of a critical nature: e.g., tight-fit chimney damper, exhaust fan backdraft damper, no mail slot, full skirting for mobile home coaches, air-conditioning intake and exhaust ducting, etc. A through-the-wall air-conditioner shall be treated as a separate component when calculating composite wall attenuation values.

(f) The following CNEL data shall be provided as appropriate:

(1) Existing and future CNEL, before mitigation;

(2) Worst case outdoor living area CNEL, before mitigation;

(3) Worst-case CNEL incident upon structure prior to mitigation; and

(4) Worst-case interior CNEL after mitigation by building components and/or exterior barriers.

(Code 1972, § 16.22.070; Ord. No. 684, § 1(part), 1987)

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APPENDIX 5.1:

STUDY AREA PHOTOS

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JN: 13780 Study Area Photos

L1_E
33, 51' 2.270000", 117, 12' 26.410000"

L1_N
33, 51' 2.320000", 117, 12' 26.410000"

L1_S
33, 51' 2.260000", 117, 12' 26.440000"

L1_W
33, 51' 2.270000", 117, 12' 26.470000"

L2_E
33, 50' 56.400000", 117, 12' 15.810000"

L2_N
33, 50' 56.380000", 117, 12' 15.700000"

JN: 13780 Study Area Photos

L2_S
33, 50' 56.420000", 117, 12' 15.780000"

L2_W
33, 50' 56.370000", 117, 12' 15.780000"

L3_E
33, 50' 53.550000", 117, 12' 9.930000"

L3_N
33, 50' 52.950000", 117, 12' 9.990000"

L3_S
33, 50' 53.440000", 117, 12' 9.820000"

L3_W
33, 50' 53.070000", 117, 12' 9.630000"

JN: 13780 Study Area Photos

L4_E
33, 50' 29.320000", 117, 12' 24.570000"

L4_N
33, 50' 29.340000", 117, 12' 24.570000"

L4_S
33, 50' 29.300000", 117, 12' 24.520000"

L4_W
33, 50' 29.270000", 117, 12' 24.540000"

L5_E
33, 50' 39.600000", 117, 12' 42.510000"

L5_N
33, 50' 39.600000", 117, 12' 42.510000"

JN: 13780 Study Area Photos

L5_S
33, 50' 39.590000", 117, 12' 42.510000"

L5_W
33, 50' 39.570000", 117, 12' 42.510000"

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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24-Hour Noise Level Measurement Summary

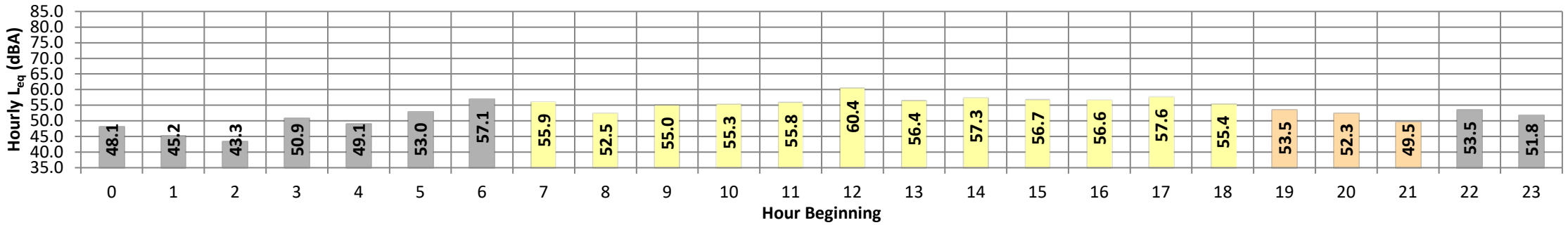
Date: Thursday, March 25, 2021
Project: Stratford Ranch East

Location: L1 - Located north of the Project site on Amaya Drive near existing single-family residential home at 4316 Miraluna Drive.

Meter: Piccolo II

JN: 13780
Analyst: P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	48.1	58.1	41.5	57.7	57.3	54.9	52.4	46.9	44.4	42.3	42.0	41.6	48.1	10.0	58.1
	1	45.2	52.4	40.5	52.2	51.8	50.2	48.6	45.4	43.5	41.5	41.0	40.6	45.2	10.0	55.2
	2	43.3	52.3	39.2	51.7	50.6	47.4	45.9	43.3	41.9	40.0	39.7	39.3	43.3	10.0	53.3
	3	50.9	62.6	42.4	62.1	61.6	58.2	54.7	48.0	45.1	43.2	42.9	42.5	50.9	10.0	60.9
	4	49.1	57.2	45.3	56.9	56.3	54.0	52.0	48.7	47.5	45.9	45.7	45.4	49.1	10.0	59.1
	5	53.0	63.8	46.9	63.5	62.9	60.3	57.3	50.3	49.1	47.6	47.3	47.0	53.0	10.0	63.0
	6	57.1	67.3	50.8	67.0	66.5	64.2	61.2	55.1	53.5	51.8	51.5	51.0	57.1	10.0	67.1
Day	7	55.9	63.6	51.0	63.2	62.7	60.9	59.6	56.2	54.1	52.2	51.8	51.3	55.9	0.0	55.9
	8	52.5	61.2	47.3	60.9	60.5	58.4	56.1	51.9	50.2	48.3	48.0	47.5	52.5	0.0	52.5
	9	55.0	63.2	49.7	63.0	62.4	60.2	58.2	54.6	53.2	51.1	50.6	50.0	55.0	0.0	55.0
	10	55.3	63.4	50.2	63.0	62.4	60.3	58.8	55.3	53.6	51.6	51.1	50.5	55.3	0.0	55.3
	11	55.8	63.8	50.7	63.3	62.7	60.7	59.2	55.7	54.1	52.0	51.6	51.0	55.8	0.0	55.8
	12	60.4	68.0	52.1	67.4	66.8	65.8	65.1	61.6	58.0	53.2	52.8	52.3	60.4	0.0	60.4
	13	56.4	64.4	51.6	64.0	63.2	61.0	59.5	56.6	54.9	52.6	52.3	51.7	56.4	0.0	56.4
	14	57.3	65.2	50.7	64.6	63.9	62.2	61.1	57.8	55.5	52.6	51.8	51.0	57.3	0.0	57.3
	15	56.7	65.3	51.0	64.8	63.9	61.6	60.3	56.6	54.7	52.4	51.9	51.3	56.7	0.0	56.7
	16	56.6	65.3	51.2	65.0	64.5	62.2	60.7	56.2	54.3	52.0	51.7	51.3	56.6	0.0	56.6
	17	57.6	67.4	51.1	66.8	66.1	63.5	61.4	57.0	54.7	52.1	51.7	51.2	57.6	0.0	57.6
	18	55.4	65.3	49.7	64.8	63.9	61.0	58.8	54.8	52.9	50.8	50.4	49.9	55.4	0.0	55.4
Evening	19	53.5	63.7	46.6	63.2	62.4	59.6	57.6	53.0	50.3	47.5	47.2	46.7	53.5	5.0	58.5
	20	52.3	63.5	44.9	62.9	62.2	59.5	56.6	50.2	48.0	45.7	45.4	45.0	52.3	5.0	57.3
	21	49.5	60.2	42.3	59.7	59.0	56.2	54.0	48.0	45.7	43.2	42.8	42.4	49.5	5.0	54.5
Night	22	53.5	67.2	44.1	66.5	65.5	60.0	56.2	48.9	47.1	44.9	44.6	44.2	53.5	10.0	63.5
	23	51.8	61.6	43.7	60.9	60.1	58.8	57.8	48.7	46.4	44.5	44.2	43.8	51.8	10.0	61.8

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	52.5	61.2	47.3	60.9	60.5	58.4	56.1	51.9	50.2	48.3	48.0	47.5
	Max	60.4	68.0	52.1	67.4	66.8	65.8	65.1	61.6	58.0	53.2	52.8	52.3
Energy Average		56.6	Average:		64.2	63.6	61.5	59.9	56.2	54.2	51.7	51.3	50.7
Evening	Min	49.5	60.2	42.3	59.7	59.0	56.2	54.0	48.0	45.7	43.2	42.8	42.4
	Max	53.5	63.7	46.6	63.2	62.4	59.6	57.6	53.0	50.3	47.5	47.2	46.7
Energy Average		52.1	Average:		61.9	61.2	58.4	56.0	50.4	48.0	45.5	45.1	44.7
Night	Min	43.3	52.3	39.2	51.7	50.6	47.4	45.9	43.3	41.9	40.0	39.7	39.3
	Max	57.1	67.3	50.8	67.0	66.5	64.2	61.2	55.1	53.5	51.8	51.5	51.0
Energy Average		51.9	Average:		59.8	59.2	56.4	54.0	48.4	46.5	44.6	44.3	43.9

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
54.9	56.0	51.9

24-Hour CNEL (dBA)

59.4

24-Hour Noise Level Measurement Summary

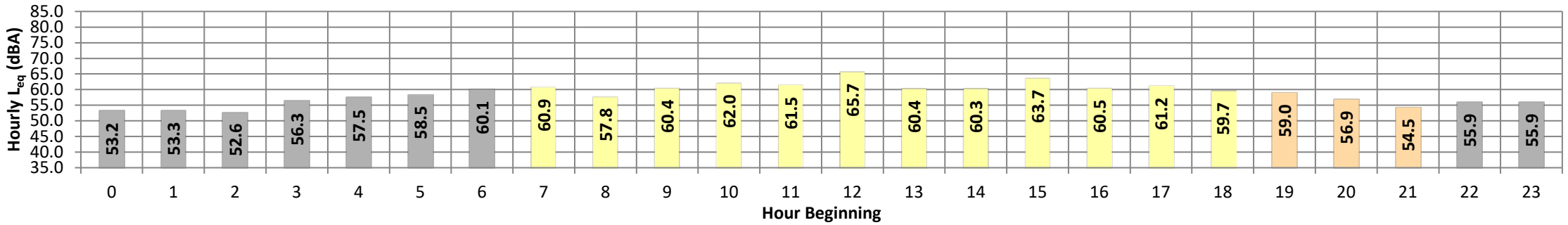
Date: Thursday, March 25, 2021
Project: Stratford Ranch East

Location: L2 - Located by the eastern boundary of the Project site on Lake Perris Drive.

Meter: Piccolo II

JN: 13780
Analyst: P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	53.2	59.5	48.3	59.1	58.5	57.1	56.5	54.2	51.8	49.4	48.9	48.5	53.2	10.0	63.2
	1	53.3	60.4	48.4	59.9	59.4	57.7	56.3	53.8	52.1	49.6	49.0	48.6	53.3	10.0	63.3
	2	52.6	57.6	48.1	57.2	56.8	55.9	55.2	53.6	51.9	49.1	48.7	48.2	52.6	10.0	62.6
	3	56.3	62.6	51.5	62.3	61.9	60.6	60.0	56.7	54.9	52.5	52.1	51.7	56.3	10.0	66.3
	4	57.5	61.7	54.3	61.4	61.0	60.0	59.5	58.2	57.0	55.2	54.9	54.4	57.5	10.0	67.5
	5	58.5	63.5	54.9	63.1	62.7	61.6	60.9	59.2	57.9	55.9	55.5	55.1	58.5	10.0	68.5
	6	60.1	68.1	55.6	67.6	66.8	64.5	63.2	60.2	58.6	56.4	56.2	55.8	60.1	10.0	70.1
Day	7	60.9	69.2	56.5	68.7	67.9	65.8	64.4	60.8	58.7	57.2	56.9	56.6	60.9	0.0	60.9
	8	57.8	65.7	53.5	65.1	64.4	62.1	60.7	58.0	56.2	54.3	54.0	53.6	57.8	0.0	57.8
	9	60.4	68.5	55.3	68.0	67.1	64.8	63.5	60.8	58.8	56.5	56.1	55.5	60.4	0.0	60.4
	10	62.0	69.2	57.3	68.5	67.7	65.8	64.8	62.5	61.0	58.7	58.2	57.6	62.0	0.0	62.0
	11	61.5	69.7	55.9	69.1	68.2	66.1	64.8	61.8	59.9	57.2	56.7	56.1	61.5	0.0	61.5
	12	65.7	74.7	55.2	74.1	73.0	71.5	70.7	67.4	59.9	56.4	55.9	55.4	65.7	0.0	65.7
	13	60.4	68.4	54.0	67.8	67.1	65.5	64.4	61.0	58.3	55.2	54.7	54.2	60.4	0.0	60.4
	14	60.3	69.6	54.3	68.9	67.9	65.8	64.4	60.2	57.9	55.5	54.9	54.4	60.3	0.0	60.3
	15	63.7	73.9	55.6	73.3	72.9	71.4	69.2	61.1	58.3	56.4	56.1	55.7	63.7	0.0	63.7
	16	60.5	68.4	55.9	67.9	67.1	65.1	63.8	60.4	58.9	56.8	56.5	56.0	60.5	0.0	60.5
	17	61.2	68.8	56.3	68.3	67.6	65.9	64.7	61.7	59.7	57.3	56.9	56.4	61.2	0.0	61.2
	18	59.7	67.4	55.3	66.9	66.1	63.9	62.6	59.9	58.4	56.3	55.9	55.4	59.7	0.0	59.7
Evening	19	59.0	66.2	54.5	65.7	65.0	63.0	62.1	59.7	57.6	55.4	55.1	54.7	59.0	5.0	64.0
	20	56.9	64.2	52.8	63.7	62.9	61.0	59.9	57.2	55.6	53.7	53.4	53.0	56.9	5.0	61.9
	21	54.5	61.9	49.7	61.5	60.9	59.1	58.0	54.8	52.9	50.7	50.2	49.8	54.5	5.0	59.5
Night	22	55.9	63.3	51.7	62.8	62.0	59.8	58.5	56.3	54.8	52.7	52.3	51.8	55.9	10.0	65.9
	23	55.9	62.7	51.5	62.4	61.9	60.3	59.0	56.2	54.7	52.5	52.1	51.7	55.9	10.0	65.9

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	57.8	65.7	53.5	65.1	64.4	62.1	60.7	58.0	56.2	54.3	54.0	53.6
	Max	65.7	74.7	57.3	74.1	73.0	71.5	70.7	67.4	61.0	58.7	58.2	57.6
Energy Average		61.6	Average:		68.9	68.1	66.1	64.8	61.3	58.8	56.5	56.1	55.6
Evening	Min	54.5	61.9	49.7	61.5	60.9	59.1	58.0	54.8	52.9	50.7	50.2	49.8
	Max	59.0	66.2	54.5	65.7	65.0	63.0	62.1	59.7	57.6	55.4	55.1	54.7
Energy Average		57.2	Average:		63.6	62.9	61.1	60.0	57.2	55.4	53.3	52.9	52.5
Night	Min	52.6	57.6	48.1	57.2	56.8	55.9	55.2	53.6	51.8	49.1	48.7	48.2
	Max	60.1	68.1	55.6	67.6	66.8	64.5	63.2	60.2	58.6	56.4	56.2	55.8
Energy Average		56.6	Average:		61.8	61.2	59.7	58.8	56.5	54.8	52.6	52.2	51.7

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
59.8	61.0	56.6

24-Hour CNEL (dBA)
64.2

24-Hour Noise Level Measurement Summary

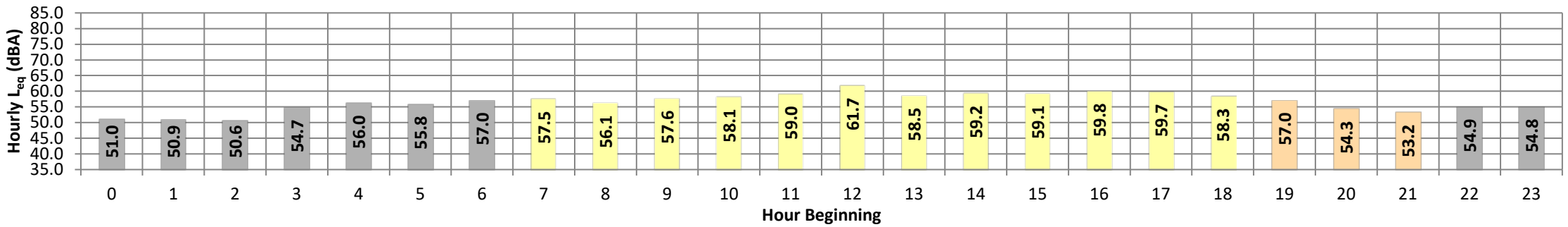
Date: Thursday, March 25, 2021
Project: Stratford Ranch East

Location: L3 - Located east of the Project site by the Perris Auto Speedway at 18700 Lake Perris Drive.

Meter: Piccolo II

JN: 13780
Analyst: P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	51.0	56.7	45.8	56.3	55.9	55.1	54.5	52.0	49.8	47.0	46.5	46.0	51.0	10.0	61.0
	1	50.9	56.6	46.2	56.2	55.8	54.9	54.2	51.8	49.7	47.2	46.8	46.4	50.9	10.0	60.9
	2	50.6	55.7	45.5	55.4	55.1	54.5	53.9	51.7	49.6	46.6	46.0	45.6	50.6	10.0	60.6
	3	54.7	60.5	49.6	60.2	59.8	58.9	58.2	55.4	53.6	50.8	50.3	49.8	54.7	10.0	64.7
	4	56.0	59.7	52.0	59.5	59.3	58.8	58.4	57.0	55.7	53.1	52.6	52.1	56.0	10.0	66.0
	5	55.8	59.8	52.1	59.6	59.3	58.5	58.1	56.7	55.3	53.0	52.6	52.2	55.8	10.0	65.8
	6	57.0	60.8	53.2	60.4	60.2	59.7	59.3	58.0	56.5	54.2	53.8	53.4	57.0	10.0	67.0
Day	7	57.5	61.2	54.3	61.0	60.7	60.1	59.7	58.3	56.9	55.1	54.7	54.4	57.5	0.0	57.5
	8	56.1	60.3	52.3	60.0	59.7	58.9	58.4	57.0	55.8	53.3	52.9	52.4	56.1	0.0	56.1
	9	57.6	63.2	53.5	62.6	61.9	61.0	60.5	58.3	56.9	54.5	54.1	53.7	57.6	0.0	57.6
	10	58.1	62.7	54.3	62.3	61.9	60.9	60.4	58.9	57.6	55.3	54.9	54.4	58.1	0.0	58.1
	11	59.0	65.7	54.0	64.7	64.2	62.7	62.0	59.7	57.9	55.3	54.7	54.2	59.0	0.0	59.0
	12	61.7	69.9	54.3	69.4	69.2	67.4	65.9	61.8	59.7	55.5	55.0	54.4	61.7	0.0	61.7
	13	58.5	63.8	54.0	63.2	62.6	61.5	60.9	59.4	58.0	55.2	54.7	54.1	58.5	0.0	58.5
	14	59.2	65.2	55.0	64.5	64.0	63.0	62.0	59.9	58.4	56.0	55.6	55.1	59.2	0.0	59.2
	15	59.1	63.4	55.8	63.1	62.6	61.5	61.1	59.8	58.7	56.8	56.4	55.9	59.1	0.0	59.1
	16	59.8	65.7	55.9	65.4	64.8	63.0	62.5	60.2	59.0	56.8	56.5	56.0	59.8	0.0	59.8
	17	59.7	64.4	55.8	64.1	63.7	62.8	62.3	60.6	59.0	56.7	56.3	55.9	59.7	0.0	59.7
	18	58.3	62.2	54.6	61.9	61.6	60.9	60.4	59.1	58.0	55.6	55.2	54.7	58.3	0.0	58.3
Evening	19	57.0	61.7	52.9	61.4	61.0	60.2	59.7	57.9	56.3	53.8	53.4	53.0	57.0	5.0	62.0
	20	54.3	58.9	50.7	58.5	58.1	57.4	56.9	55.1	53.7	51.6	51.3	50.9	54.3	5.0	59.3
	21	53.2	58.1	48.9	57.8	57.5	56.6	56.0	54.0	52.4	49.9	49.4	49.0	53.2	5.0	58.2
Night	22	54.9	59.9	50.6	59.5	59.1	58.1	57.5	55.8	54.3	51.8	51.2	50.7	54.9	10.0	64.9
	23	54.8	59.2	50.9	58.9	58.5	57.8	57.3	55.8	54.3	51.9	51.5	51.0	54.8	10.0	64.8

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	56.1	60.3	52.3	60.0	59.7	58.9	58.4	57.0	55.8	53.3	52.9	52.4
	Max	61.7	69.9	55.9	69.4	69.2	67.4	65.9	61.8	59.7	56.8	56.5	56.0
Energy Average		58.9	Average:		63.5	63.1	62.0	61.3	59.4	58.0	55.5	55.1	54.6
Evening	Min	53.2	58.1	48.9	57.8	57.5	56.6	56.0	54.0	52.4	49.9	49.4	49.0
	Max	57.0	61.7	52.9	61.4	61.0	60.2	59.7	57.9	56.3	53.8	53.4	53.0
Energy Average		55.1	Average:		59.2	58.9	58.1	57.5	55.7	54.1	51.7	51.4	51.0
Night	Min	50.6	55.7	45.5	55.4	55.1	54.5	53.9	51.7	49.6	46.6	46.0	45.6
	Max	57.0	60.8	53.2	60.4	60.2	59.7	59.3	58.0	56.5	54.2	53.8	53.4
Energy Average		54.5	Average:		58.4	58.1	57.4	56.8	54.9	53.2	50.6	50.1	49.7

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
57.3	58.4	54.5

24-Hour CNEL (dBA)
62.0

24-Hour Noise Level Measurement Summary

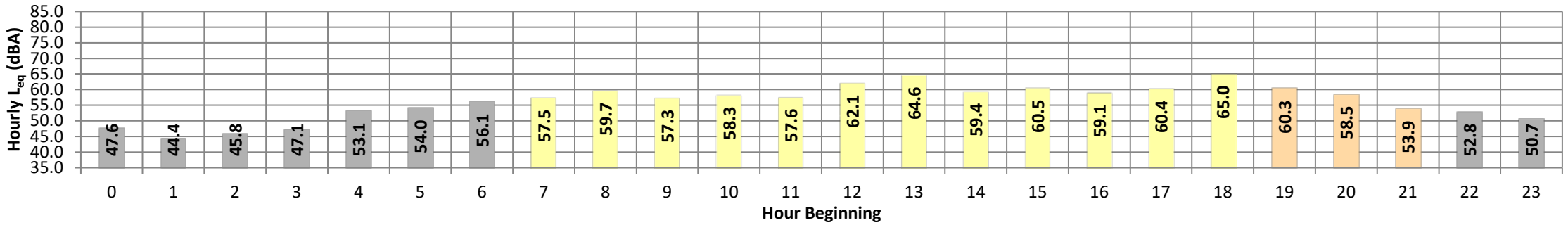
Date: Thursday, March 25, 2021
Project: Stratford Ranch East

Location: L4 - Located south of the Project site on Cameron Glen Road near existing single-family residential home at 3847 Cameron Glen Road.

Meter: Piccolo II

JN: 13780
Analyst: P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	47.6	58.1	38.5	57.7	57.1	54.6	52.0	46.6	43.1	39.5	39.0	38.6	47.6	10.0	57.6
	1	44.4	51.3	39.7	50.9	50.4	49.4	48.8	44.7	42.5	40.4	40.1	39.8	44.4	10.0	54.4
	2	45.8	57.6	38.0	57.2	56.4	52.8	49.7	43.7	40.5	38.6	38.4	38.1	45.8	10.0	55.8
	3	47.1	56.0	41.7	55.7	55.1	52.9	50.8	46.9	44.5	42.4	42.1	41.8	47.1	10.0	57.1
	4	53.1	65.0	44.0	64.5	63.7	60.5	57.2	50.5	47.7	44.8	44.5	44.1	53.1	10.0	63.1
	5	54.0	64.0	44.9	63.5	62.8	60.5	58.8	53.7	49.5	45.8	45.4	45.0	54.0	10.0	64.0
	6	56.1	66.6	46.3	66.1	65.3	62.7	61.2	54.3	51.0	47.4	46.9	46.4	56.1	10.0	66.1
Day	7	57.5	68.0	49.5	67.6	67.0	64.1	61.7	55.9	53.5	50.3	49.9	49.6	57.5	0.0	57.5
	8	59.7	73.1	45.8	72.6	71.4	67.4	63.2	54.6	51.0	47.3	46.6	46.0	59.7	0.0	59.7
	9	57.3	68.9	46.9	68.6	67.8	65.1	62.4	54.6	51.3	48.2	47.7	47.1	57.3	0.0	57.3
	10	58.3	67.3	49.7	66.8	66.2	64.4	62.9	58.4	55.1	51.2	50.7	50.0	58.3	0.0	58.3
	11	57.6	66.9	50.0	66.5	65.9	63.1	61.4	57.9	54.7	51.6	51.0	50.3	57.6	0.0	57.6
	12	62.1	69.9	49.7	69.4	68.8	67.7	66.9	64.3	55.2	51.3	50.7	49.9	62.1	0.0	62.1
	13	64.6	77.6	51.2	76.8	75.6	73.4	69.3	59.0	55.8	52.6	52.0	51.4	64.6	0.0	64.6
	14	59.4	68.4	50.6	67.8	67.0	65.1	63.3	60.0	56.5	52.4	51.7	50.9	59.4	0.0	59.4
	15	60.5	71.7	51.8	71.3	70.7	67.4	64.3	58.7	56.6	53.4	52.8	52.1	60.5	0.0	60.5
	16	59.1	67.3	52.4	66.8	66.2	64.2	62.7	59.2	57.1	54.2	53.5	52.7	59.1	0.0	59.1
	17	60.4	68.7	51.9	68.1	67.5	66.0	64.9	61.2	57.4	53.6	52.9	52.1	60.4	0.0	60.4
	18	65.0	76.8	50.9	76.2	75.5	73.0	70.7	62.1	57.1	52.4	51.8	51.1	65.0	0.0	65.0
Evening	19	60.3	71.7	49.0	71.4	71.0	68.2	65.5	58.0	53.9	50.4	49.7	49.2	60.3	5.0	65.3
	20	58.5	70.3	46.9	69.8	68.9	66.1	64.1	55.1	51.7	48.2	47.5	47.0	58.5	5.0	63.5
	21	53.9	64.6	43.5	64.3	63.7	61.2	58.8	52.0	49.0	45.1	44.5	43.7	53.9	5.0	58.9
Night	22	52.8	63.4	43.9	63.0	62.5	59.7	57.4	51.6	48.3	44.9	44.4	44.0	52.8	10.0	62.8
	23	50.7	60.5	44.8	60.2	59.5	56.7	54.3	50.0	47.8	45.5	45.2	44.9	50.7	10.0	60.7

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	57.3	66.9	45.8	66.5	65.9	63.1	61.4	54.6	51.0	47.3	46.6	46.0
	Max	65.0	77.6	52.4	76.8	75.6	73.4	70.7	64.3	57.4	54.2	53.5	52.7
Energy Average		60.9	Average:		69.9	69.1	66.7	64.5	58.8	55.1	51.5	50.9	50.3
Evening	Min	53.9	64.6	43.5	64.3	63.7	61.2	58.8	52.0	49.0	45.1	44.5	43.7
	Max	60.3	71.7	49.0	71.4	71.0	68.2	65.5	58.0	53.9	50.4	49.7	49.2
Energy Average		58.3	Average:		68.5	67.8	65.2	62.8	55.0	51.5	47.9	47.2	46.6
Night	Min	44.4	51.3	38.0	50.9	50.4	49.4	48.8	43.7	40.5	38.6	38.4	38.1
	Max	56.1	66.6	46.3	66.1	65.3	62.7	61.2	54.3	51.0	47.4	46.9	46.4
Energy Average		51.7	Average:		59.9	59.2	56.6	54.5	49.1	46.1	43.3	42.9	42.5

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
58.8	60.5	51.7

24-Hour CNEL (dBA)
61.6

24-Hour Noise Level Measurement Summary

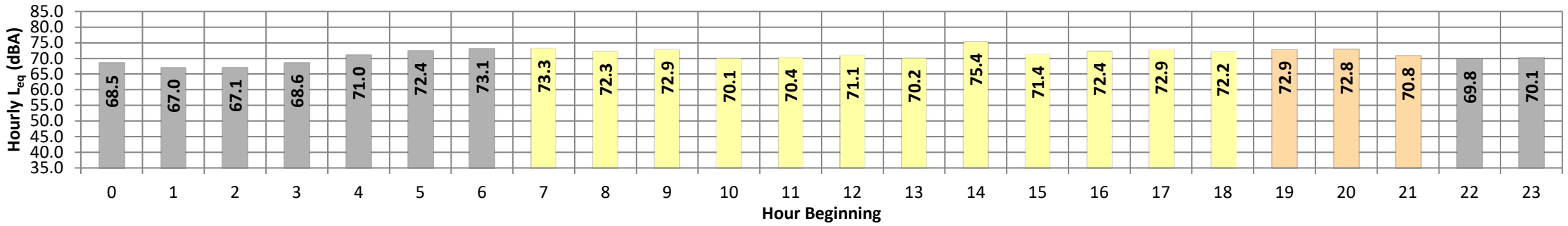
Date: Thursday, March 25, 2021
Project: Stratford Ranch East

Location: L5 - Located southwest of the Project site on Ramona Expressway and Akina Avenue near existing single-family residential home at 3896 Akina Avenue.

Meter: Piccolo II

JN: 13780
Analyst: P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	68.5	78.1	48.8	77.7	77.1	75.2	73.6	69.1	63.7	52.0	50.5	49.1	68.5	10.0	78.5
	1	67.0	77.2	47.8	76.9	76.4	74.4	72.4	66.8	60.3	50.3	49.0	48.0	67.0	10.0	77.0
	2	67.1	77.6	48.3	77.2	76.8	74.4	72.4	66.5	60.7	50.7	49.5	48.5	67.1	10.0	77.1
	3	68.6	77.5	53.6	77.2	76.8	75.0	73.6	69.1	65.1	56.8	55.0	53.8	68.6	10.0	78.6
	4	71.0	78.7	56.7	78.4	78.0	76.4	75.4	72.1	68.8	60.9	58.7	57.0	71.0	10.0	81.0
	5	72.4	81.6	60.4	81.1	80.6	78.1	76.4	73.0	69.8	63.8	62.0	60.6	72.4	10.0	82.4
	6	73.1	81.0	61.8	80.7	80.3	78.6	77.4	74.2	70.8	64.5	63.2	62.0	73.1	10.0	83.1
Day	7	73.3	81.5	59.7	81.1	80.7	79.1	77.9	74.1	70.6	63.8	61.9	60.0	73.3	0.0	73.3
	8	72.3	80.1	58.8	79.8	79.4	77.9	76.8	73.4	69.9	62.3	60.4	59.1	72.3	0.0	72.3
	9	72.9	82.6	56.5	82.0	81.5	79.7	78.5	72.6	68.1	59.9	58.4	56.8	72.9	0.0	72.9
	10	70.1	78.3	55.4	77.9	77.3	75.8	74.7	71.3	67.3	59.3	57.8	55.9	70.1	0.0	70.1
	11	70.4	78.9	55.3	78.5	78.1	76.3	75.1	71.5	67.4	59.1	57.1	55.6	70.4	0.0	70.4
	12	71.1	79.8	55.1	79.4	79.0	77.1	75.7	72.2	67.7	59.0	57.1	55.3	71.1	0.0	71.1
	13	70.2	79.1	57.0	78.6	77.9	75.5	74.3	71.2	67.9	60.3	58.7	57.3	70.2	0.0	70.2
	14	75.4	88.6	58.2	88.1	87.3	82.8	78.0	71.6	68.5	61.8	60.1	58.6	75.4	0.0	75.4
	15	71.4	81.0	58.4	80.4	79.7	76.9	75.1	72.1	69.1	61.7	60.1	58.7	71.4	0.0	71.4
	16	72.4	82.3	59.3	81.6	80.6	78.3	76.3	72.9	70.1	62.8	60.8	59.5	72.4	0.0	72.4
	17	72.9	81.9	60.2	81.5	81.1	78.8	77.0	73.5	70.5	63.2	61.7	60.4	72.9	0.0	72.9
	18	72.2	79.2	59.2	78.8	78.3	76.8	76.1	73.6	70.6	62.8	61.0	59.5	72.2	0.0	72.2
Evening	19	72.9	82.3	58.5	81.8	81.0	78.7	77.4	73.7	69.9	62.1	60.4	58.7	72.9	5.0	77.9
	20	72.8	82.9	56.0	82.2	81.5	79.5	77.7	73.1	69.4	60.2	58.1	56.3	72.8	5.0	77.8
	21	70.8	79.6	54.6	79.2	78.7	76.8	75.5	71.7	67.6	58.3	56.2	54.9	70.8	5.0	75.8
Night	22	69.8	78.6	52.7	78.1	77.5	75.5	74.5	71.0	66.6	56.4	54.5	52.9	69.8	10.0	79.8
	23	70.1	80.7	52.2	80.3	79.5	76.4	74.4	70.3	65.8	55.6	54.0	52.5	70.1	10.0	80.1

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	70.1	78.3	55.1	77.9	77.3	75.5	74.3	71.2	67.3	59.0	57.1	55.3
	Max	75.4	88.6	60.2	88.1	87.3	82.8	78.5	74.1	70.6	63.8	61.9	60.4
Energy Average		72.3	Average:		80.7	80.1	77.9	76.3	72.5	69.0	61.3	59.6	58.1
Evening	Min	70.8	79.6	54.6	79.2	78.7	76.8	75.5	71.7	67.6	58.3	56.2	54.9
	Max	72.9	82.9	58.5	82.2	81.5	79.5	77.7	73.7	69.9	62.1	60.4	58.7
Energy Average		72.3	Average:		81.1	80.4	78.3	76.8	72.8	69.0	60.2	58.3	56.7
Night	Min	67.0	77.2	47.8	76.9	76.4	74.4	72.4	66.5	60.3	50.3	49.0	48.0
	Max	73.1	81.6	61.8	81.1	80.6	78.6	77.4	74.2	70.8	64.5	63.2	62.0
Energy Average		70.2	Average:		78.6	78.1	76.0	74.4	70.2	65.7	56.8	55.2	53.8

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
71.6	72.3	70.2

24-Hour CNEL (dBA)
77.4

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APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE CONTOURS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing | Project Name: Stratford Ranch East
Road Name: Redlands Av. | Job Number: 13780
Road Segment: s/o Ramona Exwy.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,720 vehicles
Peak Hour Percentage:	8.08%
Peak Hour Volume:	139 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	56 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	47.0 feet
Centerline Dist. to Observer:	47.0 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:	38.079
Medium Trucks:	37.846
Heavy Trucks:	37.869

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-10.01	1.67	-1.20	-4.63	0.000	0.000
Medium Trucks:	77.72	-27.25	1.71	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-31.20	1.71	-1.20	-5.46	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.0	56.0	54.2	48.2	56.8	57.4
Medium Trucks:	51.0	50.4	44.0	42.5	51.0	51.2
Heavy Trucks:	52.3	51.8	42.8	44.0	52.4	52.5
Vehicle Noise:	59.0	58.2	54.9	50.4	58.9	59.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	9	18	40	85
CNEL:	9	20	42	92

Thursday, May 6, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing | Project Name: Stratford Ranch East
Road Name: Evans Rd. | Job Number: 13780
Road Segment: s/o Ramona Exwy.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,069 vehicles
Peak Hour Percentage:	8.08%
Peak Hour Volume:	1,541 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	80 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	50.210
Medium Trucks:	50.033
Heavy Trucks:	50.050

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.07	-0.13	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-17.31	-0.11	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-21.27	-0.11	-1.20	-5.31	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.1	66.1	64.3	58.3	66.9	67.5
Medium Trucks:	60.8	60.2	53.9	52.3	60.8	61.0
Heavy Trucks:	61.7	61.2	52.1	53.4	61.7	61.9
Vehicle Noise:	68.9	68.1	64.9	60.3	68.8	69.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	53	115	247	532
CNEL:	57	123	265	571

Thursday, May 6, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing | Project Name: Stratford Ranch East
Road Name: Evans Rd. | Job Number: 13780
Road Segment: n/o Street A

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,664 vehicles
Peak Hour Percentage:	8.08%
Peak Hour Volume:	2,074 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	80 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	50.210
Medium Trucks:	50.033
Heavy Trucks:	50.050

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.22	-0.13	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-16.02	-0.11	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-19.98	-0.11	-1.20	-5.31	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	67.4	65.6	59.6	68.2	68.8
Medium Trucks:	62.1	61.5	55.2	53.6	62.1	62.3
Heavy Trucks:	63.0	62.5	53.4	54.7	63.0	63.2
Vehicle Noise:	70.2	69.4	66.2	61.5	70.1	70.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	65	140	301	649
CNEL:	70	150	323	696

Thursday, May 6, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing | Project Name: Stratford Ranch East
Road Name: Ramona Exwy. | Job Number: 13780
Road Segment: w/o Redlands Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	32,445 vehicles
Peak Hour Percentage:	8.08%
Peak Hour Volume:	2,622 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	102 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	92.0 feet
Centerline Dist. to Observer:	92.0 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:	76.733
Medium Trucks:	76.618
Heavy Trucks:	76.629

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.36	-2.89	-1.20	-4.76	0.000	0.000
Medium Trucks:	82.40	-15.88	-2.88	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-19.83	-2.88	-1.20	-5.18	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:	69.1	68.1	66.3	60.3	68.9	69.5
Medium Trucks:	62.4	61.9	55.5	54.0	62.4	62.6
Heavy Trucks:	62.5	62.0	52.9	54.2	62.6	62.7
Vehicle Noise:	70.6	69.8	66.8	62.0	70.5	71.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	100	215	462	996
CNEL:	107	231	497	1,072

Thursday, May 6, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Ramona Exwy.
Road Segment: w/o Evans Rd.
Project Name: Stratford Ranch East
Job Number: 13780

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,395	vehicles
Peak Hour Percentage:	8.08%	
Peak Hour Volume:	3,022	vehicles
Vehicle Speed:	55	mph
Near/Far Lane Distance:	102	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	92.0	feet
Centerline Dist. to Observer:	92.0	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:	76.733
Medium Trucks:	76.618
Heavy Trucks:	76.629

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	1.98	-2.89	-1.20	*-4.76*	0.000	0.000
Medium Trucks:	82.40	-15.26	-2.88	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-19.21	-2.88	-1.20	*-5.18*	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	68.7	66.9	60.9	69.5	70.1
Medium Trucks:	63.1	62.5	56.1	54.6	63.0	63.3
Heavy Trucks:	63.1	62.6	53.6	54.8	63.2	63.3
Vehicle Noise:	71.2	70.4	67.5	62.6	71.1	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	110	236	508	1,095
CNEL:	118	254	547	1,178

Thursday, May 6, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + P
Road Name: Redlands Av.
Road Segment: s/o Ramona Exwy.
Project Name: Stratford Ranch East
Job Number: 13780

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,720	vehicles
Peak Hour Percentage:	8.08%	
Peak Hour Volume:	139	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	56	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	47.0	feet
Centerline Dist. to Observer:	47.0	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:	38.079
Medium Trucks:	37.846
Heavy Trucks:	37.869

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-10.01	1.67	-1.20	*-4.63*	0.000	0.000
Medium Trucks:	77.72	-27.25	1.71	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-31.20	1.71	-1.20	*-5.46*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	57.0	56.0	54.2	48.2	56.8	57.4
Medium Trucks:	51.0	50.4	44.0	42.5	51.0	51.2
Heavy Trucks:	52.3	51.8	42.8	44.0	52.4	52.5
Vehicle Noise:	59.0	58.2	54.9	50.4	58.9	59.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	9	18	40	85
CNEL:	9	20	42	92

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Ramona Exwy.
Road Segment: e/o Evans Rd.
Project Name: Stratford Ranch East
Job Number: 13780

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,899	vehicles
Peak Hour Percentage:	8.08%	
Peak Hour Volume:	2,093	vehicles
Vehicle Speed:	55	mph
Near/Far Lane Distance:	102	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	92.0	feet
Centerline Dist. to Observer:	92.0	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:	76.733
Medium Trucks:	76.618
Heavy Trucks:	76.629

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	0.38	-2.89	-1.20	*-4.76*	0.000	0.000
Medium Trucks:	82.40	-16.85	-2.88	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-20.81	-2.88	-1.20	*-5.18*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.1	67.1	65.3	59.3	67.9	68.5
Medium Trucks:	61.5	60.9	54.5	53.0	61.4	61.7
Heavy Trucks:	61.5	61.0	52.0	53.2	61.6	61.7
Vehicle Noise:	69.7	68.8	65.9	61.0	69.5	70.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	86	185	398	857
CNEL:	92	199	428	922

Thursday, May 6, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + P
Road Name: Evans Rd.
Road Segment: n/o Street A
Project Name: Stratford Ranch East
Job Number: 13780

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,036	vehicles
Peak Hour Percentage:	8.08%	
Peak Hour Volume:	2,104	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	80	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	64.0	feet
Centerline Dist. to Observer:	64.0	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:	50.210
Medium Trucks:	50.033
Heavy Trucks:	50.050

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	1.28	-0.13	-1.20	*-4.70*	0.000	0.000
Medium Trucks:	79.45	-15.96	-0.11	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-19.92	-0.11	-1.20	*-5.31*	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	67.4	65.7	59.6	68.2	68.8
Medium Trucks:	62.2	61.6	55.2	53.7	62.2	62.4
Heavy Trucks:	63.0	62.5	53.5	54.7	63.1	63.2
Vehicle Noise:	70.3	69.4	66.3	61.6	70.1	70.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	65	141	304	655
CNEL:	70	151	326	702

Thursday, May 6, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + P
Road Name: Evans Rd.
Road Segment: s/o Ramona Exwy.

Project Name: Stratford Ranch East
Job Number: 13780

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,441 vehicles
Peak Hour Percentage:	8.08%
Peak Hour Volume:	1,571 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	80 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	50.210
Medium Trucks:	50.033
Heavy Trucks:	50.050

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	0.01	-0.13	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-17.23	-0.11	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-21.18	-0.11	-1.20	-5.31	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.1	66.2	64.4	58.3	67.0	67.6
Medium Trucks:	60.9	60.3	54.0	52.4	60.9	61.1
Heavy Trucks:	61.8	61.3	52.2	53.5	61.8	62.0
Vehicle Noise:	69.0	68.2	65.0	60.3	68.9	69.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	54	116	250	539
CNEL:	58	125	268	578

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + P
Road Name: Ramona Exwy.
Road Segment: w/o Evans Rd.

Project Name: Stratford Ranch East
Job Number: 13780

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,233 vehicles
Peak Hour Percentage:	8.08%
Peak Hour Volume:	3,089 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	102 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	92.0 feet
Centerline Dist. to Observer:	92.0 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:	76.733
Medium Trucks:	76.618
Heavy Trucks:	76.629

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	2.08	-2.89	-1.20	-4.76	0.000	0.000
Medium Trucks:	82.40	-15.16	-2.88	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-19.12	-2.88	-1.20	-5.18	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:	69.8	68.8	67.0	61.0	69.6	70.2
Medium Trucks:	63.2	62.6	56.2	54.7	63.1	63.4
Heavy Trucks:	63.2	62.7	53.7	54.9	63.3	63.4
Vehicle Noise:	71.3	70.5	67.6	62.7	71.2	71.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	111	239	516	1,112
CNEL:	120	258	555	1,196

Thursday, May 6, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + P
Road Name: Ramona Exwy.
Road Segment: w/o Redlands Av.

Project Name: Stratford Ranch East
Job Number: 13780

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,283 vehicles
Peak Hour Percentage:	8.08%
Peak Hour Volume:	2,689 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	102 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	92.0 feet
Centerline Dist. to Observer:	92.0 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:	76.733
Medium Trucks:	76.618
Heavy Trucks:	76.629

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.47	-2.89	-1.20	-4.76	0.000	0.000
Medium Trucks:	82.40	-15.76	-2.88	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-19.72	-2.88	-1.20	-5.18	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:	69.2	68.2	66.4	60.4	69.0	69.6
Medium Trucks:	62.6	62.0	55.6	54.1	62.5	62.8
Heavy Trucks:	62.6	62.1	53.1	54.3	62.7	62.8
Vehicle Noise:	70.7	69.9	66.9	62.1	70.6	71.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	101	218	470	1,013
CNEL:	109	235	506	1,090

Thursday, May 6, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E + P
Road Name: Ramona Exwy.
Road Segment: e/o Evans Rd.

Project Name: Stratford Ranch East
Job Number: 13780

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,179 vehicles
Peak Hour Percentage:	8.08%
Peak Hour Volume:	2,115 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	102 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	92.0 feet
Centerline Dist. to Observer:	92.0 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:	76.733
Medium Trucks:	76.618
Heavy Trucks:	76.629

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	0.43	-2.89	-1.20	-4.76	0.000	0.000
Medium Trucks:	82.40	-16.81	-2.88	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-20.76	-2.88	-1.20	-5.18	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.1	67.1	65.4	59.3	67.9	68.6
Medium Trucks:	61.5	60.9	54.6	53.0	61.5	61.7
Heavy Trucks:	61.5	61.1	52.0	53.3	61.6	61.7
Vehicle Noise:	69.7	68.9	65.9	61.0	69.6	70.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	86	186	401	864
CNEL:	93	200	431	929

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC | Project Name: Stratford Ranch East
Road Name: Redlands Av. | Job Number: 13780
Road Segment: s/o Ramona Exwy.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,540 vehicles
Peak Hour Percentage:	8.08%
Peak Hour Volume:	448 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	56 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	47.0 feet
Centerline Dist. to Observer:	47.0 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:	38.079
Medium Trucks:	37.846
Heavy Trucks:	37.869

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-4.93	1.67	-1.20	-4.63	0.000	0.000
Medium Trucks:	77.72	-22.17	1.71	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-26.12	1.71	-1.20	-5.46	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.1	61.1	59.3	53.3	61.9	62.5
Medium Trucks:	56.1	55.5	49.1	47.6	56.0	56.3
Heavy Trucks:	57.4	56.9	47.8	49.1	57.4	57.6
Vehicle Noise:	64.1	63.3	60.0	55.4	64.0	64.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	19	40	87	186
CNEL:	20	43	93	200

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC | Project Name: Stratford Ranch East
Road Name: Evans Rd. | Job Number: 13780
Road Segment: s/o Ramona Exwy.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	48,459 vehicles
Peak Hour Percentage:	8.08%
Peak Hour Volume:	3,915 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	80 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	50.210
Medium Trucks:	50.033
Heavy Trucks:	50.050

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.98	-0.13	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-13.26	-0.11	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-17.22	-0.11	-1.20	-5.31	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:	71.1	70.1	68.4	62.3	70.9	71.5
Medium Trucks:	64.9	64.3	57.9	56.4	64.9	65.1
Heavy Trucks:	65.7	65.2	56.2	57.4	65.8	65.9
Vehicle Noise:	72.9	72.1	69.0	64.3	72.8	73.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	99	213	460	991
CNEL:	106	229	493	1,063

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC | Project Name: Stratford Ranch East
Road Name: Evans Rd. | Job Number: 13780
Road Segment: n/o Street A

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	41,436 vehicles
Peak Hour Percentage:	8.08%
Peak Hour Volume:	3,348 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	80 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	64.0 feet
Centerline Dist. to Observer:	64.0 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:	50.210
Medium Trucks:	50.033
Heavy Trucks:	50.050

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.30	-0.13	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-13.94	-0.11	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-17.90	-0.11	-1.20	-5.31	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:	70.4	69.5	67.7	61.6	70.3	70.9
Medium Trucks:	64.2	63.6	57.3	55.7	64.2	64.4
Heavy Trucks:	65.0	64.5	55.5	56.8	65.1	65.2
Vehicle Noise:	72.3	71.5	68.3	63.6	72.2	72.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	89	192	414	893
CNEL:	96	206	444	957

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC | Project Name: Stratford Ranch East
Road Name: Ramona Exwy. | Job Number: 13780
Road Segment: w/o Redlands Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	84,487 vehicles
Peak Hour Percentage:	8.08%
Peak Hour Volume:	6,827 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	102 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	92.0 feet
Centerline Dist. to Observer:	92.0 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:	76.733
Medium Trucks:	76.618
Heavy Trucks:	76.629

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	5.52	-2.89	-1.20	-4.76	0.000	0.000
Medium Trucks:	82.40	-11.72	-2.88	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-15.67	-2.88	-1.20	-5.18	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.2	72.2	70.5	64.4	73.0	73.6
Medium Trucks:	66.6	66.0	59.7	58.1	66.6	66.8
Heavy Trucks:	66.6	66.1	57.1	58.4	66.7	66.8
Vehicle Noise:	74.8	74.0	71.0	66.1	74.7	75.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	189	406	875	1,886
CNEL:	203	437	942	2,029

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC
Road Name: Ramona Exwy.
Road Segment: w/o Evans Rd.
Project Name: Stratford Ranch East
Job Number: 13780

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	91,578	vehicles
Peak Hour Percentage:	8.08%	
Peak Hour Volume:	7,400	vehicles
Vehicle Speed:	55	mph
Near/Far Lane Distance:	102	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	92.0	feet
Centerline Dist. to Observer:	92.0	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:	76.733
Medium Trucks:	76.618
Heavy Trucks:	76.629

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	5.87	-2.89	-1.20	*-4.76*	0.000	0.000
Medium Trucks:	82.40	-11.37	-2.88	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-15.32	-2.88	-1.20	*-5.18*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	73.6	72.6	70.8	64.8	73.4	74.0
Medium Trucks:	67.0	66.4	60.0	58.5	66.9	67.2
Heavy Trucks:	67.0	66.5	57.5	58.7	67.1	67.2
Vehicle Noise:	75.1	74.3	71.3	66.5	75.0	75.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	199	429	924	1,990
CNEL:	214	461	994	2,141

Thursday, May 6, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC
Road Name: Redlands Av.
Road Segment: s/o Ramona Exwy.
Project Name: Stratford Ranch East
Job Number: 13780

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,540	vehicles
Peak Hour Percentage:	8.08%	
Peak Hour Volume:	448	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	56	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	47.0	feet
Centerline Dist. to Observer:	47.0	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:	38.079
Medium Trucks:	37.846
Heavy Trucks:	37.869

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-4.93	1.67	-1.20	*-4.63*	0.000	0.000
Medium Trucks:	77.72	-22.17	1.71	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-26.12	1.71	-1.20	*-5.46*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	62.1	61.1	59.3	53.3	61.9	62.5
Medium Trucks:	56.1	55.5	49.1	47.6	56.0	56.3
Heavy Trucks:	57.4	56.9	47.8	49.1	57.4	57.6
Vehicle Noise:	64.1	63.3	60.0	55.4	64.0	64.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	19	40	87	186
CNEL:	20	43	93	200

Thursday, May 6, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC
Road Name: Ramona Exwy.
Road Segment: e/o Evans Rd.
Project Name: Stratford Ranch East
Job Number: 13780

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	80,223	vehicles
Peak Hour Percentage:	8.08%	
Peak Hour Volume:	6,482	vehicles
Vehicle Speed:	55	mph
Near/Far Lane Distance:	102	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	92.0	feet
Centerline Dist. to Observer:	92.0	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:	76.733
Medium Trucks:	76.618
Heavy Trucks:	76.629

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	5.29	-2.89	-1.20	*-4.76*	0.000	0.000
Medium Trucks:	82.40	-11.94	-2.88	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-15.90	-2.88	-1.20	*-5.18*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	73.0	72.0	70.2	64.2	72.8	73.4
Medium Trucks:	66.4	65.8	59.4	57.9	66.3	66.6
Heavy Trucks:	66.4	65.9	56.9	58.1	66.5	66.6
Vehicle Noise:	74.6	73.7	70.8	65.9	74.5	74.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	182	392	846	1,822
CNEL:	196	422	910	1,960

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC
Road Name: Evans Rd.
Road Segment: n/o Street A
Project Name: Stratford Ranch East
Job Number: 13780

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	41,844	vehicles
Peak Hour Percentage:	8.08%	
Peak Hour Volume:	3,381	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	80	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	64.0	feet
Centerline Dist. to Observer:	64.0	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:	50.210
Medium Trucks:	50.033
Heavy Trucks:	50.050

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	*-4.70*	0.000	0.000
Medium Trucks:	79.45	-13.90	-0.11	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-17.85	-0.11	-1.20	*-5.31*	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:	70.5	69.5	67.7	61.7	70.3	70.9
Medium Trucks:	64.2	63.7	57.3	55.8	64.2	64.4
Heavy Trucks:	65.1	64.6	55.6	56.8	65.2	65.3
Vehicle Noise:	72.3	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:	90	194	417	898
CNEL:	96	208	447	964

Thursday, May 6, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC
Road Name: Evans Rd.
Road Segment: s/o Ramona Exwy.
Project Name: Stratford Ranch East
Job Number: 13780

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	48,867	vehicles
Peak Hour Percentage:	8.08%	
Peak Hour Volume:	3,948	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	80	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	64.0	feet
Centerline Dist. to Observer:	64.0	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:	50.210
Medium Trucks:	50.033
Heavy Trucks:	50.050

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	*-4.70*	0.000	0.000
Medium Trucks:	79.45	-13.23	-0.11	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-17.18	-0.11	-1.20	*-5.31*	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:	71.1	70.2	68.4	62.3	71.0	71.6
Medium Trucks:	64.9	64.3	58.0	56.4	64.9	65.1
Heavy Trucks:	65.8	65.3	56.2	57.5	65.8	66.0
Vehicle Noise:	73.0	72.2	69.0	64.3	72.9	73.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	100	215	462	996
CNEL:	107	230	496	1,069

Thursday, May 6, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC
Road Name: Ramona Exwy.
Road Segment: w/o Evans Rd.
Project Name: Stratford Ranch East
Job Number: 13780

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	92,498	vehicles
Peak Hour Percentage:	8.08%	
Peak Hour Volume:	7,474	vehicles
Vehicle Speed:	55	mph
Near/Far Lane Distance:	102	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	92.0	feet
Centerline Dist. to Observer:	92.0	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:	76.733
Medium Trucks:	76.618
Heavy Trucks:	76.629

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	5.91	-2.89	-1.20	*-4.76*	0.000	0.000
Medium Trucks:	82.40	-11.33	-2.88	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-15.28	-2.88	-1.20	*-5.18*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	73.6	72.6	70.9	64.8	73.4	74.0
Medium Trucks:	67.0	66.4	60.1	58.5	67.0	67.2
Heavy Trucks:	67.0	66.5	57.5	58.7	67.1	67.2
Vehicle Noise:	75.2	74.3	71.4	66.5	75.1	75.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	200	432	930	2,003
CNEL:	216	464	1,000	2,155

Thursday, May 6, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC
Road Name: Ramona Exwy.
Road Segment: w/o Redlands Av.
Project Name: Stratford Ranch East
Job Number: 13780

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	85,407	vehicles
Peak Hour Percentage:	8.08%	
Peak Hour Volume:	6,901	vehicles
Vehicle Speed:	55	mph
Near/Far Lane Distance:	102	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	92.0	feet
Centerline Dist. to Observer:	92.0	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:	76.733
Medium Trucks:	76.618
Heavy Trucks:	76.629

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	5.57	-2.89	-1.20	*-4.76*	0.000	0.000
Medium Trucks:	82.40	-11.67	-2.88	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-15.63	-2.88	-1.20	*-5.18*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	73.3	72.3	70.5	64.5	73.1	73.7
Medium Trucks:	66.6	66.1	59.7	58.2	66.6	66.9
Heavy Trucks:	66.7	66.2	57.2	58.4	66.8	66.9
Vehicle Noise:	74.8	74.0	71.0	66.2	74.7	75.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	190	409	882	1,899
CNEL:	204	440	948	2,043

Thursday, May 6, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC
Road Name: Ramona Exwy.
Road Segment: e/o Evans Rd.
Project Name: Stratford Ranch East
Job Number: 13780

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	80,531	vehicles
Peak Hour Percentage:	8.08%	
Peak Hour Volume:	6,507	vehicles
Vehicle Speed:	55	mph
Near/Far Lane Distance:	102	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	92.0	feet
Centerline Dist. to Observer:	92.0	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:	76.733
Medium Trucks:	76.618
Heavy Trucks:	76.629

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	5.31	-2.89	-1.20	*-4.76*	0.000	0.000
Medium Trucks:	82.40	-11.93	-2.88	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-15.88	-2.88	-1.20	*-5.18*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	73.0	72.0	70.3	64.2	72.8	73.4
Medium Trucks:	66.4	65.8	59.4	57.9	66.4	66.6
Heavy Trucks:	66.4	65.9	56.9	58.1	66.5	66.6
Vehicle Noise:	74.6	73.7	70.8	65.9	74.5	74.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	183	393	848	1,826
CNEL:	196	423	912	1,965

Thursday, May 6, 2021

APPENDIX 8.1:

ON-SITE TRAFFIC NOISE CALCULATIONS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Backyard No Wall
Road Name: Ramona Expressway
Lot No: 177

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,900 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	102 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	220.0 feet
Centerline Dist. to Observer:	230.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	224.330
Medium Trucks:	224.291
Heavy Trucks:	224.295

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	72.73	4.08	-9.88	-1.20	*-1.10*	0.000	0.000
Medium Trucks:	79.85	-13.16	-9.88	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	83.81	-17.11	-9.88	-1.20	*-1.28*	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:	65.7	63.8	62.1	56.0	64.6	65.2
Medium Trucks:	55.6	54.1	47.7	46.2	54.7	54.9
Heavy Trucks:	55.6	54.2	45.2	46.4	54.8	54.9
Vehicle Noise:	66.5	64.7	62.3	56.8	65.4	66.0

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.7	63.8	62.1	56.0	64.6	65.2
Medium Trucks:	55.6	54.1	47.7	46.2	54.7	54.9
Heavy Trucks:	55.6	54.2	45.2	46.4	54.8	54.9
Vehicle Noise:	66.5	64.7	62.3	56.8	65.4	66.0

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Backyard No Wall
Road Name: Ramona Expressway
Lot No: 182

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,900 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	102 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	220.0 feet
Centerline Dist. to Observer:	230.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	224.330
Medium Trucks:	224.291
Heavy Trucks:	224.295

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	72.73	4.08	-9.88	-1.20	*-1.10*	0.000	0.000
Medium Trucks:	79.85	-13.16	-9.88	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	83.81	-17.11	-9.88	-1.20	*-1.28*	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:	65.7	63.8	62.1	56.0	64.6	65.2
Medium Trucks:	55.6	54.1	47.7	46.2	54.7	54.9
Heavy Trucks:	55.6	54.2	45.2	46.4	54.8	54.9
Vehicle Noise:	66.5	64.7	62.3	56.8	65.4	66.0

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.7	63.8	62.1	56.0	64.6	65.2
Medium Trucks:	55.6	54.1	47.7	46.2	54.7	54.9
Heavy Trucks:	55.6	54.2	45.2	46.4	54.8	54.9
Vehicle Noise:	66.5	64.7	62.3	56.8	65.4	66.0

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Backyard No Wall
Road Name: Evans Road
Lot No: 1

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	80 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	63.0 feet
Centerline Dist. to Observer:	73.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	61.270
Medium Trucks:	61.125
Heavy Trucks:	61.139

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	2.63	-1.43	-1.20	*-0.99*	0.000	0.000
Medium Trucks:	77.62	-14.61	-1.41	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.14	-18.57	-1.41	-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:	69.3	67.4	65.7	59.6	68.2	68.9
Medium Trucks:	60.4	58.9	52.5	51.0	59.4	59.7
Heavy Trucks:	61.0	59.5	50.5	51.8	60.1	60.2
Vehicle Noise:	70.4	68.6	66.0	60.8	69.3	69.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.3	67.4	65.7	59.6	68.2	68.9
Medium Trucks:	60.4	58.9	52.5	51.0	59.4	59.7
Heavy Trucks:	61.0	59.5	50.5	51.8	60.1	60.2
Vehicle Noise:	70.4	68.6	66.0	60.8	69.3	69.9

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Backyard No Wall
Road Name: Evans Road
Lot No: 11

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	80 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	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:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	63.640
Medium Trucks:	63.500
Heavy Trucks:	63.514

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	2.63	-1.67	-1.20	*-0.99*	0.000	0.000
Medium Trucks:	77.62	-14.61	-1.66	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	82.14	-18.57	-1.66	-1.20	*-1.58*	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:	69.1	67.2	65.4	59.4	68.0	68.6
Medium Trucks:	60.2	58.6	52.3	50.7	59.2	59.4
Heavy Trucks:	60.7	59.3	50.3	51.5	59.9	60.0
Vehicle Noise:	70.1	68.3	65.8	60.5	69.1	69.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.1	67.2	65.4	59.4	68.0	68.6
Medium Trucks:	60.2	58.6	52.3	50.7	59.2	59.4
Heavy Trucks:	60.7	59.3	50.3	51.5	59.9	60.0
Vehicle Noise:	70.1	68.3	65.8	60.5	69.1	69.6

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Backyard No Wall
Road Name: Redlands Avenue
Lot No: 172

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	0 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	77.0 feet
Centerline Dist. to Observer:	87.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	87.144
Medium Trucks:	87.042
Heavy Trucks:	87.052

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	3.14	-3.72	-1.20	*-1.01*	0.000	0.000
Medium Trucks:	76.31	-14.10	-3.71	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	81.16	-18.05	-3.72	-1.20	*-1.51*	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:	65.6	63.7	61.9	55.9	64.5	65.1
Medium Trucks:	57.3	55.8	49.4	47.9	56.3	56.6
Heavy Trucks:	58.2	56.8	47.7	49.0	57.3	57.5
Vehicle Noise:	66.8	65.0	62.3	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:	65.6	63.7	61.9	55.9	64.5	65.1
Medium Trucks:	57.3	55.8	49.4	47.9	56.3	56.6
Heavy Trucks:	58.2	56.8	47.7	49.0	57.3	57.5
Vehicle Noise:	66.8	65.0	62.3	57.2	65.8	66.3

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Backyard No Wall
Road Name: Redlands Avenue
Lot No: 46

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	0 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	96.0 feet
Centerline Dist. to Observer:	106.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	106.118
Medium Trucks:	106.034
Heavy Trucks:	106.043

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	3.14	-5.01	-1.20	*-1.04*	0.000	0.000
Medium Trucks:	76.31	-14.10	-5.00	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	81.16	-18.05	-5.00	-1.20	*-1.44*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.3	62.4	60.6	54.6	63.2	63.8
Medium Trucks:	56.0	54.5	48.1	46.6	55.1	55.3
Heavy Trucks:	56.9	55.5	46.4	47.7	56.1	56.2
Vehicle Noise:	65.5	63.7	61.0	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:	64.3	62.4	60.6	54.6	63.2	63.8
Medium Trucks:	56.0	54.5	48.1	46.6	55.1	55.3
Heavy Trucks:	56.9	55.5	46.4	47.7	56.1	56.2
Vehicle Noise:	65.5	63.7	61.0	55.9	64.5	65.0

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Backyard No Wall
Road Name: Redlands Avenue
Lot No: 168

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	0 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	83.0 feet
Centerline Dist. to Observer:	93.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	93.134
Medium Trucks:	93.039
Heavy Trucks:	93.049

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	3.14	-4.16	-1.20	*-1.02*	0.000	0.000
Medium Trucks:	76.31	-14.10	-4.15	-1.20	*-1.15*	0.000	0.000
Heavy Trucks:	81.16	-18.05	-4.15	-1.20	*-1.48*	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	64.7
Medium Trucks:	56.9	55.4	49.0	47.5	55.9	56.1
Heavy Trucks:	57.8	56.3	47.3	48.5	56.9	57.0
Vehicle Noise:	66.4	64.6	61.9	56.8	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:	65.1	63.2	61.5	55.4	64.0	64.7
Medium Trucks:	56.9	55.4	49.0	47.5	55.9	56.1
Heavy Trucks:	57.8	56.3	47.3	48.5	56.9	57.0
Vehicle Noise:	66.4	64.6	61.9	56.8	65.3	65.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Backyard With Wall
Road Name: Ramona Expressway
Lot No: 177

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,900 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	102 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	220.0 feet
Centerline Dist. to Observer:	230.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	224.141
Medium Trucks:	224.089
Heavy Trucks:	224.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	72.73	4.08	-9.88	-1.20	*0.08*	-5.800	-8.800
Medium Trucks:	79.85	-13.16	-9.88	-1.20	*0.06*	-5.600	-8.600
Heavy Trucks:	83.81	-17.11	-9.87	-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:	65.7	63.8	62.1	56.0	64.6	65.2
Medium Trucks:	55.6	54.1	47.8	46.2	54.7	54.9
Heavy Trucks:	55.6	54.2	45.2	46.4	54.8	54.9
Vehicle Noise:	66.5	64.7	62.3	56.9	65.4	66.0

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	59.9	58.0	56.3	50.2	58.8	59.4
Medium Trucks:	50.0	48.5	42.2	40.6	49.1	49.3
Heavy Trucks:	50.2	48.8	39.8	41.0	49.4	49.5
Vehicle Noise:	60.8	58.9	56.5	51.1	59.7	60.2

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Backyard With Wall
Road Name: Ramona Expressway
Lot No: 182

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,900 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	102 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	220.0 feet
Centerline Dist. to Observer:	230.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	224.141
Medium Trucks:	224.089
Heavy Trucks:	224.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	72.73	4.08	-9.88	-1.20	*0.08*	-5.800	-8.800
Medium Trucks:	79.85	-13.16	-9.88	-1.20	*0.06*	-5.600	-8.600
Heavy Trucks:	83.81	-17.11	-9.87	-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:	65.7	63.8	62.1	56.0	64.6	65.2
Medium Trucks:	55.6	54.1	47.8	46.2	54.7	54.9
Heavy Trucks:	55.6	54.2	45.2	46.4	54.8	54.9
Vehicle Noise:	66.5	64.7	62.3	56.9	65.4	66.0

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	59.9	58.0	56.3	50.2	58.8	59.4
Medium Trucks:	50.0	48.5	42.2	40.6	49.1	49.3
Heavy Trucks:	50.2	48.8	39.8	41.0	49.4	49.5
Vehicle Noise:	60.8	58.9	56.5	51.1	59.7	60.2

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Backyard With Wall
Road Name: Evans Road
Lot No: 1

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	80 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	63.0 feet
Centerline Dist. to Observer:	73.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	59.091
Medium Trucks:	58.863
Heavy Trucks:	58.764

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	2.63	-1.19	-1.20	*0.16*	-6.480	-9.480
Medium Trucks:	77.62	-14.61	-1.17	-1.20	*0.11*	-6.080	-9.080
Heavy Trucks:	82.14	-18.57	-1.16	-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:	69.6	67.7	65.9	59.9	68.5	69.1
Medium Trucks:	60.6	59.1	52.8	51.2	59.7	59.9
Heavy Trucks:	61.2	59.8	50.8	52.0	60.4	60.5
Vehicle Noise:	70.6	68.8	66.2	61.0	69.6	70.1

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	63.1	61.2	59.4	53.4	62.0	62.6
Medium Trucks:	54.6	53.1	46.7	45.2	53.6	53.8
Heavy Trucks:	56.0	54.6	45.6	46.8	55.2	55.3
Vehicle Noise:	64.4	62.6	59.8	54.8	63.3	63.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Backyard With Wall
Road Name: Evans Road
Lot No: 11

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	80 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:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	61.635
Medium Trucks:	61.418
Heavy Trucks:	61.324

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	2.63	-1.47	-1.20	*0.16*	-6.480	-9.480
Medium Trucks:	77.62	-14.61	-1.44	-1.20	*0.10*	-6.000	-9.000
Heavy Trucks:	82.14	-18.57	-1.43	-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:	69.3	67.4	65.6	59.6	68.2	68.8
Medium Trucks:	60.4	58.9	52.5	51.0	59.4	59.6
Heavy Trucks:	60.9	59.5	50.5	51.7	60.1	60.2
Vehicle Noise:	70.4	68.6	66.0	60.7	69.3	69.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	62.8	60.9	59.2	53.1	61.7	62.3
Medium Trucks:	54.4	52.9	46.5	45.0	53.4	53.6
Heavy Trucks:	55.7	54.3	45.3	46.5	54.9	55.0
Vehicle Noise:	64.1	62.3	59.6	54.5	63.0	63.5

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Backyard With Wall
Road Name: Redlands Avenue
Lot No: 172

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	0 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	77.0 feet
Centerline Dist. to Observer:	87.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	87.283
Medium Trucks:	87.139
Heavy Trucks:	87.076

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	3.14	-3.73	-1.20	*0.14*	-6.320	-9.320
Medium Trucks:	76.31	-14.10	-3.72	-1.20	*0.09*	-5.900	-8.900
Heavy Trucks:	81.16	-18.05	-3.72	-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:	65.6	63.7	61.9	55.8	64.5	65.1
Medium Trucks:	57.3	55.8	49.4	47.9	56.3	56.6
Heavy Trucks:	58.2	56.8	47.7	49.0	57.3	57.5
Vehicle Noise:	66.8	65.0	62.3	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:	59.2	57.3	55.6	49.5	58.1	58.8
Medium Trucks:	51.4	49.9	43.5	42.0	50.4	50.7
Heavy Trucks:	53.0	51.6	42.5	43.8	52.1	52.3
Vehicle Noise:	60.7	58.9	56.0	51.1	59.7	60.2

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Backyard With Wall
Road Name: Redlands Avenue
Lot No: 46

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	0 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	96.0 feet
Centerline Dist. to Observer:	106.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	106.237
Medium Trucks:	106.121
Heavy Trucks:	106.071

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	3.14	-5.01	-1.20	*0.12*	-6.160	-9.160
Medium Trucks:	76.31	-14.10	-5.01	-1.20	*0.08*	-5.800	-8.800
Heavy Trucks:	81.16	-18.05	-5.00	-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:	64.3	62.4	60.6	54.6	63.2	63.8
Medium Trucks:	56.0	54.5	48.1	46.6	55.1	55.3
Heavy Trucks:	56.9	55.5	46.4	47.7	56.0	56.2
Vehicle Noise:	65.5	63.7	61.0	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:	58.1	56.2	54.5	48.4	57.0	57.6
Medium Trucks:	50.2	48.7	42.3	40.8	49.3	49.5
Heavy Trucks:	51.6	50.2	41.1	42.4	50.7	50.9
Vehicle Noise:	59.5	57.8	54.9	49.9	58.5	59.0

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Backyard With Wall
Road Name: Redlands Avenue
Lot No: 168

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	0 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	83.0 feet
Centerline Dist. to Observer:	93.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	93.266
Medium Trucks:	93.132
Heavy Trucks:	93.074

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	3.14	-4.16	-1.20	*0.13*	-6.240	-9.240
Medium Trucks:	76.31	-14.10	-4.16	-1.20	*0.09*	-5.900	-8.900
Heavy Trucks:	81.16	-18.05	-4.15	-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:	65.1	63.2	61.5	55.4	64.0	64.6
Medium Trucks:	56.9	55.4	49.0	47.4	55.9	56.1
Heavy Trucks:	57.8	56.3	47.3	48.5	56.9	57.0
Vehicle Noise:	66.4	64.6	61.9	56.8	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:	58.9	57.0	55.2	49.2	57.8	58.4
Medium Trucks:	51.0	49.5	43.1	41.5	50.0	50.2
Heavy Trucks:	52.6	51.1	42.1	43.3	51.7	51.8
Vehicle Noise:	60.3	58.6	55.7	50.7	59.3	59.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: First Floor With Wall
Road Name: Ramona Expressway
Lot No: 177

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,900 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	102 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	220.0 feet
Centerline Dist. to Observer:	240.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	234.116
Medium Trucks:	234.064
Heavy Trucks:	234.041

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	72.73	4.08	-10.16	-1.20	*0.05*	-5.500	-8.500
Medium Trucks:	79.85	-13.16	-10.16	-1.20	*0.04*	-5.400	-8.400
Heavy Trucks:	83.81	-17.11	-10.16	-1.20	*0.01*	-5.100	-8.100

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.4	63.5	61.8	55.7	64.3	65.0
Medium Trucks:	55.3	53.8	47.5	45.9	54.4	54.6
Heavy Trucks:	55.3	53.9	44.9	46.1	54.5	54.6
Vehicle Noise:	66.2	64.4	62.0	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:	59.9	58.0	56.3	50.2	58.8	59.5
Medium Trucks:	49.9	48.4	42.1	40.5	49.0	49.2
Heavy Trucks:	50.2	48.8	39.8	41.0	49.4	49.5
Vehicle Noise:	60.8	58.9	56.5	51.1	59.7	60.2

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: First Floor With Wall
Road Name: Ramona Expressway
Lot No: 182

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,900 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	102 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	220.0 feet
Centerline Dist. to Observer:	240.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	234.116
Medium Trucks:	234.064
Heavy Trucks:	234.041

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	72.73	4.08	-10.16	-1.20	*0.05*	-5.500	-8.500
Medium Trucks:	79.85	-13.16	-10.16	-1.20	*0.04*	-5.400	-8.400
Heavy Trucks:	83.81	-17.11	-10.16	-1.20	*0.01*	-5.100	-8.100

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.4	63.5	61.8	55.7	64.3	65.0
Medium Trucks:	55.3	53.8	47.5	45.9	54.4	54.6
Heavy Trucks:	55.3	53.9	44.9	46.1	54.5	54.6
Vehicle Noise:	66.2	64.4	62.0	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:	59.9	58.0	56.3	50.2	58.8	59.5
Medium Trucks:	49.9	48.4	42.1	40.5	49.0	49.2
Heavy Trucks:	50.2	48.8	39.8	41.0	49.4	49.5
Vehicle Noise:	60.8	58.9	56.5	51.1	59.7	60.2

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: First Floor With Wall
Road Name: Evans Road
Lot No: 1

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	80 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	63.0 feet
Centerline Dist. to Observer:	83.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	69.066
Medium Trucks:	68.838
Heavy Trucks:	68.739

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	2.63	-2.21	-1.20	*0.16*	-6.480	-9.480
Medium Trucks:	77.62	-14.61	-2.19	-1.20	*0.09*	-5.900	-8.900
Heavy Trucks:	82.14	-18.57	-2.18	-1.20	*0.00*	-4.900	-7.900

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.6	66.7	64.9	58.8	67.5	68.1
Medium Trucks:	59.6	58.1	51.8	50.2	58.7	58.9
Heavy Trucks:	60.2	58.8	49.7	51.0	59.3	59.5
Vehicle Noise:	69.6	67.8	65.2	60.0	68.6	69.1

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	62.1	60.2	58.4	52.4	61.0	61.6
Medium Trucks:	53.7	52.2	45.9	44.3	52.8	53.0
Heavy Trucks:	55.3	53.9	44.8	46.1	54.4	54.6
Vehicle Noise:	63.4	61.6	58.8	53.8	62.4	62.9

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: First Floor With Wall
Road Name: Evans Road
Lot No: 11

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	80 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:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	71.610
Medium Trucks:	71.393
Heavy Trucks:	71.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	2.63	-2.44	-1.20	*0.15*	-6.400	-9.400
Medium Trucks:	77.62	-14.61	-2.42	-1.20	*0.09*	-5.900	-8.900
Heavy Trucks:	82.14	-18.57	-2.42	-1.20	*0.00*	-4.900	-7.900

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	64.7	58.6	67.2	67.8
Medium Trucks:	59.4	57.9	51.5	50.0	58.4	58.7
Heavy Trucks:	60.0	58.5	49.5	50.8	59.1	59.2
Vehicle Noise:	69.4	67.6	65.0	59.8	68.3	68.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	61.9	60.0	58.3	52.2	60.8	61.4
Medium Trucks:	53.5	52.0	45.6	44.1	52.5	52.8
Heavy Trucks:	55.1	53.6	44.6	45.9	54.2	54.3
Vehicle Noise:	63.2	61.4	58.7	53.6	62.2	62.7

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: First Floor With Wall
Road Name: Redlands Avenue
Lot No: 172

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	0 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	77.0 feet
Centerline Dist. to Observer:	97.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	97.258
Medium Trucks:	97.114
Heavy Trucks:	97.051

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	3.14	-4.44	-1.20	*0.13*	-6.240	-9.240
Medium Trucks:	76.31	-14.10	-4.43	-1.20	*0.07*	-5.700	-8.700
Heavy Trucks:	81.16	-18.05	-4.42	-1.20	*0.00*	-4.900	-7.900

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	55.1	63.8	64.4
Medium Trucks:	56.6	55.1	48.7	47.2	55.6	55.9
Heavy Trucks:	57.5	56.1	47.0	48.3	56.6	56.8
Vehicle Noise:	66.1	64.3	61.6	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:	58.6	56.7	55.0	48.9	57.5	58.1
Medium Trucks:	50.9	49.4	43.0	41.5	49.9	50.2
Heavy Trucks:	52.6	51.2	42.1	43.4	51.7	51.9
Vehicle Noise:	60.1	58.4	55.4	50.5	59.1	59.6

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: First Floor With Wall
Road Name: Redlands Avenue
Lot No: 46

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	0 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	96.0 feet
Centerline Dist. to Observer:	116.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	116.212
Medium Trucks:	116.096
Heavy Trucks:	116.046

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	3.14	-5.60	-1.20	*0.10*	-6.000	-9.000
Medium Trucks:	76.31	-14.10	-5.59	-1.20	*0.06*	-5.600	-8.600
Heavy Trucks:	81.16	-18.05	-5.59	-1.20	*0.01*	-5.100	-8.100

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	63.7	61.8	60.0	54.0	62.6	63.2
Medium Trucks:	55.4	53.9	47.6	46.0	54.5	54.7
Heavy Trucks:	56.3	54.9	45.9	47.1	55.5	55.6
Vehicle Noise:	64.9	63.2	60.4	55.3	63.9	64.4

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:	49.8	48.3	42.0	40.4	48.9	49.1
Heavy Trucks:	51.2	49.8	40.8	42.0	50.4	50.5
Vehicle Noise:	59.1	57.4	54.5	49.5	58.1	58.6

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: First Floor With Wall
Road Name: Redlands Avenue
Lot No: 168

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	0 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	83.0 feet
Centerline Dist. to Observer:	103.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	103.242
Medium Trucks:	103.108
Heavy Trucks:	103.049

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	3.14	-4.83	-1.20	*0.12*	-6.160	-9.160
Medium Trucks:	76.31	-14.10	-4.82	-1.20	*0.07*	-5.700	-8.700
Heavy Trucks:	81.16	-18.05	-4.81	-1.20	*0.01*	-5.100	-8.100

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:	56.2	54.7	48.3	46.8	55.2	55.5
Heavy Trucks:	57.1	55.7	46.6	47.9	56.2	56.4
Vehicle Noise:	65.7	63.9	61.2	56.1	64.7	65.2

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:	50.5	49.0	42.6	41.1	49.5	49.8
Heavy Trucks:	52.0	50.6	41.5	42.8	51.1	51.3
Vehicle Noise:	59.8	58.0	55.1	50.2	58.7	59.2

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Second Floor With Wall
Road Name: Ramona Expressway
Lot No: 177

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,900 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	102 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	220.0 feet
Centerline Dist. to Observer:	240.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	234.936
Medium Trucks:	234.810
Heavy Trucks:	234.595

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	72.73	4.08	-10.18	-1.20	*-1.19*	0.000	0.000
Medium Trucks:	79.85	-13.16	-10.18	-1.20	*-1.26*	0.000	0.000
Heavy Trucks:	83.81	-17.11	-10.17	-1.20	*-1.44*	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:	65.4	63.5	61.8	55.7	64.3	64.9
Medium Trucks:	55.3	53.8	47.4	45.9	54.4	54.6
Heavy Trucks:	55.3	53.9	44.9	46.1	54.5	54.6
Vehicle Noise:	66.2	64.4	62.0	56.5	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:	65.4	63.5	61.8	55.7	64.3	64.9
Medium Trucks:	55.3	53.8	47.4	45.9	54.4	54.6
Heavy Trucks:	55.3	53.9	44.9	46.1	54.5	54.6
Vehicle Noise:	66.2	64.4	62.0	56.5	65.1	65.7

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Second Floor With Wall
Road Name: Ramona Expressway
Lot No: 182

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,900 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	102 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	220.0 feet
Centerline Dist. to Observer:	240.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	234.936
Medium Trucks:	234.810
Heavy Trucks:	234.595

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	72.73	4.08	-10.18	-1.20	*-1.19*	0.000	0.000
Medium Trucks:	79.85	-13.16	-10.18	-1.20	*-1.26*	0.000	0.000
Heavy Trucks:	83.81	-17.11	-10.17	-1.20	*-1.44*	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:	65.4	63.5	61.8	55.7	64.3	64.9
Medium Trucks:	55.3	53.8	47.4	45.9	54.4	54.6
Heavy Trucks:	55.3	53.9	44.9	46.1	54.5	54.6
Vehicle Noise:	66.2	64.4	62.0	56.5	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:	65.4	63.5	61.8	55.7	64.3	64.9
Medium Trucks:	55.3	53.8	47.4	45.9	54.4	54.6
Heavy Trucks:	55.3	53.9	44.9	46.1	54.5	54.6
Vehicle Noise:	66.2	64.4	62.0	56.5	65.1	65.7

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Second Floor With Wall
Road Name: Evans Road
Lot No: 1

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	80 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	63.0 feet
Centerline Dist. to Observer:	83.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	74.061
Medium Trucks:	73.661
Heavy Trucks:	72.972

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	2.63	-2.66	-1.20	*-0.64*	0.000	0.000
Medium Trucks:	77.62	-14.61	-2.63	-1.20	*-0.81*	0.000	0.000
Heavy Trucks:	82.14	-18.57	-2.57	-1.20	*-1.33*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.1	66.2	64.4	58.4	67.0	67.6
Medium Trucks:	59.2	57.7	51.3	49.8	58.2	58.5
Heavy Trucks:	59.8	58.4	49.4	50.6	59.0	59.1
Vehicle Noise:	69.2	67.4	64.8	59.5	68.1	68.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.1	66.2	64.4	58.4	67.0	67.6
Medium Trucks:	59.2	57.7	51.3	49.8	58.2	58.5
Heavy Trucks:	59.8	58.4	49.4	50.6	59.0	59.1
Vehicle Noise:	69.2	67.4	64.8	59.5	68.1	68.6

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Second Floor With Wall
Road Name: Evans Road
Lot No: 11

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	80 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:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	76.295
Medium Trucks:	75.908
Heavy Trucks:	75.239

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	2.63	-2.86	-1.20	*-0.66*	0.000	0.000
Medium Trucks:	77.62	-14.61	-2.82	-1.20	*-0.83*	0.000	0.000
Heavy Trucks:	82.14	-18.57	-2.77	-1.20	*-1.33*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.9	66.0	64.3	58.2	66.8	67.4
Medium Trucks:	59.0	57.5	51.1	49.6	58.0	58.3
Heavy Trucks:	59.6	58.2	49.2	50.4	58.8	58.9
Vehicle Noise:	69.0	67.2	64.6	59.3	67.9	68.4

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.9	66.0	64.3	58.2	66.8	67.4
Medium Trucks:	59.0	57.5	51.1	49.6	58.0	58.3
Heavy Trucks:	59.6	58.2	49.2	50.4	58.8	58.9
Vehicle Noise:	69.0	67.2	64.6	59.3	67.9	68.4

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Second Floor With Wall
Road Name: Redlands Avenue
Lot No: 172

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	0 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	77.0 feet
Centerline Dist. to Observer:	97.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	98.005
Medium Trucks:	97.703
Heavy Trucks:	97.185

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	3.14	-4.49	-1.20	*-0.75*	0.000	0.000
Medium Trucks:	76.31	-14.10	-4.47	-1.20	*-0.91*	0.000	0.000
Heavy Trucks:	81.16	-18.05	-4.43	-1.20	*-1.35*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.8	62.9	61.1	55.1	63.7	64.3
Medium Trucks:	56.5	55.0	48.7	47.1	55.6	55.8
Heavy Trucks:	57.5	56.1	47.0	48.3	56.6	56.7
Vehicle Noise:	66.1	64.3	61.5	56.5	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:	64.8	62.9	61.1	55.1	63.7	64.3
Medium Trucks:	56.5	55.0	48.7	47.1	55.6	55.8
Heavy Trucks:	57.5	56.1	47.0	48.3	56.6	56.7
Vehicle Noise:	66.1	64.3	61.5	56.5	65.0	65.5

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Second Floor With Wall
Road Name: Redlands Avenue
Lot No: 46

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	0 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	96.0 feet
Centerline Dist. to Observer:	116.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	116.842
Medium Trucks:	116.589
Heavy Trucks:	116.155

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	3.14	-5.63	-1.20	*-0.87*	0.000	0.000
Medium Trucks:	76.31	-14.10	-5.62	-1.20	*-1.00*	0.000	0.000
Heavy Trucks:	81.16	-18.05	-5.59	-1.20	*-1.38*	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:	63.7	61.8	60.0	53.9	62.6	63.2
Medium Trucks:	55.4	53.9	47.5	46.0	54.4	54.7
Heavy Trucks:	56.3	54.9	45.9	47.1	55.5	55.6
Vehicle Noise:	64.9	63.1	60.4	55.3	63.9	64.4

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	63.7	61.8	60.0	53.9	62.6	63.2
Medium Trucks:	55.4	53.9	47.5	46.0	54.4	54.7
Heavy Trucks:	56.3	54.9	45.9	47.1	55.5	55.6
Vehicle Noise:	64.9	63.1	60.4	55.3	63.9	64.4

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO) - 10/1/2012

Scenario: Second Floor With Wall
Road Name: Redlands Avenue
Lot No: 168

Project Name: Stratford Ranch East
Job Number: 13780
Analyst: P. Mara

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,870 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	0 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	83.0 feet
Centerline Dist. to Observer:	103.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Road Grade:	0.0%

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	103.947
Medium Trucks:	103.663
Heavy Trucks:	103.174

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	67.36	3.14	-4.87	-1.20	*-0.79*	0.000	0.000
Medium Trucks:	76.31	-14.10	-4.85	-1.20	*-0.94*	0.000	0.000
Heavy Trucks:	81.16	-18.05	-4.82	-1.20	*-1.36*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.4	62.5	60.8	54.7	63.3	63.9
Medium Trucks:	56.2	54.7	48.3	46.7	55.2	55.4
Heavy Trucks:	57.1	55.7	46.6	47.9	56.2	56.4
Vehicle Noise:	65.7	63.9	61.2	56.1	64.6	65.1

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.4	62.5	60.8	54.7	63.3	63.9
Medium Trucks:	56.2	54.7	48.3	46.7	55.2	55.4
Heavy Trucks:	57.1	55.7	46.6	47.9	56.2	56.4
Vehicle Noise:	65.7	63.9	61.2	56.1	64.6	65.1

APPENDIX 11.1:

CADNAA CONSTRUCTION NOISE MODEL INPUTS

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13780- Startford Ranch East

CadnaA Noise Prediction Model: 13780_02.cna
Date: 10.05.21
Analyst: S. Shami

Calculation Configuration

Configuration	
Parameter	Value
General	
Country	(user defined)
Max. Error (dB)	0.00
Max. Search Radius (#(Unit,LEN))	2000.01
Min. Dist Src to Rcvr	0.00
Partition	
Raster Factor	0.50
Max. Length of Section (#(Unit,LEN))	999.99
Min. Length of Section (#(Unit,LEN))	1.01
Min. Length of Section (%)	0.00
Proj. Line Sources	On
Proj. Area Sources	On
Ref. Time	
Reference Time Day (min)	960.00
Reference Time Night (min)	480.00
Daytime Penalty (dB)	0.00
Recr. Time Penalty (dB)	5.00
Night-time Penalty (dB)	10.00
DTM	
Standard Height (m)	0.00
Model of Terrain	Triangulation
Reflection	
max. Order of Reflection	2
Search Radius Src	100.00
Search Radius Rcvr	100.00
Max. Distance Source - Rcvr	1000.00 1000.00
Min. Distance Rvcr - Reflector	1.00 1.00
Min. Distance Source - Reflector	0.10
Industrial (ISO 9613)	
Lateral Diffraction	some Obj
Obst. within Area Src do not shield	On
Screening	Incl. Ground Att. over Barrier
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	3.0 20.0 0.0
Temperature (#(Unit,TEMP))	10
rel. Humidity (%)	70
Ground Absorption G	0.50
Wind Speed for Dir. (#(Unit,SPEED))	3.0
Roads (RLS-90)	
Strictly acc. to RLS-90	
Railways (FTA/FRA)	
Aircraft (???)	
Strictly acc. to AzB	

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	76.8	76.8	83.5	0.0	0.0	0.0		x	Total	5.00	a	6270962.61	2254321.97	5.00
RECEIVERS		R2	65.0	65.0	71.6	0.0	0.0	0.0		x	Total	5.00	a	6271308.48	2251599.94	5.00
RECEIVERS		R3	64.0	64.0	70.7	0.0	0.0	0.0		x	Total	5.00	a	6269745.20	2252181.06	5.00

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL"			Lw / Li			Operating Time			Height
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	(ft)
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	
SITEBOUNDARY		CONSTRUCTION	135.7	135.7	135.7	83.0	83.0	83.0	Lw"	83					8

Name	Height			Coordinates			
	Begin		End	x	y	z	Ground
	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
SITEBOUNDARY	8.00	a		6271891.23	2253619.15	8.00	0.00
				6271881.68	2252531.65	8.00	0.00
				6270628.21	2252528.18	8.00	0.00
				6270642.10	2254305.09	8.00	0.00
				6271561.49	2254302.42	8.00	0.00
				6271559.63	2253619.32	8.00	0.00

Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height				Coordinates			
			left	right		horz.	vert.	Begin		End		x	y	z	Ground
					(ft)	(ft)	(ft)	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
BARRIEREXISTING		0						6.00	a			6270644.12	2254313.87	6.00	0.00
												6271562.09	2254307.36	6.00	0.00
												6271563.17	2254284.57	6.00	0.00
												6271860.48	2254282.40	6.00	0.00
BARRIEREXISTING		0						6.00	a			6270712.40	2251621.67	6.00	0.00
												6272561.35	2251600.83	6.00	0.00
BARRIEREXISTING		0						6.00	a			6269755.10	2252207.26	6.00	0.00
												6269751.63	2251756.73	6.00	0.00