Appendix L

Noise Impact Analysis

Lake and Mountain Shopping Center

NOISE IMPACT ANALYSIS

CITY OF LAKE ELSINORE

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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
EA	Existing plus Ambient Growth
EAC	EA plus Cumulative
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
I-15	Interstate 15
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
L_{min}	Minimum level measured over the time interval
mph	Miles per hour
PPV	Peak Particle Velocity
Project	Lake and Mountain Shopping Center
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 potential noise impacts and the necessary noise mitigation measures for the proposed Lake and Mountain Shopping Center development ("Project"). The Project site is located on the northwest corner of Lake Street and Mountain Street in the City of Lake Elsinore. The Project is proposed to consist of 13,200 square feet of shopping center use, a gasoline service station with a 3,400 square foot convenience market, 7,365 square feet of fast-food restaurant with drive-through window use, and an automated car wash tunnel. This study has been prepared to satisfy applicable City of Lake Elsinore noise standards and significance criteria based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

OFF-SITE TRAFFIC NOISE ANALYSIS

Traffic generated by the operation of the Project will influence the traffic noise levels in surrounding off-site areas. To quantify the off-site traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on 14 roadway segments were calculated based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in the *Lake and Mountain Shopping Center Traffic Impact Analysis* prepared by Urban Crossroads, Inc. (2) To assess the off-site noise level impacts associated with the proposed Project, noise contour boundaries were developed for Existing 2019, Existing plus Ambient (EA) 2019, and Existing plus Ambient plus Cumulative (EAC) 2021 traffic conditions. The analysis shows that the Project-related traffic noise level increases under all traffic scenarios will be *less than significant*. The analysis shows that the unmitigated Project-related traffic noise level increases under all with Project traffic scenarios are considered *less than significant* impacts at land uses adjacent to the study area roadway segments.

OPERATIONAL NOISE ANALYSIS

Using reference noise levels to represent the expected operational noise sources of the Lake and Mountain Shopping Center site, this analysis estimates the Project-related stationary-source noise levels at nearby sensitive receiver locations. The typical activities associated with the proposed Lake and Mountain Shopping Center are anticipated to include: roof-top air conditioning units, drive-thru speakerphones, trash enclosures, parking lots, gas station activity, car wash tunnels and car wash vacuum activity.

The analysis shows that the unmitigated Project-related operational noise levels will exceed the City of Lake Elsinore daytime and nighttime exterior noise level standards at the closest noise-sensitive receiver locations in the Project study area. Therefore, the unmitigated operational noise impacts are considered *potentially significant*.

OPERATIONAL NOISE MITIGATION

To satisfy the applicable local noise standards the project shall implement the following operational noise mitigation measures.

- No car wash activities shall be permitted during the nighttime hours of 10:00 p.m. to 7:00 a.m.
- Reduce the car wash air blower and dryer equipment noise by locating the equipment inside the tunnel and/or utilize sound rated air blower and dryer equipment measuring no more than 71 dBA L_{50} at 10 feet.
- Incorporate parapet walls where appropriate
- Incorporate on-site noise barriers, landscaping, or similar physical features that would act to generally attenuate noise emanating from the Project related noise sources.
- If an outdoor speaker system is being used in conjunction with a Project, the outdoor speaker system shall be oriented away from sensitive receivers and the volume set at a level not readily audible past the property line.

Car wash activities may cycle on and off as each car progresses through the tunnel, however, this analysis assumes all activities would operate continuously to present worst-case conditions. Short-term noise events such as car doors slamming, air blowers cycling on and off, and water spraying are expected to occur and produce high noise levels over short durations of a few seconds to a few minutes, which are likely to be audible and could be perceived as a short-term annoyance, or nuisance, to nearby residents. However, these short-term events will not exceed or represent a significant contribution to the overall City of Lake Elsinore L_{50} noise level standards. As such, while the mitigated daytime car wash operational noise levels are shown to be compliant with City of Lake Elsinore standards, however, short-term individual events may still be perceived as nuisance noise.

With application of these Project operational noise mitigation measures, impacts at all receiver locations would be *less than significant*. In addition, the project operational noise level contribution analysis shows Project-related incremental noise level increase to the ambient noise environment would be *less than significant* at all receiver locations.

CONSTRUCTION NOISE ANALYSIS

Construction-related noise impacts are expected to create temporary and intermittent high-level noise conditions at receivers surrounding the Project site when certain activities occur at the closest point to the nearby receiver locations from primary Project construction activity. Using sample reference noise levels to represent the planned construction activities of the Lake and Mountain Shopping Center site, this analysis estimates the Project-related construction noise levels at nearby receiver locations.

While the Project related construction equipment noise levels satisfy the City of Lake Elsinore Municipal Code construction noise level standards of 75 dBA L_{max} for mobile equipment, the noise Project noise levels will exceed the 60 dBA L_{max} standards for stationary equipment during temporary Project construction activities at receiver locations R1 and R5. Therefore, the noise

impacts due to the unmitigated Project construction noise levels is considered as a *potentially significant* impact at receiver locations R1 and R5 and mitigation measures are required to reduce the stationary equipment noise levels generated during temporary Project construction activities. The required construction noise mitigation measures include the use of 12-foot high temporary noise barriers near receiver locations R1 and R5 if occupied during construction.

CONSTRUCTION NOISE MITIGATION

Though construction is temporary, intermittent and of short duration, and will not present any long-term impacts, the following mitigation measures would reduce the noise level impacts due to Project construction activities at the nearby noise-sensitive residential land uses:

- If R1 and R5 represents occupied residential use at the time of Project construction, install a minimum 12-foot high temporary construction noise barrier as shown on Exhibit ES-B, for the duration of Project construction. The noise control barriers must have a solid face from top to bottom. The noise control barrier must meet the minimum height and be constructed as follows:
    - The temporary noise barrier shall provide a minimum transmission loss of 20 dBA (Federal Highway Administration, Noise Barrier Design Handbook). The noise barrier shall be constructed using an acoustical blanket (e.g. vinyl acoustic curtains or quilted blankets) attached to the construction site perimeter fence or equivalent temporary fence posts. Example photos are provided in Appendix 10.2.;
    - The noise barrier must be maintained, and any damage promptly repaired. Gaps, holes, or weaknesses in the barrier or openings between the barrier and the ground shall be promptly repaired;
    - The noise control barrier and associated elements shall be completely removed, and the site appropriately restored upon the conclusion of the construction activity.
- Prior to approval of grading plans and/or issuance of building permits, plans shall include a note indicating that noise-generating Project construction activities shall only occur between the hours of 7:00 a.m. to 7:00 p.m. daily, *or at any time on weekends or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work by public service utilities or by variance issued by the City is prohibited*. (City of Lake Elsinore Municipal Code, Section 17.176.080 (F).
- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site during all Project construction activities (i.e., to the center).
- The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment (between the hours of 7:00 a.m. to 7:00 p.m. daily, with no activity allowed on Sundays or holidays). The contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

- The contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

The temporary construction noise mitigation measures will reduce the stationary source construction noise levels at the potentially impacted receiver locations and satisfy the construction noise thresholds for noise-sensitive single-family residential receiver locations. Therefore, the noise impacts due to Project construction are considered *less than significant* with mitigation.

CONSTRUCTION VIBRATION ANALYSIS

Based on the reference vibration levels provided by the Federal Transit Administration (FTA), Project-related construction vibration velocity levels are expected to approach 0.01 in/sec root-mean-square (RMS) at the nearby receiver locations at distances ranging from 85 to 390 feet. Based on the City of Lake Elsinore vibration threshold of 0.01 in/sec RMS, the construction-related vibration impacts are considered *less than significant.*

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

SUMMARY OF CEQA SIGNIFICANCE FINDINGS

The results of this Lake and Mountain Shopping Center Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report is 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*	-
Operational Noise	9	*Potentially Significant*	*Less Than Significant*
Construction Noise	10	*Potentially Significant*	*Less Than Significant*
Construction Vibration		*Less Than Significant*	-

1 INTRODUCTION

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

1.1 SITE LOCATION

The proposed Lake and Mountain Shopping Center Project is located on the northwest corner of Lake Street and Mountain Street in the City of Lake Elsinore, as shown on Exhibit 1-A. The Project site is currently vacant. Nearby existing residential tract homes are located east of the Project site across Lake Street and south across Mountain Street. Individual large lot single-family residential homes are located west and north of the Project site.

1.2 PROJECT DESCRIPTION

The Project is proposed to consist of 13,200 square feet of shopping center use, a gasoline service station with a 3,400 square foot convenience market, 7,365 square feet of fast-food restaurant with drive-through window use, and an automated car wash tunnel, as shown on Exhibit 1-B. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2021. The on-site Project-related operational noise sources are expected to include: roof-top air conditioning units, drive-thru speakerphones, trash enclosures, parking lots, gas station activity, car wash tunnels and car wash vacuum activity.

EXHIBIT 1-A: LOCATION MAP

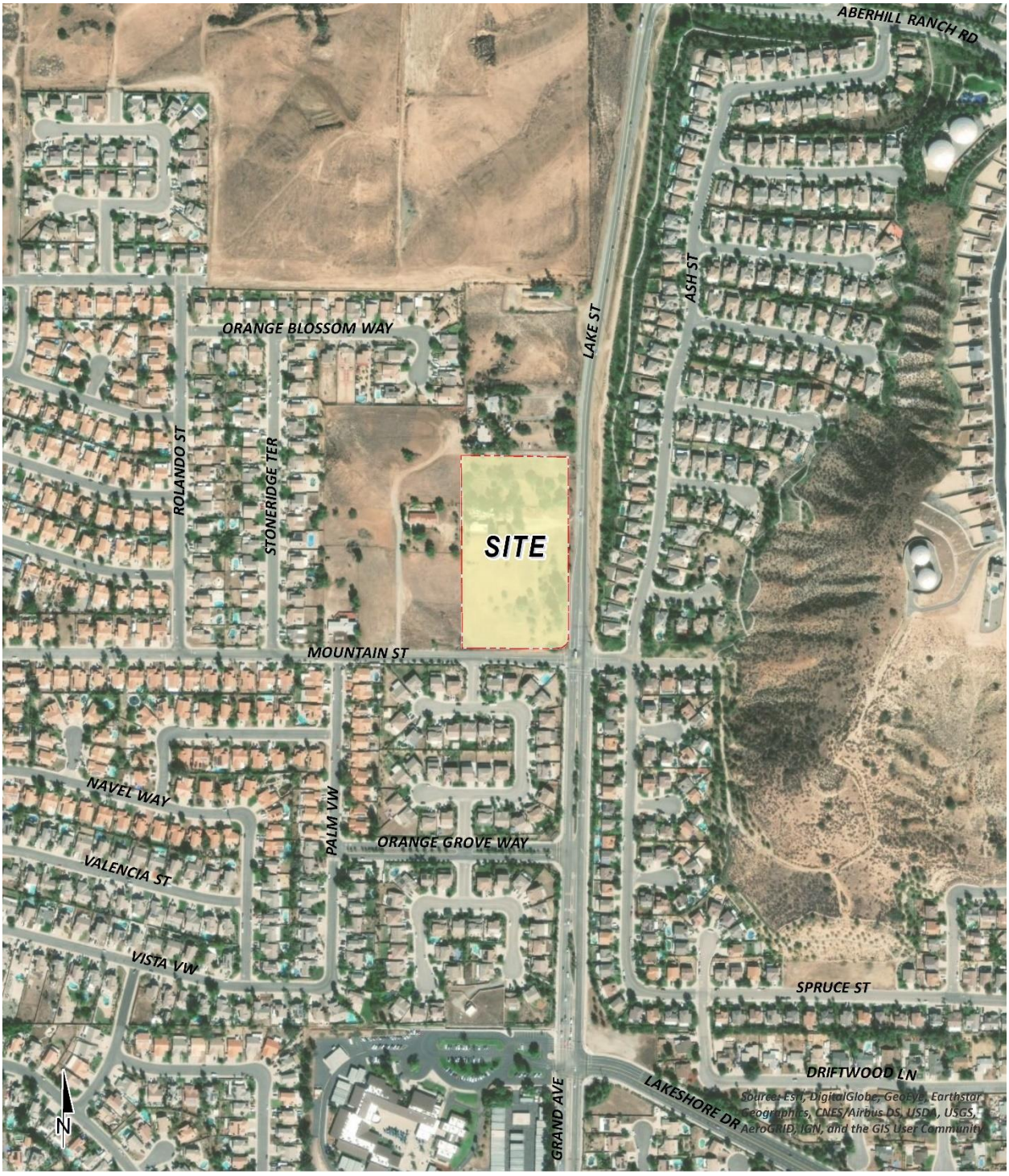
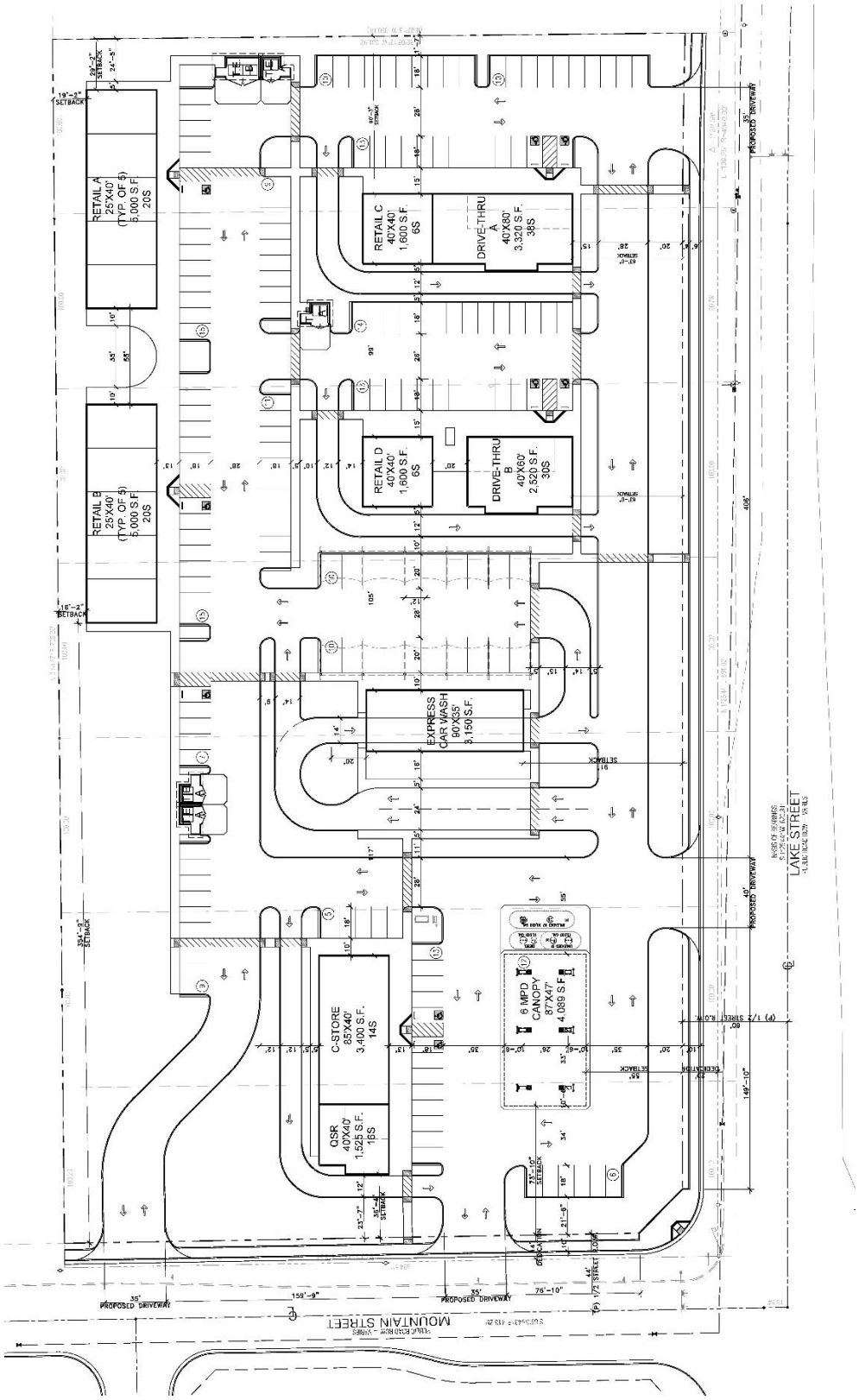


EXHIBIT 1-B: SITE PLAN



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2 FUNDAMENTALS

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

EXHIBIT 2-A: TYPICAL NOISE LEVELS

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

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 commonly used figure is the equivalent level (Leq). 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 (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the "average" noise levels within the environment.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level is utilized. The CNEL is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of 5 decibels to dBA Leq sound levels in the evening from 7:00 p.m. to 10:00 p.m., and the addition of 10 decibels to dBA Leq 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 Lake Elsinore relies on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources.

2.3 SOUND PROPAGATION

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

2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. (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 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those

sites with an absorptive ground surface between the source and the receiver such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source. (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 nearby residents. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The FHWA does not consider the planting of vegetation to be a noise abatement measure. (5)

2.4 NOISE CONTROL

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

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by 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. 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)

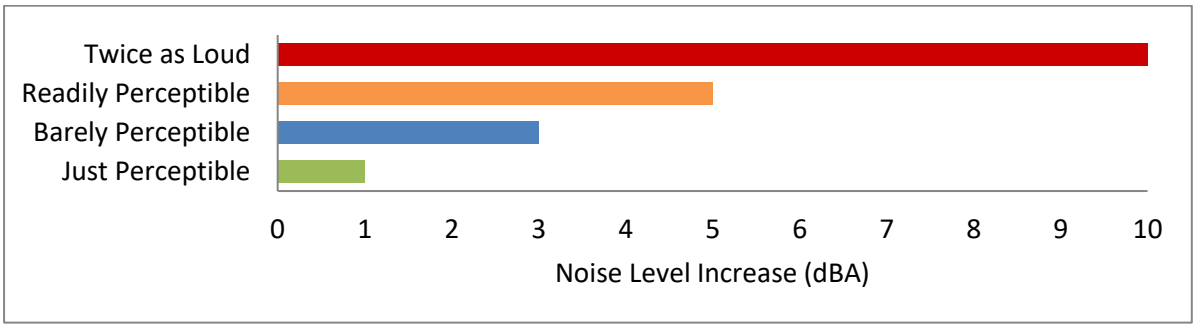
2.7 COMMUNITY RESPONSE TO NOISE

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

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

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Another twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (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 are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (5)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



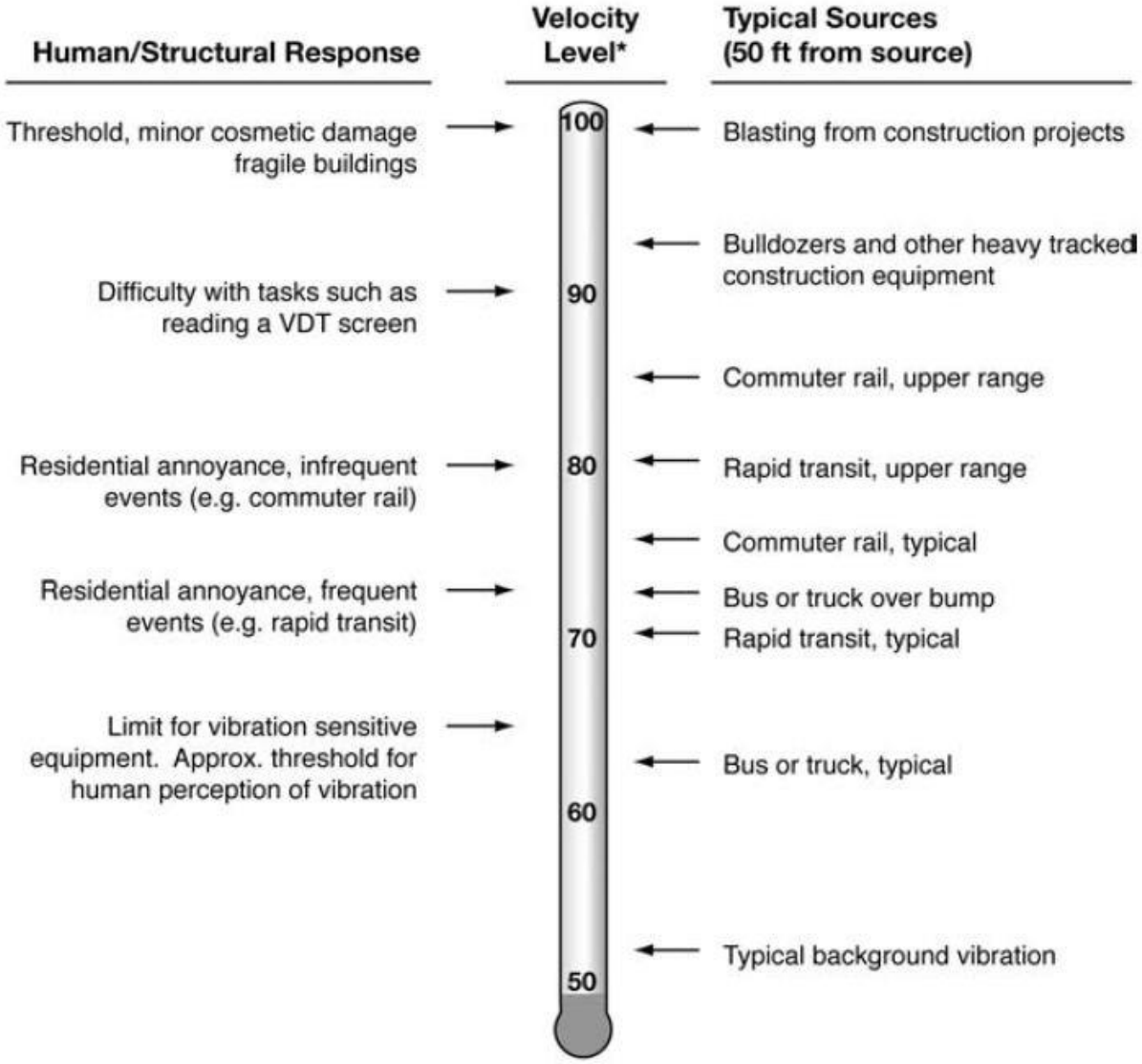
2.8 VIBRATION

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

3 REGULATORY SETTING

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

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

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

3.2 STATE OF CALIFORNIA GREEN BUILDING STANDARDS CODE

The State of California's Green Building Standards Code contains mandatory measures for non-residential building construction in Section 5.507 on Environmental Comfort. (10) These noise standards are applied to new construction in California for controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when non-residential structures are developed in areas where the exterior noise levels exceed 65 dBA CNEL, such as within a noise contour of an airport, freeway, railroad, and other areas where noise contours are not readily available. If the development falls within an airport or freeway 65 dBA CNEL noise contour, the combined sound transmission class (STC) rating of the wall and roof-ceiling assemblies must be at least 50. For those developments in areas where noise contours are not readily available, and the noise level exceeds 65 dBA L_{eq} for any hour of operation, a wall and roof-ceiling combined STC rating of 45, and exterior windows with a minimum STC rating of 40 are required (Section 5.507.4.1).

3.3 CITY OF LAKE ELSINORE GENERAL PLAN

The City of Lake Elsinore has adopted Section 3.7, *Noise,* of the Public Safety and Welfare Element (11) of the General Plan to control and abate environmental noise, and to protect the citizens of Lake Elsinore from excessive exposure to noise. The Noise section specifies the maximum allowable exterior noise levels for new developments impacted by transportation noise sources such as arterial roads, freeways, airports, and railroads. In addition, the Noise section identifies

noise polices designed to protect, create, and maintain an environment free from noise that may jeopardize the health or welfare of sensitive receivers, or degrade quality of life. To protect City of Lake Elsinore residents from excessive noise, the Noise section contains the following goal related to the Project:

Goal 7 *Maintain an environment for all City residents and visitors free of unhealthy, obtrusive, or otherwise excessive noise.*

To ensure noise-sensitive land uses are protected from excessive noise levels (Goal 7), the Noise section identifies the following policies:

7.1 Apply the noise standards set forth in the Lake Elsinore Noise and Land Use Compatibility Matrix (see Table 3-1) and Interior and Exterior Noise Standards (see Table 3-2) when considering all new development and redevelopment proposed within the City.

7.2 Require that mixed-use structures and areas be designed to prevent transfer of noise and vibration from commercial areas to residential areas.

7.3 Strive to reduce the effect of transportation noise on the I-15.

7.4 Consider estimated roadway noise contours based upon Figure 3.6, Noise Contours, when making land use design decisions along busy roadways throughout the City.

7.5 Participate and cooperate with other agencies and jurisdictions in the development of noise abatement plans for highways.

3.3.1 LAND USE COMPATIBILITY

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

The *Noise and Land Use Compatibility Matrix* describes categories of compatibility and not specific noise standards. According to these categories of compatibility, sensitive residential land use in the Project Study area is considered *clearly compatible* with exterior noise levels below 60 dBA CNEL and *normally compatible* with exterior noise levels below 70 dBA CNEL. For *normally compatible* land use, *new construction or development should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.* (11)

EXHIBIT 3-A: NOISE AND LAND USE COMPATIBILITY MATRIX

Land Use Categories		Day-Night Noise Level (LDN)						
Categories	**Uses**	**≤55**	**60**	**65**	**70**	**75**	**80≥**	
Residential	Single, Family, Duplex, Multiple Family	A	A	B	B	C	D	D
Residential	Mobile Homes	A	A	B	C	C	D	D
Commercial Regional District	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
Commercial Regional Village, District Special	Commercial, Retail, Bank, Restaurant, Movie Theatre	A	A	A	A	B	B	C
Commercial Industrial Institutional	Office Building, Research and Development, Professional Offices, City Office Building	A	A	A	B	B	C	D
Commercial Regional Institutional Civic Center	Amphitheatre, Concert Hall Auditorium, Meeting Hall	B	B	C	C	D	D	D
Commercial Recreation	Children's Amusement Park, Miniature Golf Course, Go-cart Track, Equestrian Center, Sports Club	A	A	A	B	B	D	D
Commercial General, Special Industrial Institutional	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
Institutional General	Hospital, Church, Library, Schools, Classroom	A	A	B	C	C	D	D
Open Space	Parks	A	A	A	B	C	D	D
Open Space	Golf Course, Cemeteries, Nature Centers, Wildlife Reserves, Wildlife Habitat	A	A	A	A	B	C	C
Agriculture	Agriculture	A	A	A	A	A	A	A

Interpretation	
Zone A Clearly Compatible	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
Zone B Normally Compatible	New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed nose insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.
Zone C Normally Incompatible	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 the design.
Zone D Clearly Incompatible	New construction or development should generally not be undertaken.

Source: City of Lake Elsinore General Plan, Public Safety and Welfare Element, Table 3-1.

3.4 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Lake and Mountain Shopping Center Project, stationary-source (operational) noise such as roof-top air conditioning units, drive-thru speakerphones, trash enclosures, parking lots, gas station activity, car wash tunnels and car wash vacuum activity are typically evaluated against standards established under a City's Municipal Code.

Section 17.176.060 of the City of Lake Elsinore Municipal Code states the following: *No person shall, operate or cause to be operated, any source of sound at any location within the incorporated City or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level when measured on any other property, either incorporated or unincorporated to exceed*…the maximum permissible sound levels by receiving land use. For residential land use, the Municipal Code identifies base exterior noise level limits for the daytime (7:00 a.m. to 10:00 p.m.) hours of 50 dBA L_{50} and 40 dBA L_{50} during the nighttime (10:00 p.m. to 7:00 a.m.) hours. These standards shall apply for a cumulative period of 30 minutes in any hour (L_{50}), as well as the standard plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes in any hour (L_{25}), or the standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour (L_8), or the standard plus 15 dBA for a cumulative period of more than 1 minute in any hour (L_2), or the standard plus 20 dBA for any period of time (L_{max}). (12). Table 3-1 shows the City of Lake Elsinore noise standards by land use.

TABLE 3-1: OPERATIONAL EXTERIOR NOISE LEVEL STANDARDS

Land Use	Condition	Based Exterior Noise Level Standards (dBA)[2]				
		L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
Single-Family Residential	Daytime	50	55	60	65	70
	Nighttime	40	45	50	55	60
Multi-Family Residential	Daytime	50	55	60	65	70
	Nighttime	45	50	55	60	65
Public Space/ Light Comm.	Daytime	60	65	70	75	80
	Nighttime	55	60	65	70	75
General Commercial	Daytime	65	70	75	80	85
	Nighttime	60	65	70	75	80
Light Industrial	Anytime	70	75	80	85	90
Heavy Industrial	Anytime	75	80	85	90	95

[1] Source: City of Lake Elsinore Municipal Code, Section 17.176.060(A)(2) & Table 1 (Appendix 3.1).
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

3.5 CONSTRUCTION NOISE STANDARDS

To analyze noise impacts originating from the construction of the Lake and Mountain Shopping Center Project, noise from construction activities are typically limited to the hours of operation established under a City's Municipal Code. The Municipal Code noise standards for construction are described below for the City of Lake Elsinore. The construction-related noise standards are summarized in Tables 3-2 and 3-3.

The City of Lake Elsinore has set restrictions to control noise impacts associated with the construction of the proposed Project. Section 17.176.080 (F), Construction/Demolition indicates that *operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between the weekday hours of 7:00 p.m. and 7:00 a.m., or at any time on weekends or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work by public service utilities or by variance issued by the City is prohibited*. The Municipal code further requires construction activities to be conducted in such a manner that the maximum (L_{max}) noise levels at affected residential and commercial properties will not exceed the mobile (less than 10-day duration) and stationary equipment (greater than 10-day duration) noise standards provided below on Tables 3-2 and 3-3, respectively. (12)

TABLE 3-2: MOBILE EQUIPMENT NOISE LEVEL LIMITS

Type	Receiving Land Use Category	Time Period	Maximum Noise Levels (dBA L_{max})[1]
I	Single-Family Residential	Daytime (7:00 a.m. - 7:00 p.m.)	75
		Nighttime (7:00 p.m. - 7:00 a.m.)	60
II	Multi-Family Residential	Daytime (7:00 a.m. - 7:00 p.m.)	80
		Nighttime (7:00 p.m. - 7:00 a.m.)	65
III	Semi-Residential/ Commercial	Daytime (7:00 a.m. - 7:00 p.m.)	85
		Nighttime (7:00 p.m. - 7:00 a.m.)	70

[1] Maximum noise levels for nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment, City of Lake Elsinore Municipal Code 17.176.080 (F) (Appendix 3.1).

TABLE 3-3: STATIONARY EQUIPMENT NOISE LEVEL LIMITS

Type	Receiving Land Use Category	Time Period	Maximum Noise Levels (dBA L_{max})[1]
I	Single-Family Residential	Daytime (7:00 a.m. - 7:00 p.m.)	60
		Nighttime (7:00 p.m. - 7:00 a.m.)	50
II	Multi-Family Residential	Daytime (7:00 a.m. - 7:00 p.m.)	65
		Nighttime (7:00 p.m. - 7:00 a.m.)	55
III	Semi-Residential/ Commercial	Daytime (7:00 a.m. - 7:00 p.m.)	70
		Nighttime (7:00 p.m. - 7:00 a.m.)	60

[1] Maximum noise levels for repetitively scheduled and relatively long-term operation (period of 10 days or more) of stationary equipment, City of Lake Elsinore Municipal Code 17.176.080 (F) (Appendix 3.1).

3.6 CONSTRUCTION VIBRATION STANDARDS

To analyze the vibration impacts originating from the construction of the Project, vibration from construction activities are typically evaluated against standards established under a City's Municipal Code. The Municipal Code vibration standards for construction are described below for the City of Lake Elsinore to determine the potential vibration impacts at sensitive receiver locations. The construction-related vibration standards for are summarized in Table 3-4.

3.6.1 CITY OF LAKE ELSINORE CONSTRUCTION VIBRATION STANDARDS

The City of Lake Elsinore Municipal Code, Section 17.176.080(G), states that *operating or permitting the operation of any device that creates a vibration which is above the vibration perception threshold of any individual at or beyond the property boundary of the source if on private property or at 150 feet (46 meters) from the source if on public space or public right-of-way* is prohibited. The Municipal Code defines the vibration perception threshold to be a motion velocity of 0.01 in/sec over the range of one to 100 Hz, as shown on Table 3-4. (12)

TABLE 3-4: CONSTRUCTION VIBRATION STANDARDS

Jurisdiction	Root-Mean-Square (RMS) Velocity (in/sec)
City of Lake Elsinore[1]	0.01

[1] Source: City of Lake Elsinore Municipal Code, Section 17.176.080(G) (Appendix 3.1).

3.6.2 HUMAN PERCEPTION OF VIBRATION

Typically, the human response at the perception threshold for vibration includes annoyance in residential areas as previously shown on Exhibit 2-B, when vibration levels expressed in vibration decibels (VdB) approach 75 VdB. The City of Lake Elsinore, however, identifies a vibration perception threshold of 0.01 in/sec. For vibration levels expressed in velocity, the human body responds to the average vibration amplitude often described as the root-mean-square (RMS). The RMS of a signal is the average of the squared amplitude of the signal, typically calculated over a one-second period. As with airborne sound, the RMS velocity is often expressed in decibel notation as vibration decibels (VdB), which serves to reduce the range of numbers used to describe human response to vibration. Therefore, the City of Lake Elsinore vibration standard of 0.01 in/sec in RMS velocity levels is used in this analysis to assess the human perception of vibration levels due to Project-related construction activities.

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4 SIGNIFICANCE CRITERIA

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

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

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

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

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

The Project site is not located within an airport land use plan or within 2 miles of a public airport, or within the vicinity of a private airstrip. Therefore, the Project would not result in potential noise impacts for people residing or working at the Project site. As such, the Project does not have the potential to expose people residing or working in the Project area to excessive noise levels and no impact would occur. No further analysis of CEQA Guideline C is required.

4.1 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.* (13) 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) (14) 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. (13) 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. Table 4-1 below provides a summary of the potential noise impact significance criteria, based on guidance from FICON.

TABLE 4-1: SIGNIFICANCE OF NOISE IMPACTS AT NOISE-SENSITIVE RECEIVERS

Without Project Noise Level	Potential Significant Impact
< 60 dBA	5 dBA or more
60 - 65 dBA	3 dBA or more
> 65 dBA	1.5 dBA or more

Federal Interagency Committee on Noise (FICON), 1992.

4.2 SIGNIFICANCE CRITERIA SUMMARY

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 4-2 shows the significance criteria summary matrix.

OFF-SITE TRAFFIC NOISE

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

OPERATIONAL NOISE

- If Project-related operational (stationary-source) noise levels exceed the exterior noise level standard at nearby sensitive receiver locations identified on Table 3-1 by land use category (City of Lake Elsinore Municipal Code, Chapter 17.176 Noise Control);
- If the existing ambient noise levels at the nearby noise-sensitive receivers near the Project site:
    - are less than 60 dBA and the Project creates a *readily perceptible* 5 dBA or greater Project-related noise level increase; or
    - range from 60 to 65 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project-related noise level increase; or
    - already exceed 65 dBA, and the Project creates a community noise level increase of greater than 1.5 dBA (FICON, 1992).

CONSTRUCTION NOISE AND VIBRATION

- If Project-related construction activities generate noise levels which exceed the mobile or stationary equipment noise level limits described on Tables 3-2 and 3-3 (City of Lake Elsinore Municipal Code, Section 17.176.080(F)).
- If short-term Project generated construction vibration levels exceed the City of Lake Elsinore maximum acceptable vibration standard of 0.01 in/sec (RMS) at sensitive receiver locations (City of Lake Elsinore Municipal Code, Section 17.176.080(G)).

TABLE 4-2: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Condition(s)	Significance Criteria	
		Daytime	Nighttime
Off-Site	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	
Operational	≥ 30 Minutes L_{50}	See Table 3-1 for the Exterior Noise Level Standards by Land Use	
	≥ 15 Minutes L_{25}		
	≥ 5 Minutes L_8		
	≥ 1 Minute L_2		
	Anytime L_{max}		
Construction	Noise Level Threshold (<10 Days)[4]	See Table 3-2	
	Noise Level Threshold (>10 Days)[4]	See Table 3-3	
	Vibration Level Threshold[5]	0.01 in/sec RMS	

[1] Source: FICON, 1992.
[2] Source: City of Lake Elsinore General Plan, Public Safety & Welfare Element, Section 3.7 Noise, Tables 3-1 & 3-2.
[3] Source: City of Lake Elsinore Municipal Code, Chapter 17.176 Noise Control (Appendix 3.1).
[4] Source: City of Lake Elsinore Municipal Code, Section 17.176.080(F) (Appendix 3.1).
[5] Source: City of Lake Elsinore Municipal Code, Section 17.176.080(G) (Appendix 3.1).
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, five 24-hour noise level measurements were taken at sensitive receiver locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Wednesday, October 9th, 2019. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

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

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent any part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (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 (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location. Appendix 5.2 provides a summary of the existing hourly ambient noise levels described below:

- Location L1 represents the noise levels in a vacant lot north of single-family home at 28885 Raveta Lane approximately 500 feet east of Stonebridge Terrace. The noise level measurements collected show an overall 24-hour exterior noise level of 53.1 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 46.3 dBA L_{eq} with an average nighttime noise level of 46.5 dBA L_{eq}.
- Location L2 represents the noise levels north of Project site southeast of 28891 Lake Street adjacent to dirt road. The noise level measurements collected show an overall 24-hour exterior noise level of 62.6 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 58.0 dBA L_{eq} with an average nighttime noise level of 55.5 dBA L_{eq}.
- Location L3 represents the noise levels across the street from single family home at 3764 Ash Street. The 24-hour CNEL indicates that the overall exterior noise level is 61.1 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 57.1 dBA L_{eq} with an average nighttime noise level of 53.9 dBA L L_{eq}.
- Location L4 represents the noise levels on Mountain Street north of single-family home at 14851 Noblewood Circle. The noise level measurements collected show an overall 24-hour exterior noise level of 68.5 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 64.6 dBA L_{eq} with an average nighttime noise level of 61.1 dBA L_{eq}.
- Location L5 represents the noise levels n Mountain Street north of single-family home at 14859 Noblewood Circle. The 24-hour CNEL indicates that the overall exterior noise level is 70.4 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 65.3 dBA L_{eq} with an average nighttime noise level of 63.5 dBA L L_{eq}.

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

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

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

Location[1]	Distance to Project Boundary (Feet)	Description	Energy Average Noise Level (dBA L_{eq})[2]		Median Noise Level (dBA L_{50})[2]		CNEL
			Daytime	Nighttime	Daytime	Nighttime	
L1	185'	Located in a vacant lot north of single-family home at 28885 Raveta Lane approximately 500 feet east of Stonebridge Terrace.	46.3	46.5	42.4	42.9	53.1
L2	10'	Located north of Project site southeast of 28891 Lake Street adjacent to dirt road.	58.0	55.5	52.4	49.3	62.6
L3	350'	Located across the street from single family home at 3764 Ash Street.	57.1	53.9	47.6	45.3	61.1
L4	65'	Located along Mountain Street north of single-family home at 14851 Noblewood Circle	64.6	61.1	57.2	50.3	68.5
L5	70'	Located on Mountain Street north of single-family home at 14859 Noblewood Circle.	65.3	63.5	52.7	46.4	70.4

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

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

6 METHODS AND PROCEDURES

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

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The estimated roadway noise impacts from vehicular traffic were calculated using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (16) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (17) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period.

6.2 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. Table 6-1 identifies the eight study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of Lake Elsinore General Plan Community Form Element, and the posted vehicle speeds. For this analysis, soft site conditions are used to analyze the traffic noise impacts within the Project study area. Soft site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. 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 noise study. (18)

The average daily traffic volumes used for this study are presented on Tables 6-2 and 6-3, and are provided by the *Lake and Mountain Shopping Center Traffic Impact Analysis* prepared by Urban Crossroads, Inc. for Existing (2019), Existing plus Ambient (EA) 2019, and Existing plus Ambient plus Cumulative (EAC) 2021 traffic conditions.

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Adjacent Planned Land Use[1]	Distance from Centerline to Nearest Adjacent Land Use (Feet)[2]	Vehicle Speed (mph)[3]
1	Lake St.	n/o Nichols Rd.	Commercial	60'	50
2	Lake St.	s/o Nichols Rd.	Commercial	60'	50
3	Lake St.	s/o Alberhill Ranch Rd.	Commercial/Residential	60'	50
4	Lake St.	n/o Mountain St.	Residential	60'	50
5	Lake St.	s/o Mountain St.	Residential	60'	50
6	Lake St.	s/o Lakeshore Dr.	Residential/School	50'	50
7	Lincoln St.	s/o Grand Av.	Residential	50'	40
9	Nichols Rd.	e/o Lake St.	Commercial/Residential	60'	50
10	Alberhill Ranch Rd.	e/o Lake St.	Residential	39'	40
11	Lakeshore Drive	e/o Lake St.	Residential	60'	50
12	Lakeshore Drive	e/o Terra Cotta Rd.	Residential	60'	50
13	Grand Av.	w/o Lincoln St.	Residential	50'	45
14	Grand Av.	e/o Lincoln St.	Residential	50'	45

[1] Sources: City of Lake Elsinore General Plan, Community Form Element, Figure 2.1A Land Use Plan and Google Earth aerial imagery.
[2] Distance to adjacent land use is based upon the right-of-way distances for each functional roadway classification.
[3] Source: Lake and Mountain Shopping Center Traffic Impact Analysis, Urban Crossroads, Inc.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic (1,000's)[1]					
			Existing (2019)		Existing + Ambient		EA + Cumulative	
			Without Project	With Project	Without Project	With Project	Without Project	With Project
1	Lake St.	n/o Nichols Rd.	16.6	17.1	17.3	17.8	18.3	18.8
2	Lake St.	s/o Nichols Rd.	21.5	22.2	22.4	23.1	23.2	23.9
3	Lake St.	s/o Alberhill Ranch Rd.	22.0	22.9	22.9	23.8	23.8	24.7
4	Lake St.	n/o Mountain St.	21.9	23.4	22.9	24.3	23.8	25.2
5	Lake St.	s/o Mountain St.	20.9	22.9	21.8	23.8	22.6	24.6
6	Lake St.	s/o Lakeshore Dr.	17.7	22.8	22.5	23.6	23.4	24.5
7	Lincoln St.	s/o Grand Av.	5.0	5.2	5.2	5.4	5.3	5.5
9	Nichols Rd.	e/o Lake St.	6.5	6.8	6.8	7.0	7.9	8.1
10	Alberhill Ranch Rd.	e/o Lake St.	1.5	1.7	1.6	1.8	2.0	2.2
11	Lakeshore Drive	e/o Lake St.	10.0	10.9	10.4	11.3	10.8	11.7
12	Lakeshore Drive	e/o Terra Cotta Rd.	13.1	13.5	13.7	14.1	14.1	14.5
13	Grand Av.	w/o Lincoln St.	10.7	11.2	11.1	11.6	11.3	11.8
14	Grand Av.	e/o Lincoln St.	12.8	13.7	13.3	14.2	13.7	14.6

[1] Source: Lake and Mountain Shopping Center Traffic Impact Analysis, Urban Crossroads, Inc.

Table 6-3 presents the time of day vehicle splits and Table 6-4 presents the traffic flow distributions (vehicle mix) used for this analysis. The vehicle mix provides the hourly distribution percentages of automobile, medium trucks, and heavy trucks for input into the FHWA noise prediction model.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

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

Source: Typical Southern California vehicle mix.

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

Roadway	Total % Traffic Flow			Total
	Autos	Medium Trucks	Heavy Trucks	
All Roadways[2]	97.42%	1.84%	0.74%	100.00%

[1] Source: County of Riverside Office of Industrial Hygiene.

6.3 CONSTRUCTION VIBRATION ASSESSMENT METHODOLOGY

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

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

TABLE 6-5: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

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

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

7 OFF-SITE TRANSPORTATION NOISE IMPACTS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed based on the *Lake and Mountain Shopping Center Traffic Impact Analysis*. (2) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

- Existing 2019 Without / With Project: This scenario refers to the existing 2019 present-day noise conditions, without and with the proposed Project.
- Existing 2019 plus Ambient Growth (EA) 2018 Without / With Project: This scenario refers to the background noise conditions without and with the proposed Project plus ambient growth.
- EA plus Cumulative (EAC) 2021 Without / With Project: This scenario refers to the background noise conditions without and with the proposed Project plus ambient growth. This scenario corresponds to 2021 conditions, and includes all cumulative projects identified in the Traffic Impact Analysis.

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 through 7-6 present a summary of the exterior traffic noise levels, without barrier attenuation, for the study area roadway segments analyzed from the without Project to the with Project conditions in each traffic scenario. Appendix 7.1 includes a summary of the traffic noise level contours for each of the traffic scenarios.

TABLE 7-1: EXISTING 2019 WITHOUT PROJECT NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	dBA CNEL			
				@ Adj. Land Use	70	65	60
					CL to Contour Distance (Feet)[2]		
1	Lake St.	n/o Nichols Rd.	Commercial	70.1	61	130	281
2	Lake St.	s/o Nichols Rd.	Commercial	71.2	72	155	334
3	Lake St.	s/o Alberhill Ranch Rd.	Commercial/Residential	71.3	73	157	339
4	Lake St.	n/o Mountain St.	Residential	71.3	73	157	338
5	Lake St.	s/o Mountain St.	Residential	71.1	71	152	328
6	Lake St.	s/o Lakeshore Dr.	Residential/School	71.1	60	128	276
7	Lincoln St.	s/o Grand Av.	Residential	63.2	RW	RW	82
9	Nichols Rd.	e/o Lake St.	Commercial/Residential	66.0	RW	70	150
10	Alberhill Ranch Rd.	e/o Lake St.	Residential	58.9	RW	RW	RW
11	Lakeshore Drive	e/o Lake St.	Residential	67.9	RW	93	200
12	Lakeshore Drive	e/o Terra Cotta Rd.	Residential	69.0	RW	111	240
13	Grand Av.	w/o Lincoln St.	Residential	67.8	RW	77	166
14	Grand Av.	e/o Lincoln St.	Residential	68.6	RW	87	187

[1] Sources: City of Lake Elsinore General Plan, Community Form Element, Figure 2.1A Land Use Plan and Google Earth aerial imagery.
[2] "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-2: EXISTING 2019 WITH PROJECT NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	dBA CNEL			
				@ Adj. Land Use	70	65	60
					CL to Contour Distance (Feet)[2]		
1	Lake St.	n/o Nichols Rd.	Commercial	70.2	62	133	287
2	Lake St.	s/o Nichols Rd.	Commercial	71.3	73	158	341
3	Lake St.	s/o Alberhill Ranch Rd.	Commercial/Residential	71.5	75	162	348
4	Lake St.	n/o Mountain St.	Residential	71.6	76	164	353
5	Lake St.	s/o Mountain St.	Residential	71.5	75	162	348
6	Lake St.	s/o Lakeshore Dr.	Residential/School	72.2	70	152	327
7	Lincoln St.	s/o Grand Av.	Residential	63.4	RW	RW	84
9	Nichols Rd.	e/o Lake St.	Commercial/Residential	66.2	RW	72	155
10	Alberhill Ranch Rd.	e/o Lake St.	Residential	59.4	RW	RW	RW
11	Lakeshore Drive	e/o Lake St.	Residential	68.2	RW	99	212
12	Lakeshore Drive	e/o Terra Cotta Rd.	Residential	69.2	53	114	245
13	Grand Av.	w/o Lincoln St.	Residential	68.0	RW	79	171
14	Grand Av.	e/o Lincoln St.	Residential	68.9	RW	91	195

[1] Sources: City of Lake Elsinore General Plan, Community Form Element, Figure 2.1A Land Use Plan and Google Earth aerial imagery.
[2] "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-3: EA 2019 WITHOUT PROJECT NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	dBA CNEL			
				@ Adj. Land Use	70	65	60
					CL to Contour Distance (Feet)[2]		
1	Lake St.	n/o Nichols Rd.	Commercial	70.2	62	134	289
2	Lake St.	s/o Nichols Rd.	Commercial	71.4	74	159	343
3	Lake St.	s/o Alberhill Ranch Rd.	Commercial/Residential	71.5	75	162	348
4	Lake St.	n/o Mountain St.	Residential	71.5	75	162	348
5	Lake St.	s/o Mountain St.	Residential	71.2	73	156	337
6	Lake St.	s/o Lakeshore Dr.	Residential/School	72.2	70	151	324
7	Lincoln St.	s/o Grand Av.	Residential	63.4	RW	RW	84
9	Nichols Rd.	e/o Lake St.	Commercial/Residential	66.2	RW	72	155
10	Alberhill Ranch Rd.	e/o Lake St.	Residential	59.1	RW	RW	RW
11	Lakeshore Drive	e/o Lake St.	Residential	68.0	RW	96	206
12	Lakeshore Drive	e/o Terra Cotta Rd.	Residential	69.2	RW	115	247
13	Grand Av.	w/o Lincoln St.	Residential	68.0	RW	79	170
14	Grand Av.	e/o Lincoln St.	Residential	68.7	RW	89	191

[1] Sources: City of Lake Elsinore General Plan, Community Form Element, Figure 2.1A Land Use Plan and Google Earth aerial imagery.
[2] "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-4: EA 2019 WITH PROJECT NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	dBA CNEL			
				@ Adj. Land Use	70	65	60
					CL to Contour Distance (Feet)[2]		
1	Lake St.	n/o Nichols Rd.	Commercial	70.4	63	137	294
2	Lake St.	s/o Nichols Rd.	Commercial	71.5	75	163	350
3	Lake St.	s/o Alberhill Ranch Rd.	Commercial/Residential	71.6	77	166	357
4	Lake St.	n/o Mountain St.	Residential	71.7	78	168	362
5	Lake St.	s/o Mountain St.	Residential	71.6	77	166	357
6	Lake St.	s/o Lakeshore Dr.	Residential/School	72.4	72	155	335
7	Lincoln St.	s/o Grand Av.	Residential	63.6	RW	RW	86
9	Nichols Rd.	e/o Lake St.	Commercial/Residential	66.3	RW	73	158
10	Alberhill Ranch Rd.	e/o Lake St.	Residential	59.6	RW	RW	RW
11	Lakeshore Drive	e/o Lake St.	Residential	68.4	RW	101	217
12	Lakeshore Drive	e/o Terra Cotta Rd.	Residential	69.4	54	117	252
13	Grand Av.	w/o Lincoln St.	Residential	68.2	RW	81	175
14	Grand Av.	e/o Lincoln St.	Residential	69.0	RW	93	200

[1] Sources: City of Lake Elsinore General Plan, Community Form Element, Figure 2.1A Land Use Plan and Google Earth aerial imagery.
[2] "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-5: EAC 2019 WITHOUT PROJECT NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	dBA CNEL			
				@ Adj. Land Use	70	65	60
					CL to Contour Distance (Feet)[2]		
1	Lake St.	n/o Nichols Rd.	Commercial	70.5	65	139	300
2	Lake St.	s/o Nichols Rd.	Commercial	71.5	76	163	351
3	Lake St.	s/o Alberhill Ranch Rd.	Commercial/Residential	71.6	77	166	357
4	Lake St.	n/o Mountain St.	Residential	71.6	77	166	357
5	Lake St.	s/o Mountain St.	Residential	71.4	74	160	345
6	Lake St.	s/o Lakeshore Dr.	Residential/School	72.4	72	155	333
7	Lincoln St.	s/o Grand Av.	Residential	63.5	RW	RW	85
9	Nichols Rd.	e/o Lake St.	Commercial/Residential	66.8	RW	80	171
10	Alberhill Ranch Rd.	e/o Lake St.	Residential	60.1	RW	RW	40
11	Lakeshore Drive	e/o Lake St.	Residential	68.2	RW	98	211
12	Lakeshore Drive	e/o Terra Cotta Rd.	Residential	69.4	54	117	252
13	Grand Av.	w/o Lincoln St.	Residential	68.0	RW	80	172
14	Grand Av.	e/o Lincoln St.	Residential	68.9	RW	91	195

[1] Sources: City of Lake Elsinore General Plan, Community Form Element, Figure 2.1A Land Use Plan and Google Earth aerial imagery.
[2] "RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-6: EAC 2019 WITH PROJECT NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	dBA CNEL			
				@ Adj. Land Use	70	65	60
					CL to Contour Distance (Feet)[2]		
1	Lake St.	n/o Nichols Rd.	Commercial	70.6	66	142	305
2	Lake St.	s/o Nichols Rd.	Commercial	71.6	77	166	358
3	Lake St.	s/o Alberhill Ranch Rd.	Commercial/Residential	71.8	79	170	366
4	Lake St.	n/o Mountain St.	Residential	71.9	80	172	371
5	Lake St.	s/o Mountain St.	Residential	71.8	79	170	365
6	Lake St.	s/o Lakeshore Dr.	Residential/School	72.6	74	159	343
7	Lincoln St.	s/o Grand Av.	Residential	63.6	RW	41	87
9	Nichols Rd.	e/o Lake St.	Commercial/Residential	66.9	RW	81	174
10	Alberhill Ranch Rd.	e/o Lake St.	Residential	60.5	RW	RW	RW
11	Lakeshore Drive	e/o Lake St.	Residential	68.5	RW	103	223
12	Lakeshore Drive	e/o Terra Cotta Rd.	Residential	69.5	55	119	257
13	Grand Av.	w/o Lincoln St.	Residential	68.2	38	82	177
14	Grand Av.	e/o Lincoln St.	Residential	69.2	44	95	204

[1] Sources: City of Lake Elsinore General Plan, Community Form Element, Figure 2.1A Land Use Plan and Google Earth aerial imagery.
[2] "RW" = Location of the respective noise contour falls within the right-of-way of the road.

7.2 EXISTING CONDITION PROJECT TRAFFIC NOISE LEVELS

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project has been included in this report. However, the analysis of existing traffic noise levels plus traffic noise generated by the proposed Project scenario will not actually occur since the Project would not be fully constructed and operational until future cumulative conditions.

Table 7-1 presents the Existing without Project conditions CNEL noise levels. The exterior noise levels are shown to range from 58.9 to 71.3 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions will range from 59.4 to 72.2 dBA CNEL. As shown on Table 7-7 the Project will generate a noise level increase of up to 1.1 dBA CNEL on the study area roadway segments.

TABLE 7-7: EXISTING OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Planned (Existing) Land Use	CNEL at Adjacent Land Use (dBA)[1]			Noise-Sensitive?
				No Project	With Project	Project Addition	
1	Lake St.	n/o Nichols Rd.	Commercial	70.1	70.2	0.1	No
2	Lake St.	s/o Nichols Rd.	Commercial	71.2	71.3	0.1	No
3	Lake St.	s/o Alberhill Ranch Rd.	Commercial/Residential	71.3	71.5	0.2	No
4	Lake St.	n/o Mountain St.	Residential	71.3	71.6	0.3	No
5	Lake St.	s/o Mountain St.	Residential	71.1	71.5	0.4	No
6	Lake St.	s/o Lakeshore Dr.	Residential/School	71.1	72.2	1.1	No
7	Lincoln St.	s/o Grand Av.	Residential	63.2	63.4	0.2	No
9	Nichols Rd.	e/o Lake St.	Commercial/Residential	66.0	66.2	0.2	No
10	Alberhill Ranch Rd.	e/o Lake St.	Residential	58.9	59.4	0.5	No
11	Lakeshore Drive	e/o Lake St.	Residential	67.9	68.2	0.3	No
12	Lakeshore Drive	e/o Terra Cotta Rd.	Residential	69.0	69.2	0.2	No
13	Grand Av.	w/o Lincoln St.	Residential	67.8	68.0	0.2	No
14	Grand Av.	e/o Lincoln St.	Residential	68.6	68.9	0.3	No

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

7.3 EXISTING PLUS AMBIENT CONDITION PROJECT TRAFFIC NOISE LEVELS

Table 7-3 presents the EA 2019 without Project conditions CNEL noise levels which are expected to range from 59.1 to 72.2 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-4 shows the EA 2019 with Project conditions will range from 59.6 to 72.4 dBA CNEL. As shown on Table 7-8 the Project will generate a noise level increase of up to 0.5 dBA CNEL on the study area roadway segments. Based on the significance criteria in Section 4, the Project-related noise level increases are considered *less than significant* under EA 2019 with Project conditions at the land uses adjacent to roadways conveying Project traffic.

TABLE 7-8: EA 2019 OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Planned (Existing) Land Use	CNEL at Adjacent Land Use (dBA)[1]			Noise-Sensitive?
				No Project	With Project	Project Addition	
1	Lake St.	n/o Nichols Rd.	Commercial	70.2	70.4	0.2	No
2	Lake St.	s/o Nichols Rd.	Commercial	71.4	71.5	0.1	No
3	Lake St.	s/o Alberhill Ranch Rd.	Commercial/Residential	71.5	71.6	0.1	No
4	Lake St.	n/o Mountain St.	Residential	71.5	71.7	0.2	No
5	Lake St.	s/o Mountain St.	Residential	71.2	71.6	0.4	No
6	Lake St.	s/o Lakeshore Dr.	Residential/School	72.2	72.4	0.2	No
7	Lincoln St.	s/o Grand Av.	Residential	63.4	63.6	0.2	No
9	Nichols Rd.	e/o Lake St.	Commercial/Residential	66.2	66.3	0.1	No
10	Alberhill Ranch Rd.	e/o Lake St.	Residential	59.1	59.6	0.5	No
11	Lakeshore Drive	e/o Lake St.	Residential	68.0	68.4	0.4	No
12	Lakeshore Drive	e/o Terra Cotta Rd.	Residential	69.2	69.4	0.2	No
13	Grand Av.	w/o Lincoln St.	Residential	68.0	68.2	0.2	No
14	Grand Av.	e/o Lincoln St.	Residential	68.7	69.0	0.3	No

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

7.4 EA PLUS CUMULATIVE CONDITION PROJECT TRAFFIC NOISE LEVELS

Table 7-5 presents the EAC 2019 without Project conditions CNEL noise levels which are expected to range from 60.1 to 72.4 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-6 shows the EAC 2019 with Project conditions will range from 60.5 to 72.6 dBA CNEL. As shown on Table 7-9 the Project will generate a noise level increase of up to 0.4 dBA CNEL on the study area roadway segments. Based on the significance criteria in Section 4, the Project-related noise level increases are considered *less than significant* under EAC 2018 with Project conditions at the land uses adjacent to roadways conveying Project traffic.

TABLE 7-9: EAC 2019 OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Planned (Existing) Land Use	CNEL at Adjacent Land Use (dBA)[1]			Noise-Sensitive?
				No Project	With Project	Project Addition	
1	Lake St.	n/o Nichols Rd.	Commercial	70.5	70.6	0.1	No
2	Lake St.	s/o Nichols Rd.	Commercial	71.5	71.6	0.1	No
3	Lake St.	s/o Alberhill Ranch Rd.	Commercial/Residential	71.6	71.8	0.2	No
4	Lake St.	n/o Mountain St.	Residential	71.6	71.9	0.3	No
5	Lake St.	s/o Mountain St.	Residential	71.4	71.8	0.4	No
6	Lake St.	s/o Lakeshore Dr.	Residential/School	72.4	72.6	0.2	No
7	Lincoln St.	s/o Grand Av.	Residential	63.5	63.6	0.1	No
9	Nichols Rd.	e/o Lake St.	Commercial/Residential	66.8	66.9	0.1	No
10	Alberhill Ranch Rd.	e/o Lake St.	Residential	60.1	60.5	0.4	No
11	Lakeshore Drive	e/o Lake St.	Residential	68.2	68.5	0.3	No
12	Lakeshore Drive	e/o Terra Cotta Rd.	Residential	69.4	69.5	0.1	No
13	Grand Av.	w/o Lincoln St.	Residential	68.0	68.2	0.2	No
14	Grand Av.	e/o Lincoln St.	Residential	68.9	69.2	0.3	No

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

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8 RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following receiver locations as shown on Exhibit 8-A were identified as representative locations for focused 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.

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

R1: Located approximately 53 feet north of the Project site, R1 represents an existing single-family home at 28891 Lake Street. A 24-hour noise level measurement was taken near this location, L2, to describe the existing ambient noise environment.

R2: Location R2 represents existing single-family home at 3748 Ash Street located approximately 191 feet east of the Project site. A 24-hour noise level measurement was taken near this location, L3, to describe the existing ambient noise environment.

R3: Location R3 represents the existing single-family home at 14851 Noblewood Circle roughly 109 feet south of the Project site. A 24-hour noise level measurement was taken near this location, L4, to describe the existing ambient noise environment.

R4: Location R4 represents the existing single-family home at 14857 Noblewood Circle located approximately 92 feet south of the Project site. A 24-hour noise level measurement was taken near this location, L5, to describe the existing ambient noise environment.

R5: Location R5 represents an existing single-family home located at 1510 Mountain Street approximately 371 feet west of the Project site. A 24-hour noise level measurement was taken near this location, L1, to describe the existing ambient noise environment.

R6: Location R6 represents an existing single-family home located roughly 85 feet west of the Project site at 28885 Raveta Lane. A 24-hour noise level measurement was taken near this location, L1, to describe the existing ambient noise environment.

EXHIBIT 8-A: RECEIVER LOCATIONS

9 OPERATIONAL IMPACTS

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

9.1 REFERENCE NOISE LEVELS

To estimate the Project operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. This section provides a detailed description of the reference noise level measurements shown on Table 9-1 used to estimate the Project operational noise impacts.

It is important to note that the following projected noise levels assume the worst-case noise environment with the roof-top air conditioning units, drive-thru speakerphones, trash enclosures, parking lots, gas station activity, car wash tunnels and car wash vacuum activity all operating simultaneously. These noise level impacts will vary throughout the day. All noise sources were modeled assuming peak operational activity with no periods of inactivity, and are assumed to operate simultaneously, to present a conservative analysis.

TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source	Measurement Duration (hh:mm:ss)	Distance From Source (Feet)	Noise Source Height (Feet)	Reference Noise Levels (dBA L_{50})	
				@ Ref. Dist.	@ 50 Feet
Roof-Top Air Conditioning Units[1]	96:00:00	5'	5'	74.4	54.4
Drive-Through Speakerphone[2]	00:03:00	15'	3'	60.9	50.4
Trash Enclosure Activity[3]	00:00:32	5'	5'	69.0	49.0
Commercial Parking Lot[4]	00:00:13	5'	5'	56.7	36.7
Gas Station Activities[5]	01:00:00	5'	5'	65.6	45.6
Car Wash Tunnel[6]	00:03:04	10'	8'	81.6	67.6
Car Wash Vacuum[7]	00:01:02	5'	3'	74.2	54.2

[1] As measured by Urban Crossroads, Inc. on 7/27/2015 at the Santee Walmart located at 170 Town Center Parkway.
[2] As measured by Urban Crossroads, Inc. on 12/19/2014 at a Panera Bread drive-thru in the City of Brea.
[3] As measured by Urban Crossroads, Inc. on 5/3/2018 at trash enclosure in a parking lot in the City of Costa Mesa.
[4] As measured by Urban Crossroads, Inc. on 5/30/2012 at the Laguna Niguel Walmart located at 27470 Alicia Parkway.
[5] As measured by Urban Crossroads, Inc. on 4/26/2016 at an ARCO gas station located at 6501 Quail Hill Parkway in the City of Irvine.
[6] As measured by Urban Crossroads, Inc. on 6/6/2016 at the Audi Mission Viejo Dealership located at 28451 Marguerite Parkway.
[7] As measured by Urban Crossroads, Inc. on 5/27/2011 at an express car wash located at 1195 Baker Street in Costa Mesa.

9.1.1 ROOF-TOP AIR CONDITIONING UNITS

To assess the noise levels created by the roof-top air conditioning units at the Project site, reference noise levels measurements were taken at the Santee Walmart on July 27th, 2015. Located at 170 Town Center Parkway in the City of Santee, the noise level measurements describe a single mechanical roof-top air conditioning unit on the roof of an existing Walmart store with additional background units. The reference noise level represents a Lennox SCA120 series 10-ton model packaged air conditioning unit in addition to background units operating simultaneously. Using a uniform reference distance of 50 feet, the reference noise level noise level is 54.4 dBA L_{50}. The operating conditions of the reference noise level measurement reflect peak summer cooling requirements with measured temperatures approaching 96 degrees Fahrenheit (°F) with average daytime temperatures of 82°F. The noise attenuation provided by a parapet wall is not reflected in this reference noise level measurement.

9.1.2 DRIVE-THROUGH SPEAKERPHONE

To describe the potential noise level impacts associated with potential drive-through speakerphones and vehicle activities, a reference noise level measurement was collected on Friday, December 19th, 2014 at a Panera Bread restaurant located at 423 South Associated Road in the City of Brea. The reference noise levels collected at the Panera Bread restaurant are expected to reflect potential drive-through speakerphone noise level activities at the Project site, since the reference measurement includes both drive-through speakerphone and vehicle activity noise. The noise sources included in the reference noise level measurement consist of voices of the Panera Bread employees over the speakerphone, customers' voices ordering food, car engines idling, car radios playing music, and cars queuing in the drive-through lane. At 50 feet from the speakerphone, a reference noise level of 50.4 dBA L_{50} was measured. This reference noise level measurement overstates the actual average noise levels since it represents the average of 28 speakerphone menu board ordering events observed over a two-hour period. In other words, the Panera Bread speakerphone menu board reference noise level describes continuous drive-through operations and does not include any periods of inactivity.

9.1.3 TRASH ENCLOSURE ACTIVITY

To describe the noise levels associated with a trash enclosure, Urban Crossroads collected a reference noise level measurement on May 3rd, 2018 at an existing commercial and office park trash enclosure within a parking lot on the northeast corner of Baker Street and Red Hill Avenue. The measured reference noise level at the uniform 50-foot reference distance is 49.0 dBA L_{50} for the trash enclosure activity. The trash enclosure activity noise levels include two metal gates opening and closing, metal scraping against concrete floor sounds, dumpster movement on metal wheels, trash dropping into the metal dumpster, and background parking lot vehicle movements.

9.1.4 COMMERCIAL PARKING LOT

To determine the noise levels associated with commercial parking lot vehicle movements, Urban Crossroads collected reference noise level measurements at the Laguna Niguel Walmart located at 27470 Alicia Parkway on May 30, 2012. The 15-minute noise level measurement indicates that the parking lot vehicle movements generates noise levels of 36.7 dBA L_{50} at a normalized distance of 50 feet. The parking lot noise levels are mainly due to cars pulling in and out of spaces, car alarms sounding, and customers moving shopping carts.

9.1.5 GAS STATION ACTIVITIES

To describe the potential noise level impacts created by the gas station of the Project, a reference noise level measurement was collected on Tuesday, April 26th, 2016 at an ARCO gas station located at 6501 Quail Hill Parkway in the City of Irvine. The reference noise level measurement includes six cars fueling at once, car doors closing, engines starting, fuel pump TV sounds and background car pass-by events within a 3-minute period. At 50 feet from the gas station, a reference noise level of 45.6 dBA L_{50} was measured.

9.1.6 CAR WASH TUNNEL AIR BLOWERS

On June 10th, 2016, a reference noise level measurement was taken by Urban Crossroads at the Audi Mission Viejo dealership to describe the air blowers used in a car wash tunnel. A reference noise level of 67.6 dBA L_{50} was measured at the uniform distance of 50 feet. The reference noise level measurement includes an exposed five-unit air blower system with background pressure washer noise and is used to represent the proposed Project facilities. It is anticipated that the air dryers within the proposed car wash will operate continuously during the peak operating conditions. Further, this noise analysis does not include any additional attenuation or directional influence provided by locating the car wash air blower and dryer equipment inside the tunnel itself, but rather, models the tunnel exit activities as occurring at the building façade. As such, the analysis may conservatively overstate actual noise levels produced by the car wash tunnel air blower and dryer equipment.

9.1.7 CAR WASH VACUUM ACTIVITY

To represent the self-serve vacuums within the Project site, a reference noise level measurement was collected on May 27th, 2011 at an express car wash located at 1195 Baker Street in the City of Costa Mesa. The reference noise level measurement represents up to four vacuums operating simultaneously at the Costa Mesa express car wash. At a uniform reference distance of 50 feet, the vacuum reference noise level is 54.2 dBA L_{50}. This reference car wash vacuum activity noise level is anticipated to conservatively overstate those of the Project, since this reference noise level includes more vacuums operating simultaneously (4 vacuums) than what will be possible at the Project site (2 vacuums).

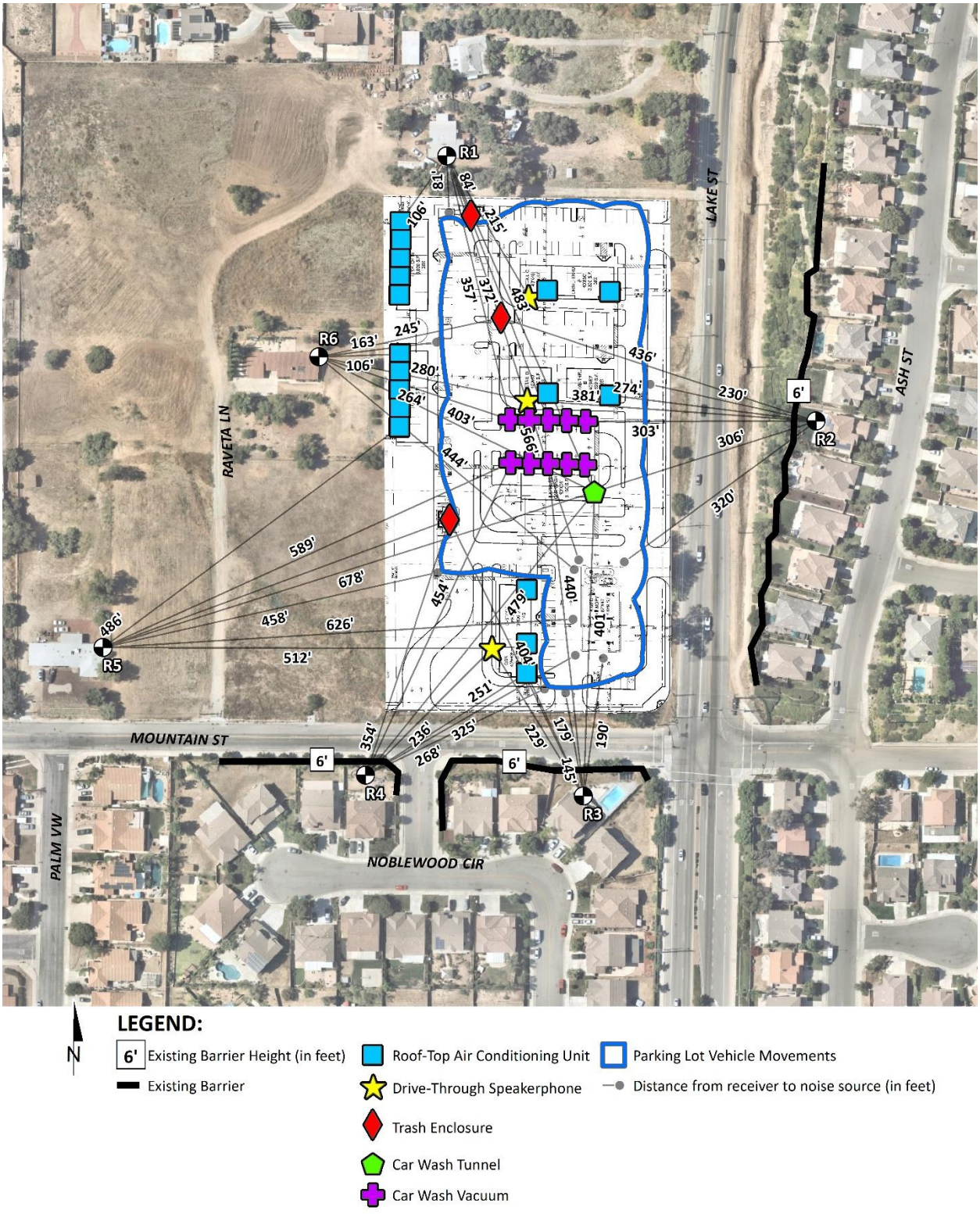
9.2 PROJECT OPERATIONAL NOISE LEVELS

Based upon the reference noise levels, it is possible to estimate the Project operational stationary-source noise levels at each of the sensitive receiver locations. The operational noise level calculations shown on Table 9-2 account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. Hard site conditions are used in the operational noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source. The basic noise attenuation equation shown below is used to calculate the distance attenuation based on a reference noise level (SPL_1):

$$SPL_2 = SPL_1 - 20\log(D_2/D_1)$$

Where SPL_2 is the resulting noise level after attenuation, SPL_1 is the source noise level, D_2 is the distance to the reference sound pressure level (SPL_1), and D_1 is the distance to the receiver location.

EXHIBIT 9-A: OPERATIONAL NOISE SOURCE AND RECEIVER LOCATIONS



9.2.1 UNMITIGATED PROJECT OPERATIONAL NOISE LEVELS

Table 9-2 indicates that the unmitigated combined Project operational noise levels associated with the roof-top air conditioning units, drive-thru speakerphones, trash enclosures, parking lots, gas station activity, car wash tunnels and car wash vacuum activity are expected to range from 39.6 to 46.9 dBA L_{50} at the noise-sensitive off-site receiver locations. The unmitigated operational noise level calculation worksheets are included in Appendix 9.1.

TABLE 9-2: UNMITIGATED PROJECT OPERATIONAL NOISE LEVELS

Receiver Location[1]	Noise Sources[2]	Operational Noise Levels (dBA)[3]				
		L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
R1	Air Conditioning Unit (Roof-Top)	35.4	37.1	38.4	38.7	39.2
	Drive-Through Speakerphone	24.4	25.6	27.1	28.8	29.9
	Trash Enclosure	29.5	35.5	42.5	47.5	49.0
	Parking Lot	32.5	36.5	39.5	42.9	55.3
	Gas Station Activity	24.5	25.8	28.4	33.3	41.3
	Car Wash Tunnel	39.0	49.4	50.0	50.7	51.2
	Car Wash Vacuum Activity	23.2	24.4	26.2	27.0	27.8
	Combined Noise Level:	41.7	50.1	51.3	53.1	57.6
R2	Air Conditioning Unit (Roof-Top)	31.5	33.2	34.5	34.8	35.3
	Drive-Through Speakerphone	26.8	28.0	29.5	31.2	32.3
	Trash Enclosure	19.6	25.6	32.6	37.6	39.1
	Parking Lot	16.9	20.9	23.9	27.3	39.7
	Gas Station Activity	23.3	24.6	27.2	32.1	40.1
	Car Wash Tunnel	46.0	56.4	57.0	57.7	58.2
	Car Wash Vacuum Activity	38.6	39.8	41.6	42.4	43.2
	Combined Noise Level:	46.9	56.5	57.2	57.9	58.5
R3	Air Conditioning Unit (Roof-Top)	34.1	35.8	37.1	37.4	37.9
	Drive-Through Speakerphone	30.9	32.1	33.6	35.3	36.4
	Trash Enclosure	20.9	26.9	33.9	38.9	40.4
	Parking Lot	19.6	23.6	26.6	30.0	42.4
	Gas Station Activity	26.6	27.9	30.5	35.4	43.4
	Car Wash Tunnel	44.1	54.5	55.1	55.8	56.3
	Car Wash Vacuum Activity	30.1	31.3	33.1	33.9	34.7
	Combined Noise Level:	44.9	54.6	55.3	56.1	56.9

Receiver Location[1]	Noise Sources[2]	Operational Noise Levels (dBA)[3]				
		L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
R4	Air Conditioning Unit (Roof-Top)	32.8	34.5	35.8	36.1	36.6
	Drive-Through Speakerphone	27.0	28.2	29.7	31.4	32.5
	Trash Enclosure	17.1	23.1	30.1	35.1	36.6
	Parking Lot	12.1	16.1	19.1	22.5	34.9
	Gas Station Activity	19.3	20.6	23.2	28.1	36.1
	Car Wash Tunnel	37.9	48.3	48.9	49.6	50.1
	Car Wash Vacuum Activity	24.9	26.1	27.9	28.7	29.5
	Combined Noise Level:	39.6	48.6	49.3	50.1	50.8
R5	Air Conditioning Unit (Roof-Top)	14.6	16.3	17.6	17.9	18.4
	Drive-Through Speakerphone	30.2	31.4	32.9	34.6	35.7
	Trash Enclosure	8.0	14.0	21.0	26.0	27.5
	Parking Lot	17.5	21.5	24.5	27.9	40.3
	Gas Station Activity	17.8	19.1	21.7	26.6	34.6
	Car Wash Tunnel	45.0	55.4	56.0	56.7	57.2
	Car Wash Vacuum Activity	32.8	34.0	35.8	36.6	37.4
	Combined Noise Level:	45.4	55.5	56.1	56.8	57.4
R6	Air Conditioning Unit (Roof-Top)	31.4	33.1	34.4	34.7	35.2
	Drive-Through Speakerphone	22.1	23.3	24.8	26.5	27.6
	Trash Enclosure	30.4	36.4	43.4	48.4	49.9
	Parking Lot	26.4	30.4	33.4	36.8	49.2
	Gas Station Activity	15.3	16.6	19.2	24.1	32.1
	Car Wash Tunnel	38.3	48.7	49.3	50.0	50.5
	Car Wash Vacuum Activity	26.3	27.5	29.3	30.1	30.9
	Combined Noise Level:	40.1	49.2	50.5	52.5	54.8

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] Reference noise sources as shown on Table 9-1.
[3] Stationary source noise level calculations are provided in Appendix 9.1.

9.2.2 UNMITIGATED PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE WITH APPLICABLE STANDARDS

Table 9-3 indicates that the noise levels associated with Project operational noise sources are expected to range from 39.6 to 46.9 dBA L_{50} at sensitive off-site sensitive receiver locations. Table 9-3 shows that the Project operational-source noise levels at potentially affected receivers exceed the City of Lake Elsinore daytime and nighttime exterior noise level standards without mitigation. Therefore, the unmitigated Project operational noise level impacts are considered *potentially significant.*

TABLE 9-3: UNMITIGATED OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Land Use	Noise Level at Receiver Locations (dBA)[2]					Threshold Exceeded?[3]	
		L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)	Daytime	Nighttime
Exterior Noise Level Standards	**Daytime Residential**	**50**	**55**	**60**	**65**	**70**	**-**	**-**
	Nighttime Residential	**40**	**45**	**50**	**55**	**60**	**-**	**-**
R1	Residential	41.7	50.1	51.3	53.1	57.6	No	Yes
R2	Residential	46.9	56.5	57.2	57.9	58.5	Yes	Yes
R3	Residential	44.9	54.6	55.3	56.1	56.9	No	Yes
R4	Residential	39.6	48.6	49.3	50.1	50.8	No	Yes
R5	Residential	45.4	55.5	56.1	56.8	57.4	Yes	Yes
R6	Residential	40.1	49.2	50.5	52.5	54.8	No	Yes

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] Estimated Project operational noise levels as shown on Table 9-2.
[3] Do the Project operational noise levels satisfy the operational noise level standards? "Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

9.2.3 MITIGATED PROJECT OPERATIONAL NOISE LEVELS

To reduce the *potentially significant* Project operational noise level increases for noise sensitive receivers, several noise mitigation measures are considered in this report. To satisfy the applicable local noise standards the project shall implement the following operational noise mitigation measures.

- No car wash activities shall be permitted during the nighttime hours of 10:00 p.m. to 7:00 a.m.
- Reduce the car wash air blower and dryer equipment noise by locating the equipment inside the tunnel and/or utilize sound rated air blower and dryer equipment measuring no more than 71 dBA L_{50} at 10 feet.
- Incorporate parapet walls where appropriate; and
- Incorporate on-site noise barriers, landscaping, or similar physical features that would act to generally attenuate noise emanating from the Project related noise sources.
- If an outdoor speaker system is being used in conjunction with a Project, the outdoor speaker system shall be oriented away from sensitive receivers and the volume set at a level not readily audible past the property line.

Table 9-4 indicates that the mitigated daytime Project operational noise levels associated with the roof-top air conditioning units, drive-thru speakerphones, trash enclosures, parking lots, gas station activity, car wash tunnels and car wash vacuum activity are expected to range from 35.5 to 41.4 dBA L_{50} at the noise-sensitive off-site receiver locations. The mitigated operational noise level calculation worksheets are included in Appendix 9.2.

TABLE 9-4: MITIGATED (DAYTIME) PROJECT OPERATIONAL NOISE LEVELS

Receiver Location[1]	Noise Sources[2]	Operational Noise Levels (dBA)[3]				
		L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
R1	Air Conditioning Unit (Roof-Top)	35.4	37.1	38.4	38.7	39.2
	Drive-Through Speakerphone	24.4	25.6	27.1	28.8	29.9
	Trash Enclosure	29.5	35.5	42.5	47.5	49.0
	Parking Lot	38.6	42.6	45.6	49.0	61.4
	Gas Station Activity	24.5	25.8	28.4	33.3	41.3
	Car Wash Tunnel	29.0	39.4	40.0	40.7	41.2
	Car Wash Vacuum Activity	23.2	24.4	26.2	27.0	27.8
	Combined Noise Level:	41.2	45.6	48.6	52.0	61.8
R2	Air Conditioning Unit (Roof-Top)	31.5	33.2	34.5	34.8	35.3
	Drive-Through Speakerphone	26.8	28.0	29.5	31.2	32.3
	Trash Enclosure	19.6	25.6	32.6	37.6	39.1
	Parking Lot	25.3	29.3	32.3	35.7	48.1
	Gas Station Activity	23.3	24.6	27.2	32.1	40.1
	Car Wash Tunnel	36.0	46.4	47.0	47.7	48.2
	Car Wash Vacuum Activity	38.6	39.8	41.6	42.4	43.2
	Combined Noise Level:	41.4	47.6	48.6	49.6	52.4
R3	Air Conditioning Unit (Roof-Top)	34.1	35.8	37.1	37.4	37.9
	Drive-Through Speakerphone	30.9	32.1	33.6	35.3	36.4
	Trash Enclosure	20.9	26.9	33.9	38.9	40.4
	Parking Lot	26.9	30.9	33.9	37.3	49.7
	Gas Station Activity	26.6	27.9	30.5	35.4	43.4
	Car Wash Tunnel	34.1	44.5	45.1	45.8	46.3
	Car Wash Vacuum Activity	30.1	31.3	33.1	33.9	34.7
	Combined Noise Level:	39.3	45.7	46.8	48.2	52.6
R4	Air Conditioning Unit (Roof-Top)	32.8	34.5	35.8	36.1	36.6
	Drive-Through Speakerphone	27.0	28.2	29.7	31.4	32.5
	Trash Enclosure	17.1	23.1	30.1	35.1	36.6
	Parking Lot	20.8	24.8	27.8	31.2	43.6
	Gas Station Activity	19.3	20.6	23.2	28.1	36.1
	Car Wash Tunnel	27.9	38.3	38.9	39.6	40.1
	Car Wash Vacuum Activity	24.9	26.1	27.9	28.7	29.5
	Combined Noise Level:	35.5	40.5	41.7	43.1	46.9

Receiver Location[1]	Noise Sources[2]	Operational Noise Levels (dBA)[3]				
		L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
R5	Air Conditioning Unit (Roof-Top)	14.6	16.3	17.6	17.9	18.4
	Drive-Through Speakerphone	30.2	31.4	32.9	34.6	35.7
	Trash Enclosure	8.0	14.0	21.0	26.0	27.5
	Parking Lot	27.3	31.3	34.3	37.7	50.1
	Gas Station Activity	17.8	19.1	21.7	26.6	34.6
	Car Wash Tunnel	35.0	45.4	46.0	46.7	47.2
	Car Wash Vacuum Activity	32.8	34.0	35.8	36.6	37.4
	Combined Noise Level:	38.3	46.0	46.9	47.9	52.2
R6	Air Conditioning Unit (Roof-Top)	31.4	33.1	34.4	34.7	35.2
	Drive-Through Speakerphone	22.1	23.3	24.8	26.5	27.6
	Trash Enclosure	30.4	36.4	43.4	48.4	49.9
	Parking Lot	34.0	38.0	41.0	44.4	56.8
	Gas Station Activity	15.3	16.6	19.2	24.1	32.1
	Car Wash Tunnel	28.3	38.7	39.3	40.0	40.5
	Car Wash Vacuum Activity	26.3	27.5	29.3	30.1	30.9
	Combined Noise Level:	38.0	43.2	46.7	50.5	57.7

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] Reference noise sources as shown on Table 9-1.
[3] Stationary source noise level calculations are provided in Appendix 9.2.

9.2.4 MITIGATED (DAYTIME) PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE WITH APPLICABLE STANDARDS

As indicated on Table 9-5, with incorporation proposed mitigation, Project operational-source noise received at potentially affected receivers would comply with applicable standards. On this basis, as mitigated, the potential for the Project to result in exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies would be *less than significant*.

TABLE 9-5: MITIGATED (DAYTIME) PROJECT OPERATIONAL NOISE LEVELS

Receiver Location[1]	Land Use	Noise Level at Receiver Locations (dBA)[2]					Threshold Exceeded?[3]
		L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)	
Exterior Noise Level Standards	**Daytime Residential**	**50**	**55**	**60**	**65**	**70**	**-**
R1	Residential	41.2	45.6	48.6	52.0	61.8	No
R2	Residential	41.4	47.6	48.6	49.6	52.4	No
R3	Residential	39.3	45.7	46.8	48.2	52.6	No
R4	Residential	35.5	40.5	41.7	43.1	46.9	No
R5	Residential	38.3	46.0	46.9	47.9	52.2	No
R6	Residential	38.0	43.2	46.7	50.5	57.7	No

1 See Exhibit 9-A for the receiver and noise source locations.
2 Mitigated daytime Project operational noise levels as shown on Table 9-4.
3 Do the Project operational noise levels satisfy the operational noise level standards?
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

9.2.5 MITIGATED (NIGHTTIME) PROJECT OPERATIONAL NOISE LEVELS

Table 9-6 indicates that the mitigated nighttime Project operational noise levels without the car wash tunnel or car wash vacuum activities are expected to range from 30.8 to 38.3 dBA L_{50} at the noise-sensitive off-site receiver locations. The mitigated operational noise level calculation worksheets are included in Appendix 9.2.

TABLE 9-6: MITIGATED (NIGHTTIME) PROJECT OPERATIONAL NOISE LEVELS

Receiver Location[1]	Noise Sources[2]	Operational Noise Levels (dBA)[3]				
		L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
R1	Air Conditioning Unit (Roof-Top)	35.4	37.1	38.4	38.7	39.2
	Drive-Through Speakerphone	24.4	25.6	27.1	28.8	29.9
	Trash Enclosure	29.5	35.5	42.5	47.5	49.0
	Parking Lot	32.5	36.5	39.5	42.9	55.3
	Gas Station Activity	24.5	25.8	28.4	33.3	41.3
	Car Wash Tunnel					
	Car Wash Vacuum Activity					
	Combined Noise Level:	38.3	41.4	45.4	49.3	56.4
R2	Air Conditioning Unit (Roof-Top)	31.5	33.2	34.5	34.8	35.3
	Drive-Through Speakerphone	26.8	28.0	29.5	31.2	32.3
	Trash Enclosure	19.6	25.6	32.6	37.6	39.1
	Parking Lot	16.9	20.9	23.9	27.3	39.7
	Gas Station Activity	23.3	24.6	27.2	32.1	40.1
	Car Wash Tunnel					
	Car Wash Vacuum Activity					
	Combined Noise Level:	33.5	35.4	38.0	40.9	45.2
R3	Air Conditioning Unit (Roof-Top)	34.1	35.8	37.1	37.4	37.9
	Drive-Through Speakerphone	30.9	32.1	33.6	35.3	36.4
	Trash Enclosure	20.9	26.9	33.9	38.9	40.4
	Parking Lot	19.6	23.6	26.6	30.0	42.4
	Gas Station Activity	26.6	27.9	30.5	35.4	43.4
	Car Wash Tunnel					
	Car Wash Vacuum Activity					
	Combined Noise Level:	36.5	38.3	40.6	43.2	47.8

Receiver Location[1]	Noise Sources[2]	Operational Noise Levels (dBA)[3]				
		L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
R4	Air Conditioning Unit (Roof-Top)	32.8	34.5	35.8	36.1	36.6
	Drive-Through Speakerphone	27.0	28.2	29.7	31.4	32.5
	Trash Enclosure	17.1	23.1	30.1	35.1	36.6
	Parking Lot	12.1	16.1	19.1	22.5	34.9
	Gas Station Activity	19.3	20.6	23.2	28.1	36.1
	Car Wash Tunnel					
	Car Wash Vacuum Activity					
	Combined Noise Level:	34.1	35.8	37.8	39.8	42.6
R5	Air Conditioning Unit (Roof-Top)	14.6	16.3	17.6	17.9	18.4
	Drive-Through Speakerphone	30.2	31.4	32.9	34.6	35.7
	Trash Enclosure	8.0	14.0	21.0	26.0	27.5
	Parking Lot	17.5	21.5	24.5	27.9	40.3
	Gas Station Activity	17.8	19.1	21.7	26.6	34.6
	Car Wash Tunnel					
	Car Wash Vacuum Activity					
	Combined Noise Level:	30.8	32.2	34.1	36.5	42.5
R6	Air Conditioning Unit (Roof-Top)	31.4	33.1	34.4	34.7	35.2
	Drive-Through Speakerphone	22.1	23.3	24.8	26.5	27.6
	Trash Enclosure	30.4	36.4	43.4	48.4	49.9
	Parking Lot	26.4	30.4	33.4	36.8	49.2
	Gas Station Activity	15.3	16.6	19.2	24.1	32.1
	Car Wash Tunnel					
	Car Wash Vacuum Activity					
	Combined Noise Level:	34.9	38.9	44.3	48.9	52.7

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] Reference noise sources as shown on Table 9-1.
[3] Stationary source noise level calculations are provided in Appendix 9.2.

9.2.6 MITIGATED (NIGHTTIME) PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE WITH APPLICABLE STANDARDS

As indicated on Table 9-7, with incorporation proposed mitigation, Project nighttime operational-source noise received at potentially affected receivers would comply with applicable standards. On this basis, as mitigated, the potential for the Project to result in exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies would be *less than significant*.

TABLE 9-7: MITIGATED (NIGHTTIME) PROJECT OPERATIONAL NOISE LEVELS

Receiver Location[1]	Land Use	Noise Level at Receiver Locations (dBA)[2]					Threshold Exceeded?[3]
		L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)	
Exterior Noise Level Standards	**Nighttime Residential**	**40**	**45**	**50**	**55**	**60**	**-**
R1	Residential	38.3	41.4	45.4	49.3	56.4	No
R2	Residential	33.5	35.4	38.0	40.9	45.2	No
R3	Residential	36.5	38.3	40.6	43.2	47.8	No
R4	Residential	34.1	35.8	37.8	39.8	42.6	No
R5	Residential	30.8	32.2	34.1	36.5	42.5	No
R6	Residential	34.9	38.9	44.3	48.9	52.7	No

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] Mitigated nighttime Project operational noise levels as shown on Table 9-6.
[3] Do the Project operational noise levels satisfy the operational noise level standards?
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

9.3 PROJECT OPERATIONAL NOISE LEVEL CONTRIBUTIONS

To describe the Project operational noise level contributions, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations potentially impacted by Project operational noise sources. Since the units used to measure noise, decibels (dB), are logarithmic units, the Project-operational and existing ambient noise levels cannot be combined using standard arithmetic equations. (3) Instead, they must be logarithmically added using the following base equation:

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

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describe the Project noise level contributions to the existing ambient noise environment. Noise levels that would be experienced at receiver locations when Project-source noise is added to the daytime and nighttime ambient conditions are presented on Tables 9-8 and 9-9, respectively.

As indicated on Tables 9-8 and 9-9, the Project will generate mitigated daytime operational noise level increases of up to 1.4 dBA L_{50} and a mitigated nighttime operational noise level increases of up to 0.6 dBA L_{50} at the nearby receiver locations. Since the Project-related operational noise level contributions with mitigation will satisfy the operational noise level increase significance criteria presented in Table 4-2, the increases at the sensitive receiver locations will be *less than significant*.

TABLE 9-6: PROJECT DAYTIME OPERATIONAL NOISE CONTRIBUTIONS

Receiver Location[1]	Unmitigated Project Operational Noise Level (dBA)[2]	Meas. Location[3]	Reference Ambient Noise Levels (dBA)[4]	Combined Project and Ambient (dBA)[5]	Project Increase (dBA)[6]	Threshold (dBA)[7]	Threshold Exceeded?[7]
R1	41.2	L2	52.4	52.7	0.3	5.0	No
R2	41.4	L3	47.6	48.5	0.9	5.0	No
R3	39.3	L4	57.2	57.3	0.1	5.0	No
R4	35.5	L5	52.7	52.8	0.1	5.0	No
R5	38.3	L1	42.4	43.8	1.4	5.0	No
R6	38.0	L1	42.4	43.7	1.3	5.0	No

[1] See Exhibit 9-A for the sensitive receiver locations.
[2] Total Project operational noise levels as shown on Table 9-5.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] FICON significance criteria as defined in Section 4, Table 4-1, based on the ambient noise level without the Project.

TABLE 9-7: PROJECT NIGHTTIME OPERATIONAL NOISE CONTRIBUTIONS

Receiver Location[1]	Unmitigated Project Operational Noise Level (dBA)[2]	Meas. Location[3]	Reference Ambient Noise Levels (dBA)[4]	Combined Project and Ambient (dBA)[5]	Project Increase (dBA)[6]	Threshold (dBA)[7]	Threshold Exceeded?[7]
R1	38.3	L2	49.3	49.6	0.3	5.0	No
R2	33.5	L3	45.3	45.6	0.3	5.0	No
R3	36.5	L4	50.3	50.5	0.2	5.0	No
R4	34.1	L5	46.4	46.6	0.2	5.0	No
R5	30.8	L1	42.9	43.2	0.3	5.0	No
R6	34.9	L1	42.9	43.5	0.6	5.0	No

[1] See Exhibit 9-A for the sensitive receiver locations.
[2] Total Project operational noise levels as shown on Table 9-7.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] FICON significance criteria as defined in Section 4, Table 4-1, based on the ambient noise level without the Project.

10 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 10-A shows the construction activity boundaries in relation to the nearby sensitive receiver locations.

10.1 CONSTRUCTION NOISE SOURCE 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 mobile and stationary equipment expected to occur in the following stages:

- Site Preparation (Mobile Equipment)
- Grading (Mobile Equipment)
- Building Construction (Stationary Equipment)
- Paving (Mobile Equipment)
- Architectural Coating (Stationary Equipment)

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to in excess of 80 dBA when measured at 50 feet. Hard site conditions are used in the construction noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source (i.e. construction equipment). For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver, and would be further reduced to 68 dBA at 200 feet from the source to the receiver. The construction stages used in this analysis are consistent with the data used to support the construction emissions in the *Lake and Mountain Shopping Center Air Quality Impact Analysis* prepared by Urban Crossroads, Inc. (19)

10.2 CONSTRUCTION REFERENCE NOISE LEVELS

To describe the Project construction noise levels, measurements were collected for similar activities at several construction sites. Table 10-1 provides a summary of the construction reference noise level measurements. Since the reference noise levels were collected at varying distances, all construction noise level measurements presented on Table 10-1 have been adjusted to describe a common reference distance of 50 feet.

EXHIBIT 10-A: CONSTRUCTION ACTIVITY AND RECEIVER LOCATIONS

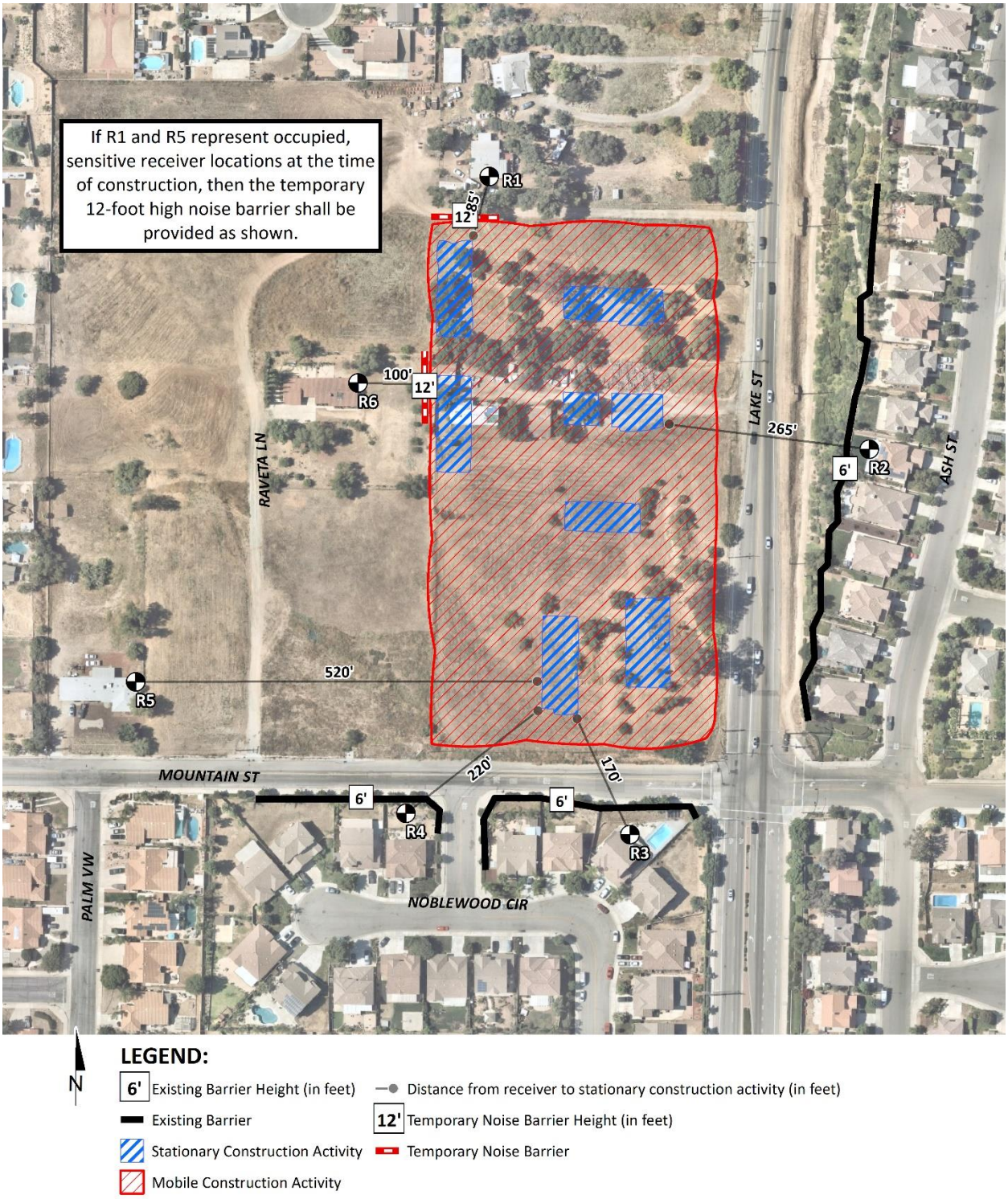


TABLE 10-1: CONSTRUCTION REFERENCE NOISE LEVELS

ID	Noise Source	Reference Distance From Source (Feet)	Reference Noise Levels @ Reference Distance (dBA L_{eq})	Reference Noise Levels @ 50 Feet (dBA L_{eq})[5]	Reference Noise Levels @ Reference Distance (dBA L_{max})	Reference Noise Levels @ 50 Feet (dBA L_{max})[5]
1	Truck Pass-Bys & Dozer Activity[1]	30'	64'	59'	68.1	63.7
2	Dozer Activity[1]	30'	69'	64'	76.4	72.0
3	Construction Vehicle Maintenance Activities[2]	30'	72'	67'	74.8	70.4
4	Foundation Trenching[2]	30'	73'	68'	74.9	70.5
5	Framing[3]	30'	67'	62'	76.7	72.3
6	Concrete Paver Activities[4]	30'	70'	66'	75.7	71.3
7	Concrete Mixer Pour & Paving Activities[4]	30'	70'	66'	76.3	71.9

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

10.3 CONSTRUCTION NOISE ANALYSIS

Tables 10-2 to 10-6 show the Project construction stages and the reference construction noise levels used for each stage. Table 10-7 provides a summary of the noise levels from each stage of construction at each of the sensitive receiver locations.

TABLE 10-2: SITE PREPARATION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{max})
Truck Pass-Bys & Dozer Activity	63.7
Dozer Activity	72.0
Highest Reference Noise Level at 50 Feet:	72.0

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA)[3]	Estimated Noise Barrier Attenuation (dBA)[4]	Construction Noise Level (dBA L_{max})
R1	70'	-2.9	0.0	69.1
R2	205'	-12.3	-5.0	54.7
R3	120'	-7.6	-5.0	59.4
R4	105'	-6.4	-5.0	60.6
R5	390'	-17.8	0.0	54.2
R6	100'	-6.0	0.0	66.0

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

TABLE 10-3: GRADING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{max})
Truck Pass-Bys & Dozer Activity	63.7
Dozer Activity	72.0
Highest Reference Noise Level at 50 Feet:	72.0

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA)[3]	Estimated Noise Barrier Attenuation (dBA)[4]	Construction Noise Level (dBA L_{max})
R1	70'	-2.9	0.0	69.1
R2	205'	-12.3	-5.0	54.7
R3	120'	-7.6	-5.0	59.4
R4	105'	-6.4	-5.0	60.6
R5	390'	-17.8	0.0	54.2
R6	100'	-6.0	0.0	66.0

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

TABLE 10-4: BUILDING CONSTRUCTION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{max})
Construction Vehicle Maintenance Activities	70.4
Foundation Trenching	70.5
Framing	72.3
Highest Reference Noise Level at 50 Feet:	72.3

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA)[3]	Estimated Noise Barrier Attenuation (dBA)[4]	Construction Noise Level (dBA L_{max})
R1	85'	-4.6	0.0	67.7
R2	265'	-14.5	-5.0	52.8
R3	170'	-10.6	-5.0	56.7
R4	220'	-12.9	-5.0	54.4
R5	390'	-17.8	0.0	54.5
R6	100'	-6.0	0.0	66.3

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

TABLE 10-5: PAVING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{max})
Concrete Paver Activities	71.3
Concrete Mixer Pour & Paving Activities	71.9
Highest Reference Noise Level at 50 Feet:	71.9

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA)[3]	Estimated Noise Barrier Attenuation (dBA)[4]	Construction Noise Level (dBA L_{max})
R1	70'	-2.9	0.0	69.0
R2	205'	-12.3	-5.0	54.6
R3	120'	-7.6	-5.0	59.3
R4	105'	-6.4	-5.0	60.5
R5	390'	-17.8	0.0	54.1
R6	100'	-6.0	0.0	65.9

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

TABLE 10-6: ARCHITECTURAL COATING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{max})
Construction Vehicle Maintenance Activities	70.4
Framing	72.3
Highest Reference Noise Level at 50 Feet:	72.3

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA)[3]	Estimated Noise Barrier Attenuation (dBA)[4]	Construction Noise Level (dBA L_{max})
R1	85'	-4.6	0.0	67.7
R2	265'	-14.5	-5.0	52.8
R3	170'	-10.6	-5.0	56.7
R4	220'	-12.9	-5.0	54.4
R5	390'	-17.8	0.0	54.5
R6	100'	-6.0	0.0	66.3

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

10.3.1 UNMITIGATED PROJECT CONSTRUCTION NOISE LEVELS

The construction noise analysis shows that the highest construction noise levels will occur when construction activities take place at the closest point from the center of Project construction activity to each of the nearby receiver locations. As shown on Table 10-7, the Project-related short-term construction noise levels are expected to approach 69.1 dBA L_{max} during mobile equipment grading and paving stages, and 67.0 dBA L_{max} during stationary equipment building construction and architectural coating stages.

TABLE 10-7: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Stage Hourly Noise Level (dBA Lmax)						
	Mobile Equipment			Stationary Equipment		Highest Noise Levels[2]	
	Site Preparation	Grading	Paving	Building Construction	Architectural Coating	Mobile Equipment	Stationary Equipment
R1	69.1	69.1	69.0	67.7	67.7	69.1	67.7
R2	54.7	54.7	54.6	52.8	52.8	54.7	52.8
R3	59.4	59.4	59.3	56.7	56.7	59.4	56.7
R4	60.6	60.6	60.5	54.4	54.4	60.6	54.4
R5	54.2	54.2	54.1	54.5	54.5	54.2	54.5
R6	66.0	66.0	65.9	66.3	66.3	66.0	66.3

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Estimated construction noise levels during peak operating conditions.

10.3.2 UNMITIGATED PROJECT CONSTRUCTION NOISE LEVEL COMPLIANCE WITH APPLICABLE STANDARDS

Table 10-8 shows the highest construction noise levels at the potentially impacted receiver locations are expected to approach 69.1 dBA L_{max} from mobile equipment, and 67.0 dBA L_{max} for stationary equipment. While the Project related construction equipment noise levels satisfy the City of Lake Elsinore Municipal Code construction noise level standards of 75 dBA L_{max} for mobile equipment, the noise Project noise levels will exceed the 60 dBA L_{max} standards for stationary equipment during temporary Project construction activities at receiver locations R1 and R5.

TABLE 10-8: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL COMPLIANCE

Receiver Location[1]	Highest Construction Activity Noise Levels[2]		Threshold[3]		Threshold Exceeded?[4]	
	Mobile	Stationary	Mobile	Stationary	Mobile	Stationary
R1	69.1	67.7	75	60	No	Yes
R2	54.7	52.8	75	60	No	No
R3	59.4	56.7	75	60	No	No
R4	60.6	54.4	75	60	No	No
R5	54.2	54.5	75	60	No	No
R6	66.0	66.3	75	60	No	Yes

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Highest construction noise levels as shown on Table 10-7.
[3] Construction noise standards as shown on Tables 3-1 and 3-2.
[4] Do the estimated Project construction noise levels meet the construction noise level thresholds?

The noise impacts due to the unmitigated Project construction noise levels is, therefore, considered a *potentially significant* impact at receiver locations R1 and R5 and mitigation measures are required to reduce the stationary equipment noise levels generated during temporary Project construction activities. The construction noise mitigation includes the use of a 12-foot high temporary noise barriers near receiver locations R1 and R5 as shown on Exhibit 10-A. Specific construction noise mitigation measures are outlined in the Executive Summary.

Since receivers R2, R3 and R4 satisfy the City of Lake Elsinore Municipal Code construction noise level standards, no mitigation is needed for these locations. Temporary construction noise mitigation measures are only required to reduce the stationary equipment Project construction noise levels at receiver locations R1 and R5.

10.3.3 MITIGATED PROJECT CONSTRUCTION NOISE LEVELS

The construction noise analysis presents a conservative approach with the highest noise-level-producing equipment for each stage of Project construction operating at the closest point from primary construction activity to the nearby sensitive receiver locations. This scenario is unlikely to occur during typical construction activities and likely overstates the construction noise levels which will be experienced at each receiver location. With the construction noise mitigation measures identified in this noise study, shown on Exhibit 10-A, the worst-case construction noise level increases at the nearby residential receivers would be reduced.

The noise attenuation provided through temporary noise barriers depends on many factors including cost, wind loading, the location of the receiver, and the ability to place barriers such that the line-of-sight of the receiver is blocked to the noise source, among others. This analysis assumes a temporary noise barrier constructed using frame-mounted materials such as vinyl acoustic curtains or quilted blankets attached to the construction site perimeter fence. Table 10-9 shows that the temporary construction noise barrier will provide an additional noise attenuation ranging from 9.2 to 10.2 dBA L_{max} at noise sensitive receiver locations R1 and R5.

TABLE 10-9: MITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Highest Construction Activity Noise Levels[2]	Distance to Construction Activity (Feet)[3]	Distance Attenuation (dBA)[3]	Estimated Noise Barrier Attenuation (dBA)[5]	Mitigated Construction Noise Level (dBA L_{max})
R1	72.3	85'	-4.6	-9.2	58.5
R5	72.3	100'	-6.0	-10.2	56.1

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Highest construction noise levels of stationary equipment, as shown on Table 10-6.
[3] Includes the 100' buffer mitigation setback for stationary equipment.
[4] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[5] Estimated barrier attenuation from temporary 12-foot high construction noise barrier. (See Appendix 10.1)

10.3.4 MITIGATED PROJECT CONSTRUCTION NOISE LEVEL COMPLIANCE WITH APPLICABLE STANDARDS

As shown on Table 10-9, the temporary construction noise mitigation measures will reduce the stationary source construction noise levels at the potentially impacted receiver locations to range from 56.1 to 58.5 dBA L_{max} and satisfy the thresholds for noise-sensitive single-family residential receiver locations. Therefore, the noise impact due to Project construction is considered *less than significant* with mitigation. Appendix 10.1 includes the temporary construction noise barrier attenuation calculations. Sample temporary noise barrier photos are provided in Appendix 10.2 for reference.

Based on the results of the construction noise level analysis, shown on Table 10-10 the Project-related construction noise levels will satisfy the City of Lake Elsinore Municipal Code 75 dBA L_{max} mobile equipment and 60 dBA L_{max} stationary equipment residential construction noise level thresholds at all nearby receiver locations. Therefore, the mitigated noise impacts due to Project construction is considered *less than significant*.

TABLE 10-10: MITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL COMPLIANCE

Receiver Location[1]	Land Use Category	Mitigated Construction Activity Noise Levels[2]	Stationary Equipment Noise Level Threshold[3]	Threshold Exceeded?[4]
R1	Single-Family Residential	58.5	60	No
R5	Single-Family Residential	56.1	60	No

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Mitigated stationary equipment construction noise levels stationary equipment, as shown on Table 10-9.
[3] Construction noise standards as shown on Table 3-1 and 3-2.
[4] Do the mitigated Project construction noise levels exceed the construction noise level thresholds?

10.5 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. The proposed Project's construction activities most likely to cause vibration impacts are:

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

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration (FTA). Construction

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

At distances ranging from 85 to 390 feet from the Project construction activities, construction vibration velocity levels are expected to approach 0.014 in/sec (PPV), as shown on Table 10-11. To assess the human perception of vibration levels in PPV, the velocities are converted to RMS vibration levels based on the Caltrans *Transportation and Construction Vibration Guidance Manual* conversion factor of 0.71. Table 10-11 shows the construction vibration levels in RMS are expected to approach 0.010 in/sec (RMS) at the nearby receiver locations. Based on the vibration threshold of 0.01 in/sec, the construction-related vibration impacts are considered *less than significant* at the nearby receiver locations.

TABLE 10-11: UNMITIGATED CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver Location[1]	Distance to Const. Activity (Feet)	Receiver PPV Levels (in/sec)[2]					RMS Velocity Levels (in/sec)[3]	Threshold (RMS)	Threshold Exceeded?[4]
		Small Bulldozer (<80k lbs)	Jack-hammer	Loaded Trucks	Large Bulldozer (>80k lbs)	Peak Vibration (PPV)			
R1	85'	0.000	0.006	0.012	0.014	0.014	0.010	0.01	No
R2	265'	0.000	0.001	0.002	0.003	0.003	0.002	0.01	No
R3	170'	0.000	0.002	0.004	0.005	0.005	0.004	0.01	No
R4	220'	0.000	0.001	0.003	0.003	0.003	0.002	0.01	No
R5	390'	0.000	0.001	0.001	0.001	0.001	0.001	0.01	No

[1] Receiver locations are shown on Exhibit 10-A.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 6-5.
[3] Vibration levels in PPV are converted to RMS velocity using a 0.71 conversion factor identified in the Caltrans Transportation and Construction Vibration Guidance Manual, September 2013.
[4] Does the peak vibration exceed the maximum acceptable vibration threshold shown on Table 3-4?

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

11 REFERENCES

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12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Lake and Mountain Shopping Center 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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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 LAKE ELSINORE MUNICIPAL CODE

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Chapter 17.176
NOISE CONTROL

Sections:

17.176.010 Purpose.

In order to control unnecessary, excessive and annoying noise and vibration in the City, it is hereby declared to be the policy of the City to prohibit such noise and vibration generated from or by all sources as specified in this chapter. It shall be the policy of the City to maintain quiet in those areas which exhibit low noise levels and to implement programs aimed at reducing noise in those areas within the City where noise levels are above acceptable values.

It is determined that certain noise levels and vibrations are detrimental to the public health, welfare and safety, and are contrary to public interest. Therefore, the City Council does ordain and declare that creating, maintaining, causing or allowing to be created, caused or maintained, any noise or vibration in a manner prohibited by or not in conformity with the provisions of this chapter, is a public nuisance and shall be punishable as such. [Ord. 772 § 17.78.010, 1986. Code 1987 § 17.78.010].

17.176.020 Definitions.

All terminology used in this chapter, not defined below, shall be in conformance with applicable publications of the. American National Standards Institute (ANSI) or its successor body.

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

“A-weighted sound level” means the sound level in decibels as measured on a sound level meter using the A-weighting network. The level so read is designated dB(A) or dBA.

“Agricultural property” means a parcel of real property of not less than 10 contiguous acres in size, which is undeveloped for any use other than agricultural purposes.

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

“Commercial area” means property which is zoned for commercial purposes, including, but not limited to, retail and wholesale businesses, personal services, and professional offices.

“Construction” means any site preparation, assembly, erection, substantial repair, alteration, or similar action, for or of public or private rights-of-way, structures, utilities or similar property.

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

“Decibel” means a unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the ratio of the sound measured to the reference pressure, which is 20 micropascals.

“Demolition” means any dismantling, intentional destruction or removal of structures, utilities, public or private right-of-way surfaces, or similar property.

“Emergency work” means any work performed for the purpose of preventing or alleviating the physical trauma or property damage threatened or caused by an emergency.

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

“Gross vehicle weight rating (GVWR)” means the value specified by the manufacturer as the recommended maximum loaded weight of a single motor vehicle. In cases where trailers and tractors are separable, the gross combination weight rating, which is the value specified by the manufacturer as the recommended maximum loaded weight of the combination vehicle, shall be used.

“Impulsive sound” means sound of short duration, usually less than one second, with an abrupt onset and rapid decay. Examples of sources of impulsive sound include explosions, drop forge impacts, and the discharge of firearms.

“Industrial area” means property which is zoned for manufacturing and related uses.

“Intrusive noise” means that noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency and time of occurrence, and tonal or informational content as well as the prevailing ambient noise level.

“Licensed” means the possession of a formal license or a permit issued by the appropriate jurisdictional authority; or, where no permits or licenses are issued, the sanctioning of the activity by the jurisdiction as noted in public record.

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

“Motor vehicle” shall include any and all self-propelled vehicles as defined in the California Motor Vehicle Code, including all on-highway type motor vehicles subject to registration under said code, and all off-highway type motor vehicles subject to identification under said code.

“Motorboat” means any vessel propelled by machinery, whether or not such machinery is the principal source of propulsion but shall not include a vessel which has a valid marine document issued by the Bureau of Customs of the United States government or any Federal agency successor thereto (Section 651(d), Harbors and Navigation Code).

“Muffler or sound dissipative device” means a device consisting of a series of chambers or baffle plates, or other mechanical design, for the purpose of receiving exhaust gas from an internal combustion engine, and effective in reducing noise.

“Noise Control Officer (NCO)” means a person or persons designated by the Community Development Director as responsible for enforcement of this chapter.

“Noise disturbance” means any sound which, as judged by the Noise Control Officer, (1) endangers or injures the safety or health of human beings or animals, or (2) annoys or disturbs reasonable persons of normal sensitivities, or (3) endangers or injures personal or real property, or (4) violates the factors set forth in LEMC 17.176.040. Compliance with the quantitative standards as listed herein shall constitute elimination of a noise disturbance.

“Noise sensitive zone” means any area designated pursuant to LEMC 17.176.070 for the purpose of ensuring exceptional quiet.

“Noise zone” means any defined areas or regions of a generally consistent land use wherein the ambient noise levels are within a range of five dB.

“Person” means any individual, association, partnership, or corporation, and includes any officer, employee, department, agency or instrumentality of a State or any political subdivision of a State.

“Powered model vehicle” means any self-propelled, airborne, waterborne, or land-borne plane, vessel, or vehicle, which is not designed to carry persons, including, but not limited to, any model airplane, boat, car, or rocket.

“Public right-of-way” means any street, avenue, boulevard, highway, sidewalk or alley or similar place which is owned or controlled by a governmental entity.

“Public space” means any real property or structures thereon which are owned or controlled by a governmental entity.

“Pure tone” means any sound which can be judged as audible as a single pitch or a set of single pitches by the Noise Control Officer. For the purposes of this chapter, a pure tone shall exist if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the sound pressure levels of the two contiguous one-third octave bands by five dB for center frequencies of 500 Hz and above and by eight dB for center frequencies between 160 and 400 Hz and by 15 dB for center frequencies less than or equal to 125 Hz.

“Real property boundary” means an imaginary line along the ground surface, and its vertical extension, which separates the real property owned by one person from that owned by another person, but not including intrabuilding real property divisions.

“Residential area” means property which is zoned for residential uses.

“Sound amplifying equipment” means any device for the amplification of the human voice, music, or any other sound, excluding standard automobile radios when used and heard only by the occupants of the vehicle in which the radio is installed, and, as used in this chapter, warning devices on authorized emergency vehicles or horns or other warning devices on any vehicle used only for traffic safety purposes.

“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 meets or exceeds the requirements pertinent for type S2A meters in American National Standards Institute specifications for sound level meters, S1.4-1971, or the most recent revision thereof.

“Sound truck” means any motor vehicle, or any other vehicle, regardless of motive power, whether in motion or stationary, having mounted thereon, or attached thereto, any sound amplifying equipment.

“Vibration perception threshold” means the minimum ground- or structure-borne vibrational motion necessary to cause a normal person to be aware of the vibration by such direct means as, but not limited to, sensation by touch or visual observation of moving objects. The perception threshold shall be presumed to be a motion velocity of 0.01 inches per second over the range of one to 100 Hz.

"Weekday" means any day, Monday through Friday, which is not a legal holiday. [Ord. 772 § 17.78.020, 1986. Code 1987 § 17.78.020].

17.176.030 Authority and duties of the Noise Control Office(r) (NCO).

A. Lead Agency. The noise control program established by this chapter shall be administered by the Community Development Director.

B. Powers. In order to implement and enforce this chapter and for the general purpose of noise abatement and control, the NCO shall have, in addition to any other authority vested in it, the power to:

1. Conduct, or cause to be conducted, studies, research, and monitoring related to noise, including joint cooperative investigation with public or private agencies, and the application for, and acceptance of, grants.

2. On all public and private projects which are likely to cause noise in violation of this chapter and which are subject to mandatory review or approval by other departments.

a. Review for compliance with the intent and provisions of this chapter.

b. Require sound analyses which identify existing and projected noise sources and associated noise levels.

c. Require usage of adequate measures to avoid violation of any provision of this chapter.

3. Upon presentation of proper credentials, enter and/or inspect any private property, place, report, or records at any time when granted permission by the owner or by some other person with apparent authority to act for the owner. When permission is refused or cannot be obtained, a search warrant may be obtained from a court of competent jurisdiction upon showing of probable cause to believe that a violation of this chapter may exist. Such inspection may include administration of any necessary tests.

4. Prepare recommendations, to be approved by the City Council, for the designation of noise sensitive zones which contain noise sensitive activities.

5. Prepare recommendations, based upon noise survey data and analytical studies, to be approved by the City Council, for the designation of zones of similar ambient environmental noise within regions of generally consistent land use. These zones shall be identified in terms of their day and nighttime ambient noise levels and their land use classifications as given in LEMC 17.176.060, Table 1. [Ord. 772 § 17.78.030, 1986. Code 1987 § 17.78.030].

17.176.040 General noise regulations.

Notwithstanding any other provision of this chapter, and in addition thereto, it shall be unlawful for

any person to willfully or negligently make or continue, or cause to be made or continued, any loud, unnecessary, or unusual noise which disturbs the peace and quiet of any neighborhood or which causes any discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area.

The factors which shall be considered in determining whether a violation of the provisions of this section exists shall include, but not be limited to, the following:

A. The sound level of the objectionable noise.

B. The sound level of the ambient noise.

C. The proximity of the noise to residential sleeping facilities.

D. The nature and zoning of the area within which the noise emanates.

E. The number of persons affected by the noise source.

F. The time of day or night the noise occurs.

G. The duration of the noise and its tonal, informational or musical content.

H. Whether the noise is continuous, recurrent, or intermittent.

I. Whether the noise is produced by a commercial or noncommercial activity. [Ord. 772 § 17.78.040, 1986. Code 1987 § 17.78.040].

17.176.050 Noise measurement procedure.

A. Upon receipt of a complaint from a citizen, the Noise Control Office(r) or his agent, equipped with sound level measurement equipment satisfying the requirements specified in LEMC 17.176.020, shall investigate the complaint. The investigation shall consist of a measurement and the gathering of data to adequately define the noise problem and shall include the following:

1. Nonacoustic Data.

    a. Type of noise source.

    b. Location of noise source relative to complainant's property.

    c. Time period during which noise source is considered by complainant to be intrusive.

    d. Total duration of noise produced by noise source.

    e. Date and time of noise measurement survey.

B. Noise Measurement Procedure. Utilizing the A-weighting scale of the sound level meter and the

"slow" meter response (use "fast" response for impulsive type sounds), the noise level shall be measured at a position or positions at any point on the receiver's property.

In general, the microphone shall be located four to five feet above the ground; 10 feet or more from the nearest reflective surface where possible. However, in those cases where another elevation is deemed appropriate, the latter shall be utilized. If the noise complaint is related to interior noise levels, interior noise measurements shall be made within the affected residential unit. The measurements shall be made at a point at least four feet from the wall, ceiling, or floor nearest the noise source, with windows in the normal seasonal configuration. Calibration of the measurement equipment, utilizing an acoustic calibration, shall be performed immediately prior to recording any noise data. [Ord. 772 § 17.78.050, 1986. Code 1987 § 17.78.050].

17.176.060 Exterior noise limits.

A. Maximum Permissible Sound Levels by Receiving Land Use.

1. The noise standards for the various categories of land use identified by the Noise Control Office(r) as presented in Table 1 shall, unless otherwise specifically indicated, apply to all such property within a designated zone.

2. No person shall operate, or cause to be operated, any source of sound at any location within the incorporated City or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level when measured on any other property, either incorporated or unincorporated, to exceed:

a. The noise standard for that land use as specified in Table 1 for a cumulative period of more than 30 minutes in any hour; or

b. The noise standard plus five dB for a cumulative period of more than 15 minutes in any hour; or

c. The noise standard plus 10 dB for a cumulative period of more than five minutes in any hour; or

d. The noise standard plus 15 dB for a cumulative period of more than one minute in any hour; or

e. The noise standard plus 20 dB or the maximum measured ambient level, for any period of time.

3. If the measured ambient level differs from that permissible within any of the fast four noise limit categories above, the allowable noise exposure standard shall be adjusted in five dB increments in each category as appropriate to encompass or reflect said ambient noise level.

In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable

noise level under this category shall be increased to reflect the maximum ambient noise level

4. If the measurement location is on a boundary between two different zones, the noise level limit applicable to the lower noise zone plus six dB shall apply.

5. If possible, the ambient noise shall be measured at the same location along the property line utilized in subsection (A)(2) of this section with the alleged offending noise source inoperative. If, for any reason, the alleged offending noise source cannot be shut down, the ambient noise must be estimated by performing a measurement in the same general area of the source but at a sufficient distance such that the noise from the source is at least 10 dB below the ambient in order that only the ambient level be measured. If the difference between the ambient and the noise source is five to 10 dB, then the level of the ambient itself can be reasonably determined by subtracting a one-decibel correction to account for the contribution of the source.

B. Correction for Character of Sound. In the event the alleged offensive noise, as judged by the Noise Control Officer, contains a steady, audible tone such as a whine, screech, or hum, or is a repetitive noise such as hammering or riveting, or contains music or speech conveying informational content, the standard limits set forth in Table 1 shall be reduced by five dB.

TABLE 1

EXTERIOR NOISE LIMITS

(Levels Not to Be Exceeded More Than 30 Minutes in Any Hour)

Receiving Land Use Category	Time Period	Noise Level (dBA)
Single-Family Residential	10:00 p.m. – 7:00 a.m.	40
	7:00 a.m. – 10:00 p.m.	50
Multiple Dwelling Residential	10:00 p.m. – 7:00 a.m.	45
	7:00 a.m. – 10:00 p.m.	50
Public Space		
Limited Commercial and Office	10:00 p.m. – 7:00 a.m.	55
	7:00 a.m. – 10:00 p.m.	60
General Commercial	10:00 p.m. – 7:00 a.m.	60
	7:00 a.m. – 10:00 p.m.	65
Light Industrial	Anytime	70
Heavy Industrial	Anytime	75

[Ord. 772 § 17.78.060, 1986. Code 1987 § 17.78.060].

17.176.070 Interior noise standards.

A. Maximum Permissible Dwelling Interior Sound Levels.

1. The interior noise standards for multifamily residential dwellings as presented in Table 2 shall apply, unless otherwise specifically indicated, within all such dwellings with windows in their normal seasonal configuration.

TABLE 2

Noise Zone	Type of Land Use	Time Internal	Allowable Interior Noise Level (dBA)
All	Multifamily Residential	10:00 p.m. – 7:00 a.m. 7:00 a.m. – 10:00 p.m.	35 45

2. No person shall operate or cause to be operated within a dwelling unit, any source of sound or allow the creation of any noise which causes the noise level when measured inside a neighboring receiving dwelling unit to exceed:

a. The noise standard as specified in Table 2 for a cumulative period of more than five minutes in any hour; or

b. The noise standard plus five dB for a cumulative period of more than one minute in any hour; or

c. The noise standard plus 10 dB or the maximum measured ambient, for any period of time.

3. If the measured ambient level differs from that permissible within any of the noise limit categories above, the allowable noise exposure standard shall be adjusted in five dB increments in each category as appropriate to reflect said ambient noise level.

B. Correction for Character of Sound. In the event the alleged offensive noise, as judged by the Noise Control Officer, contains a steady, audible tone such as a whine, screech, or hum, or is a repetitive noise such as hammering or riveting, or contains music or speech conveying informational content, the standard limits set forth in Table 2 shall be reduced by five dB. [Ord. 772 § 17.78.070, 1986. Code 1987 § 17.78.070].

17.176.080 Prohibited acts.

No person shall unnecessarily make, continue, or cause to be made or continued, any noise disturbance. The following acts, and the causing or permitting thereof, are declared to be in

violation of this chapter:

A. Operating, playing or permitting the operation or playing of any radio, television set, phonograph, drum, musical instrument, or similar device which produces or reproduces sound:

1. Between the hours of 10:00 p.m. and 7:00 a.m. in such a manner as to create a noise disturbance across a residential or commercial real property line or at any time to violate the provisions of LEMC 17.176.060(A), except for which a variance has been issued by the City.

2. In such a manner as to exceed the levels set forth for public space in Table 1, measured at a distance of at least 50 feet (15 meters) from such device operating on a public right-of-way or public space.

B. Using or operating for any purpose any loudspeaker, loudspeaker system, or similar device between the hours of 10:00 p.m. and 7:00 a.m., such that the sound therefrom creates a noise disturbance across a residential real property line, or at any time violates the provisions of LEMC 17.176.060(A), except for any noncommercial public speaking, public assembly or other activity for which a variance has been issued by the City.

C. Offering for sale, selling anything, or advertising by shouting or outcry within any residential or commercial area or noise sensitive zone of the City except by variance issued by the City. The provisions of this section shall not be construed to prohibit the selling by outcry of merchandise, food, and beverages at licensed sporting events, parades, fairs, circuses, or other similar licensed public entertainment events.

D. Owning, possessing or harboring any animal or bird which frequently or for long duration, howls, barks, meows, squawks, or makes other sounds which create a noise disturbance across a residential or commercial real property line or within a noise sensitive zone. This provision shall not apply to public zoos.

E. Loading, unloading, opening, closing or other handling of boxes, crates, containers, building materials, garbage cans, or similar objects between the hours of 10:00 p.m. and 7:00 a.m. in such a manner as to cause a noise disturbance across a residential real property line or at any time to violate the provisions of LEMC 17.176.060(A).

F. Construction/Demolition.

1. Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work between weekday hours of 7:00 p.m. and 7:00 a.m., or at any time on weekends or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work of public service utilities or by variance issued by the City.

2. Noise Restrictions at Affected Properties. Where technically and economically feasible, construction activities shall be conducted in such a manner that the maximum noise levels at affected properties will not exceed those listed in the following schedule:

AT RESIDENTIAL PROPERTIES:

Mobile Equipment

Maximum noise levels for nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment:

	Type I Areas Single-Family Residential	Type II Areas Multifamily Residential	Type III Areas Semi-Residential/Commercial
Daily, except Sundays and Legal Holidays 7:00 a.m. to 7:00 p.m.	75 dBA	80 dBA	85 dBA
Daily, 7:00 p.m. to 7:00 a.m. and all day Sunday and Legal Holidays	60 dBA	65 dBA	70 dBA

Stationary Equipment

Maximum noise levels for repetitively scheduled and relatively long-term operation (period of 10 days or more) of stationary equipment:

	Type I Areas Single-Family Residential	Type II Areas Multifamily Residential	Type III Areas Semi-Residential/Commercial
Daily, except Sundays and Legal Holidays 7:00 a.m. to 7:00 p.m.	60 dBA	65 dBA	70 dBA
Daily, 7:00 p.m. to 7:00 a.m. and all day Sunday and Legal Holidays	50 dBA	55 dBA	60 dBA

AT BUSINESS PROPERTIES:

Mobile Equipment

Maximum noise levels for nonscheduled, intermittent, short-term operation of mobile equipment:

Daily, including Sundays and Legal Holidays, all hours: maximum of 85 dBA.

Stationary Equipment

Maximum noise levels for repetitively scheduled and relatively long-term operation of stationary

equipment:

Daily, including Sundays and Legal Holidays, all hours: maximum of 75 dBA.

3. All mobile or stationary internal combustion engine powered equipment or machinery shall be equipped with suitable exhaust and air intake silencers in proper working order.

G. Operating or permitting the operation of any device that creates a vibration which is above the vibration perception threshold of any individual at or beyond the property boundary of the source if on private property or at 150 feet (46 meters) from the source if on a public space or public right-of-way.

H. Powered Model Vehicles. Operating or permitting the operation of powered model vehicles:

1. Between the hours of 7:00 p.m. and 7:00 a.m. so as to create a noise disturbance across a residential or commercial real property line or at any time to violate the provisions of LEMC 17.176.060(A).

2. In such a manner as to exceed the levels set forth for public space land use in Table 1, measured at a distance not less than 100 feet (30 meters) from any point on the path of a vehicle operating on public space or public right-of-way.

I. Stationary Nonemergency Signaling Devices.

1. Sounding or permitting the sounding of any electronically amplified signal from any stationary bell, chime, siren, whistle, or similar device, intended primarily for nonemergency purposes, from any place, for more than 10 seconds in any hourly period.

2. Houses of religious worship shall be exempt from the operation of this provision.

3. Sound sources covered by this provision and not exempted under subsection (I)(2) of this section shall be exempted by a variance issued by the City.

J. Emergency Signaling Devices.

1. The intentional sounding or permitting the sounding outdoors of any fire, burglar, or civil defense alarm, siren, whistle, or similar stationary emergency signaling device, except for emergency purposes or for testing, as provided in subsection (J)(2) of this section.

2. a. Testing of a stationary emergency signaling system shall not occur before 7:00 a.m. or after 7:00 p.m. Any such testing shall use only the minimum cycle test time. In no case shall such test time exceed 60 seconds.

b. Testing of the complete emergency signaling system, including the functioning of the signaling device and the personnel response to the signaling device, shall not occur more

than once in each calendar month. Such testing shall not occur before 7:00 a.m., or after 10:00 p.m. The time limit specified in subsection (J)(2)(a) of this section shall not apply to such complete system testing.

3. Sounding or permitting the sounding of any exterior burglar or fire alarm or any motor vehicle burglar alarm unless such alarm is terminated within 15 minutes of activation.

K. Noise Sensitive Zones.

1. Creating or causing the creation of any sound within any noise sensitive zone, so as to exceed the specified land use noise standards set forth in LEMC 17.176.060(A); provided, that conspicuous signs are displayed indicating the zone; or

2. Creating or causing the creation of any sound within or adjacent to any noise sensitive zone, containing a hospital, nursing home, school, court or other designated area, so as to interfere with the functions of such activity or annoy the occupants in the activity; provided, that conspicuous signs are displayed indicating the presence of the zone.

L. Domestic Power Tools and Machinery.

1. Operating or permitting the operation of any mechanically powered saw, sander, drill, grinder, lawn or garden tool, or similar tool between 10:00 p.m. and 7:00 a.m., so as to create a noise disturbance across a residential or commercial real property line.

2. Any motor, machinery, pump, such as swimming pool equipment, etc., shall be sufficiently enclosed or muffled and maintained so as not to create a noise disturbance in accordance with LEMC 17.176.060.

M. Residential Air-Conditioning or Air-Handling Equipment. Operating or permitting the operation of any air-conditioning or air-handling equipment in such a manner as to exceed any of the following sound levels:

Measurement Location	Units Installed before 1-1-80 dB(A)	Units Installed on or after 1-1-80 dB(A)
Any point on neighboring property line, 5 feet above grade level, no closer than 3 feet from any wall.	60	55
Center of neighboring patio, 5 feet above grade level, no closer than 3 feet from any wall.	55	50
Outside the neighboring living area window nearest the equipment location, not more than 3 feet from the window opening, but at		

least 3 feet from any other surface.	55	50

N. Places of Public Entertainment. Operating or permitting the operation or playing of any loudspeaker, musical instrument, motorized racing vehicle, or other source of sound in any place of public entertainment that exceeds 95 dBA as read on the slow response of a sound level meter at any point normally occupied by a customer, without a conspicuous and legible sign stating:

WARNING! SOUND LEVELS WITHIN MAY CAUSE HEARING IMPAIRMENT.

[Ord. 772 § 17.78.080, 1986. Code 1987 § 17.78.080].

17.176.090 Motor vehicles operating on public right-of-way.

Motor vehicles noise limits on a public right-of-way are regulated as set forth in the California Motor Vehicle Code, Sections 23130 and 23130.5. Equipment violations which create noise problems are covered under Sections 27150 and 27151. Any peace officer of any jurisdiction in California may enforce these provisions. Therefore, it shall be the policy of the City to enforce these sections of the California Motor Vehicle Code.

A. Refuse Collection Vehicles.

1. No person shall collect refuse with a refuse collection vehicle between the hours of 7:00 p.m. and 7:00 a.m. within or adjacent to a residential area or noise sensitive zone.

2. No person authorized to engage in waste disposal service or garbage collection shall operate any truck-mounted waste or garbage loading and/or compacting equipment or similar device in any manner so as to create any noise exceeding the following levels, measured at a distance of 50 feet from the equipment in an open area:

a. New equipment purchased or leased on or after a date six months from the effective date of the ordinance codified in this chapter: 80 dBA.

b. New equipment purchased or leased on or after 36 months from the effective date of the ordinance codified in this chapter: 75 dBA.

c. Existing equipment, on or after five years from the effective date of the ordinance codified in this chapter: 80 dBA.

B. Motor Vehicle Horns. It is unlawful for any person to sound a vehicular horn except as a warning signal (Motor Vehicle Code, Section 27001).

C. Motorized Recreational Vehicles Operating off Public Right-of-Way. No person shall operate or cause to be operated any motorized recreational vehicle off a public right-of-way in such a manner that the sound levels emitted therefrom violate the provisions of LEMC 17.176.060(A). This section shall apply to all motorized recreational vehicles whether or not duly licensed and registered,

including, but not limited to, commercial or noncommercial racing vehicles, motorcycles, go carts, amphibious craft, campers, snowmobiles and dune buggies, but not including motorboats.

D. *Reserved*.

E. Vehicle, Motorboat, or Aircraft Repair and Testing.

1. Repairing, rebuilding, modifying, or testing any motor vehicle, motorboat, or aircraft in such a manner as to create a noise disturbance across a residential real property line, or at any time to violate the provisions of LEMC 17.176.060(A).

2. Nothing in this section shall be construed to prohibit, restrict, penalize, enjoin, or in any manner regulate the movement of aircraft which are in all respects conducted in accordance with, or pursuant to, applicable Federal laws or regulations.

F. Standing Motor Vehicles. No person shall operate or permit the operation of any motor vehicle with a gross vehicle weight rating (GVWR) in excess of 10,000 pounds, or any auxiliary equipment attached to such a vehicle, for a period longer than 15 minutes in any hour while the vehicle is stationary, for reasons other than traffic congestion, on a public right-of-way or public space within 150 feet (46 meters) of a residential area or designated noise sensitive zone, between the hours of 10:00 p.m. and 7:00 a.m. [Ord. 984, 1994; Ord. 772 § 17.78.090, 1986. Code 1987 § 17.78.090].

17.176.100 Special provisions – Exemptions.

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

A. The emission of sound for the purpose of alerting persons to the existence of an emergency.

B. The emission of sound in the performance of emergency work.

C. Warning devices necessary for the protection of public safety, as for example, police, fire and ambulance sirens, and train horns.

D. Regularly scheduled school bands, school athletic and school entertainment events between the hours of 8:45 a.m. and 10:00 p.m., provided a special events permit is also required for band activities on City streets.

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

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

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

H. Mobile noise sources associated with agricultural operations, provided such operations take place on Monday through Friday, excepting legal holidays, between the hours of 7:00 a.m. and 6:00 p.m. All other operations shall comply with this chapter.

I. Noise sources associated with the maintenance of real property, provided such operations take place on Monday through Friday, excepting legal holidays, between the hours of 7:00 a.m. and 6:00 p.m., or on holidays and weekends between the hours of 9:00 a.m. and 6:00 p.m. All other operations shall comply with this chapter.

J. Any activity to the extent that regulation thereof has been preempted by State or Federal law. [Ord. 772 § 17.78.100, 1986. Code 1987 § 17.78.100].

17.176.110 Special variances.

A. The NCO is authorized to grant variances for exemption from any provision of this chapter, subject to limitations as to area, noise levels, time limits, and other terms and conditions as the NCO determines are appropriate to protect the public health, safety, and welfare from the noise emanating therefrom. This section shall in no way affect the duty to obtain any permit or license required by law for such activities.

B. Any person seeking a variance pursuant to this section shall file an application with the NCO. The application shall contain information which demonstrates that bringing the source of sound or activity for which the variance is sought into compliance with this chapter would constitute an unreasonable hardship on the applicant, on the community, or on other persons. The application shall be accompanied by a fee. A separate application shall be filed for each noise source; provided, however, that several mobile sources under common ownership, or several fixed sources on a single property may be combined into one application. Notice of an application for a variance shall be published according to City code. Any individual who claims to be adversely affected by allowance of the variance may file a statement with the NCO containing any information to support his claim. If at any time the NCO finds that a sufficient controversy exists regarding an application, a public hearing will be held.

C. In determining whether to grant or deny the application, the NCO shall balance the hardship on the applicant, the community, and other persons of not granting the variance against the adverse impact on the health, safety, and welfare of persons affected, the adverse impact on property affected, and any other adverse impacts of granting the variance. Applicants for variances and persons contesting variances may be required to submit such information as the NCO may reasonably require. In granting or denying an application, the NCO shall keep on public file a copy of the decision and the reasons for denying or granting the variance.

D. Variances shall be granted by notice to the applicant containing all necessary conditions, including a time limit on the permitted activity. The variance shall not become effective until all conditions are agreed to by the applicant. Noncompliance with any condition of the variance shall terminate the variance and subject the person holding it to those provisions of this chapter for which the variance was granted.

E. A variance will not exceed 365 days from the date on which it was granted. Application for extension of time limits specified in variances or for modification of other substantial conditions shall be treated like applications for initial variances under subsection (B) of this section. [Ord. 772 § 17.78.110, 1986. Code 1987 § 17.78.110].

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APPENDIX 5.1:

STUDY AREA PHOTOS

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L1_E
33, 42' 1.860000", 117, 23' 32.070000"

L1_N
33, 42' 4.950000", 117, 23' 32.290000"

L1_S
33, 42' 4.950000", 117, 23' 32.290000"

L1_W
33, 42' 1.840000", 117, 23' 31.550000"

L2_E
33, 42' 1.900000", 117, 23' 26.440000"

L2_N
33, 42' 1.900000", 117, 23' 26.330000"

L2_S
33, 42' 1.900000", 117, 23' 26.390000"

L2_W
33, 42' 1.910000", 117, 23' 26.440000"

L3_E
33, 42' 0.020000", 117, 23' 20.700000"

L3_N
33, 42' 0.060000", 117, 23' 20.730000"

L3_S
33, 42' 0.060000", 117, 23' 20.730000"

L3_W
33, 42' 0.000000", 117, 23' 20.700000"

L4_M
33, 41' 54.510000", 117, 23' 26.500000"

L4_N
33, 41' 54.540000", 117, 23' 26.500000"

L4_S
33, 41' 54.540000", 117, 23' 26.520000"

L4_W
33, 41' 54.470000", 117, 23' 26.500000"

L5_E
33, 41' 54.500000", 117, 23' 29.710000"

L5_N
33, 41' 54.450000", 117, 23' 29.740000"

JN: 12770 Study Area Photos

L5_S
33, 41' 54.470000", 117, 23' 29.710000"

L5_W
33, 41' 54.500000", 117, 23' 29.710000"

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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24-Hour Noise Level Measurement Summary

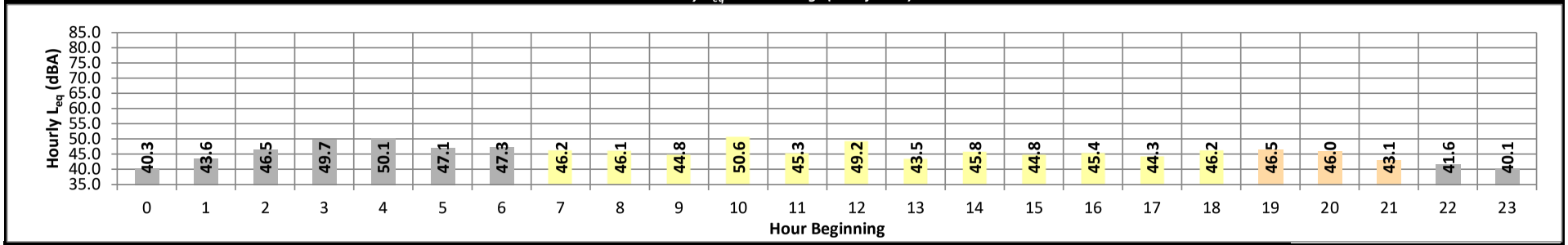
Date: Wednesday, October 9, 2019
Project: Lake and Mountain Development

Location: L1 - Located in a vacant lot north of single family home at 28885 Raveta Lane approximately 500 feet east of Stonebridge Terrace.

Meter: Piccolo I

JN: 12770
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	40.3	55.6	34.5	47.0	46.0	43.0	42.0	40.0	39.0	37.0	36.0	35.0	40.3	10.0	50.3
	1	43.6	61.4	34.5	51.0	50.0	49.0	47.0	43.0	40.0	37.0	37.0	35.0	43.6	10.0	53.6
	2	46.5	59.4	37.3	54.0	52.0	51.0	50.0	47.0	44.0	40.0	39.0	37.0	46.5	10.0	56.5
	3	49.7	70.1	41.3	55.0	54.0	52.0	51.0	49.0	47.0	44.0	43.0	42.0	49.7	10.0	59.7
	4	50.1	59.7	42.0	55.0	55.0	53.0	53.0	51.0	49.0	46.0	45.0	44.0	50.1	10.0	60.1
	5	47.1	64.0	41.3	53.0	52.0	50.0	49.0	47.0	45.0	43.0	43.0	42.0	47.1	10.0	57.1
	6	47.3	61.6	42.0	54.0	52.0	50.0	49.0	47.0	46.0	44.0	44.0	43.0	47.3	10.0	57.3
Day	7	46.2	61.3	38.8	53.0	51.0	50.0	49.0	46.0	45.0	42.0	41.0	39.0	46.2	0.0	46.2
	8	46.1	63.7	38.7	56.0	53.0	50.0	49.0	45.0	43.0	40.0	40.0	39.0	46.1	0.0	46.1
	9	44.8	60.5	37.4	55.0	52.0	48.0	47.0	44.0	42.0	39.0	39.0	38.0	44.8	0.0	44.8
	10	50.6	72.4	37.4	62.0	58.0	54.0	52.0	46.0	42.0	39.0	39.0	37.0	50.6	0.0	50.6
	11	45.3	61.4	37.4	57.0	55.0	50.0	48.0	43.0	40.0	37.0	37.0	37.0	45.3	0.0	45.3
	12	49.2	65.2	37.4	60.0	58.0	55.0	53.0	47.0	43.0	40.0	39.0	39.0	49.2	0.0	49.2
	13	43.5	59.5	37.4	51.0	49.0	47.0	46.0	43.0	41.0	39.0	39.0	37.0	43.5	0.0	43.5
	14	45.8	62.3	37.4	56.0	53.0	50.0	48.0	45.0	42.0	39.0	39.0	37.0	45.8	0.0	45.8
	15	44.8	61.5	37.4	54.0	51.0	48.0	47.0	44.0	42.0	39.0	39.0	38.0	44.8	0.0	44.8
	16	45.4	61.6	37.4	56.0	53.0	50.0	47.0	44.0	42.0	40.0	39.0	39.0	45.4	0.0	45.4
	17	44.3	61.2	38.7	54.0	49.0	47.0	46.0	43.0	42.0	40.0	39.0	39.0	44.3	0.0	44.3
	18	46.2	65.3	39.2	52.0	51.0	49.0	48.0	46.0	45.0	42.0	41.0	40.0	46.2	0.0	46.2
Evening	19	46.5	68.3	37.4	54.0	53.0	50.0	48.0	46.0	44.0	41.0	40.0	39.0	46.5	5.0	51.5
	20	46.0	68.3	37.4	56.0	52.0	48.0	47.0	44.0	42.0	39.0	39.0	37.0	46.0	5.0	51.0
	21	43.1	58.0	36.6	51.0	49.0	46.0	45.0	43.0	41.0	38.0	37.0	37.0	43.1	5.0	48.1
Night	22	41.6	56.7	34.5	51.0	48.0	45.0	44.0	41.0	39.0	37.0	36.0	35.0	41.6	10.0	51.6
	23	40.1	61.0	34.5	49.0	46.0	44.0	42.0	39.0	37.0	35.0	35.0	35.0	40.1	10.0	50.1

Timeframe	*Hour*	*L_{eq}*	*L_{max}*	*L_{min}*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	43.5	59.5	37.4	51.0	49.0	47.0	46.0	43.0	40.0	37.0	37.0	37.0
	Max	50.6	72.4	39.2	62.0	58.0	55.0	53.0	47.0	45.0	42.0	41.0	40.0
Energy Average		46.5	Average:		55.5	52.8	49.8	48.3	44.7	42.4	39.7	39.3	38.3
Evening	Min	43.1	58.0	36.6	51.0	49.0	46.0	45.0	43.0	41.0	38.0	37.0	37.0
	Max	46.5	68.3	37.4	56.0	53.0	50.0	48.0	46.0	44.0	41.0	40.0	39.0
Energy Average		45.4	Average:		53.7	51.3	48.0	46.7	44.3	42.3	39.3	38.7	37.7
Night	Min	40.1	55.6	34.5	47.0	46.0	43.0	42.0	39.0	37.0	35.0	35.0	35.0
	Max	50.1	70.1	42.0	55.0	55.0	53.0	53.0	51.0	49.0	46.0	45.0	44.0
Energy Average		46.5	Average:		52.1	50.6	48.6	47.4	44.9	42.9	40.3	39.8	38.7

L_{eq} (dBA)

24-Hour	*Daytime*	*Nighttime*
46.4	**46.3**	**46.5**

24-Hour CNEL (dBA)

53.1

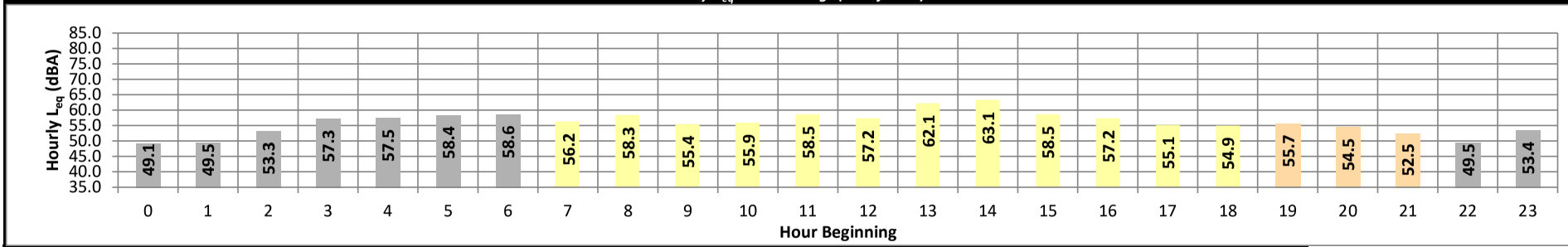
URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Wednesday, October 9, 2019 *Location:* L2 - Located north of Project site southeast of 28891 Lake Street adjacent to dirt road. *Meter:* Piccolo I *JN:* 12770

Project: Lake and Mountain Development *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	49.1	66.9	36.4	58.0	56.0	54.0	53.0	49.0	44.0	36.0	36.0	36.0	49.1	10.0	59.1
	1	49.5	69.3	36.4	60.0	57.0	55.0	53.0	48.0	44.0	36.0	36.0	36.0	49.5	10.0	59.5
	2	53.3	72.0	36.4	63.0	61.0	58.0	57.0	53.0	49.0	41.0	39.0	37.0	53.3	10.0	63.3
	3	57.3	81.6	39.5	65.0	63.0	61.0	59.0	56.0	54.0	49.0	48.0	45.0	57.3	10.0	67.3
	4	57.5	72.9	45.4	67.0	65.0	62.0	60.0	57.0	55.0	50.0	49.0	47.0	57.5	10.0	67.5
	5	58.4	74.5	44.5	68.0	66.0	62.0	61.0	58.0	56.0	51.0	50.0	46.0	58.4	10.0	68.4
	6	58.6	76.3	44.6	68.0	66.0	63.0	61.0	57.0	55.0	50.0	49.0	46.0	58.6	10.0	68.6
Day	7	56.2	75.4	41.0	66.0	64.0	61.0	59.0	55.0	53.0	47.0	45.0	42.0	56.2	0.0	56.2
	8	58.3	86.1	39.3	67.0	65.0	61.0	59.0	55.0	52.0	46.0	44.0	41.0	58.3	0.0	58.3
	9	55.4	71.9	36.4	64.0	63.0	60.0	59.0	55.0	51.0	45.0	43.0	39.0	55.4	0.0	55.4
	10	55.9	74.8	36.4	66.0	64.0	61.0	59.0	55.0	52.0	44.0	42.0	39.0	55.9	0.0	55.9
	11	58.5	83.6	36.4	68.0	65.0	62.0	60.0	55.0	52.0	44.0	42.0	39.0	58.5	0.0	58.5
	12	57.2	77.2	39.4	67.0	64.0	61.0	60.0	56.0	54.0	48.0	46.0	42.0	57.2	0.0	57.2
	13	62.1	80.9	39.4	73.0	70.0	68.0	66.0	60.0	55.0	49.0	47.0	44.0	62.1	0.0	62.1
	14	63.1	83.5	39.4	74.0	71.0	68.0	67.0	61.0	55.0	49.0	46.0	43.0	63.1	0.0	63.1
	15	58.5	77.2	39.4	70.0	67.0	63.0	61.0	56.0	53.0	47.0	45.0	42.0	58.5	0.0	58.5
	16	57.2	84.0	39.4	64.0	62.0	60.0	58.0	55.0	53.0	48.0	46.0	43.0	57.2	0.0	57.2
	17	55.1	68.8	40.1	63.0	61.0	59.0	58.0	55.0	53.0	48.0	46.0	42.0	55.1	0.0	55.1
	18	54.9	70.8	39.4	64.0	62.0	59.0	57.0	54.0	53.0	46.0	45.0	41.0	54.9	0.0	54.9
Evening	19	55.7	79.7	36.4	64.0	61.0	58.0	57.0	54.0	52.0	44.0	42.0	39.0	55.7	5.0	60.7
	20	54.5	76.2	36.4	64.0	61.0	57.0	56.0	53.0	50.0	42.0	40.0	37.0	54.5	5.0	59.5
	21	52.5	74.4	36.4	63.0	60.0	57.0	55.0	52.0	48.0	39.0	38.0	36.0	52.5	5.0	57.5
Night	22	49.5	67.3	36.4	59.0	56.0	55.0	53.0	50.0	45.0	36.0	36.0	36.0	49.5	10.0	59.5
	23	53.4	83.5	36.4	62.0	58.0	54.0	52.0	48.0	42.0	36.0	36.0	36.0	53.4	10.0	63.4

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	54.9	68.8	36.4	63.0	61.0	59.0	57.0	54.0	51.0	44.0	42.0	39.0
	Max	63.1	86.1	41.0	74.0	71.0	68.0	67.0	61.0	55.0	49.0	47.0	44.0
Energy Average		58.5	Average:		67.2	64.8	61.9	60.3	56.0	53.0	46.8	44.8	41.4
Evening	Min	52.5	74.4	36.4	63.0	60.0	57.0	55.0	52.0	48.0	39.0	38.0	36.0
	Max	55.7	79.7	36.4	64.0	61.0	58.0	57.0	54.0	52.0	44.0	42.0	39.0
Energy Average		54.4	Average:		63.7	60.7	57.3	56.0	53.0	50.0	41.7	40.0	37.3
Night	Min	49.1	66.9	36.4	58.0	56.0	54.0	52.0	48.0	42.0	36.0	36.0	36.0
	Max	58.6	83.5	45.4	68.0	66.0	63.0	61.0	58.0	56.0	51.0	50.0	47.0
Energy Average		55.5	Average:		63.3	60.9	58.2	56.6	52.9	49.3	42.8	42.1	40.6

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
57.2	58.0	55.5

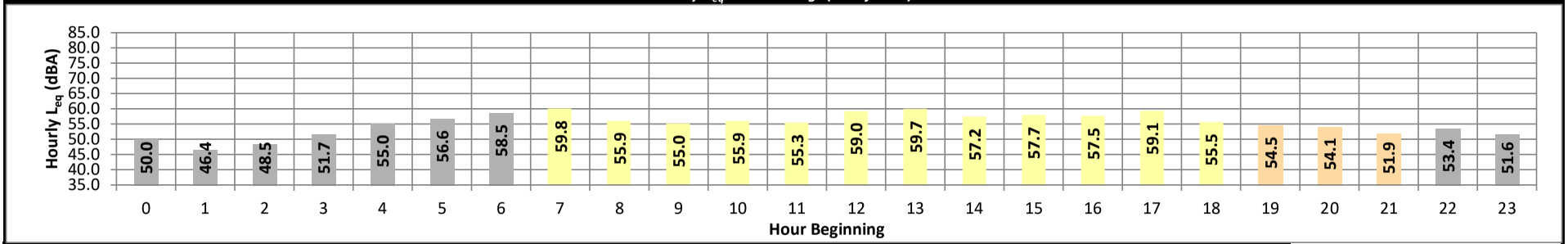
24-Hour CNEL (dBA)
62.6

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Wednesday, October 9, 2019
Project: Lake and Mountain Development
Location: L3 - Located across the streeet from single family home at 3764 Ash Street.
Meter: Piccolo I
JN: 12770
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	50.0	77.1	36.0	52.0	50.0	47.0	46.0	44.0	42.0	39.0	39.0	36.0	50.0	10.0	60.0
	1	46.4	72.0	36.0	52.0	50.0	48.0	47.0	45.0	42.0	36.0	36.0	36.0	46.4	10.0	56.4
	2	48.5	70.0	36.0	58.0	53.0	51.0	49.0	46.0	44.0	40.0	39.0	36.0	48.5	10.0	58.5
	3	51.7	73.4	38.9	64.0	57.0	53.0	51.0	49.0	47.0	44.0	43.0	40.0	51.7	10.0	61.7
	4	55.0	83.5	42.4	65.0	61.0	54.0	52.0	50.0	48.0	45.0	44.0	43.0	55.0	10.0	65.0
	5	56.6	74.9	42.9	69.0	67.0	62.0	58.0	52.0	50.0	46.0	45.0	44.0	56.6	10.0	66.6
	6	58.5	74.8	43.0	70.0	68.0	65.0	63.0	54.0	51.0	47.0	46.0	44.0	58.5	10.0	68.5
Day	7	59.8	86.9	40.3	70.0	68.0	65.0	62.0	53.0	49.0	45.0	43.0	42.0	59.8	0.0	59.8
	8	55.9	75.1	38.9	68.0	66.0	61.0	58.0	52.0	48.0	43.0	42.0	40.0	55.9	0.0	55.9
	9	55.0	75.4	36.0	66.0	65.0	60.0	58.0	52.0	47.0	42.0	40.0	38.0	55.0	0.0	55.0
	10	55.9	75.0	36.0	67.0	65.0	61.0	59.0	54.0	50.0	42.0	40.0	38.0	55.9	0.0	55.9
	11	55.3	73.9	39.0	67.0	65.0	60.0	58.0	52.0	48.0	43.0	42.0	41.0	55.3	0.0	55.3
	12	59.0	76.4	40.4	71.0	69.0	65.0	62.0	56.0	51.0	45.0	44.0	41.0	59.0	0.0	59.0
	13	59.7	87.4	38.9	70.0	68.0	65.0	63.0	54.0	49.0	44.0	42.0	41.0	59.7	0.0	59.7
	14	57.2	76.3	40.2	69.0	67.0	64.0	61.0	51.0	48.0	44.0	43.0	41.0	57.2	0.0	57.2
	15	57.7	78.0	40.1	69.0	68.0	65.0	62.0	53.0	48.0	44.0	43.0	41.0	57.7	0.0	57.7
	16	57.5	72.8	41.9	69.0	67.0	65.0	62.0	53.0	50.0	46.0	45.0	44.0	57.5	0.0	57.5
	17	59.1	81.8	41.7	70.0	68.0	65.0	62.0	52.0	49.0	46.0	45.0	43.0	59.1	0.0	59.1
	18	55.5	79.3	40.7	67.0	65.0	61.0	58.0	50.0	48.0	45.0	44.0	42.0	55.5	0.0	55.5
Evening	19	54.5	79.1	38.9	67.0	65.0	59.0	55.0	47.0	45.0	42.0	41.0	40.0	54.5	5.0	59.5
	20	54.1	78.8	36.0	67.0	64.0	57.0	52.0	45.0	43.0	39.0	39.0	38.0	54.1	5.0	59.1
	21	51.9	74.3	36.0	66.0	61.0	52.0	48.0	43.0	41.0	38.0	36.0	36.0	51.9	5.0	56.9
Night	22	53.4	83.4	36.0	64.0	58.0	49.0	46.0	44.0	43.0	39.0	37.0	36.0	53.4	10.0	63.4
	23	51.6	77.7	36.0	63.0	55.0	48.0	46.0	43.0	41.0	36.0	36.0	36.0	51.6	10.0	61.6

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	55.0	72.8	36.0	66.0	65.0	60.0	58.0	50.0	47.0	42.0	40.0	38.0
	Max	59.8	87.4	41.9	71.0	69.0	65.0	63.0	56.0	51.0	46.0	45.0	44.0
Energy Average		57.6	Average:		68.6	66.8	63.1	60.4	52.7	48.8	44.1	42.8	41.0
Evening	Min	51.9	74.3	36.0	66.0	61.0	52.0	48.0	43.0	41.0	38.0	36.0	36.0
	Max	54.5	79.1	38.9	67.0	65.0	59.0	55.0	47.0	45.0	42.0	41.0	40.0
Energy Average		53.6	Average:		66.7	63.3	56.0	51.7	45.0	43.0	39.7	38.7	38.0
Night	Min	46.4	70.0	36.0	52.0	50.0	47.0	46.0	43.0	41.0	36.0	36.0	36.0
	Max	58.5	83.5	43.0	70.0	68.0	65.0	63.0	54.0	51.0	47.0	46.0	44.0
Energy Average		53.9	Average:		61.9	57.7	53.0	50.9	47.4	45.3	41.3	40.6	39.0

L_{eq} (dBA)

24-Hour	*Daytime*	*Nighttime*
56.1	**57.1**	**53.9**

24-Hour CNEL (dBA)

61.1

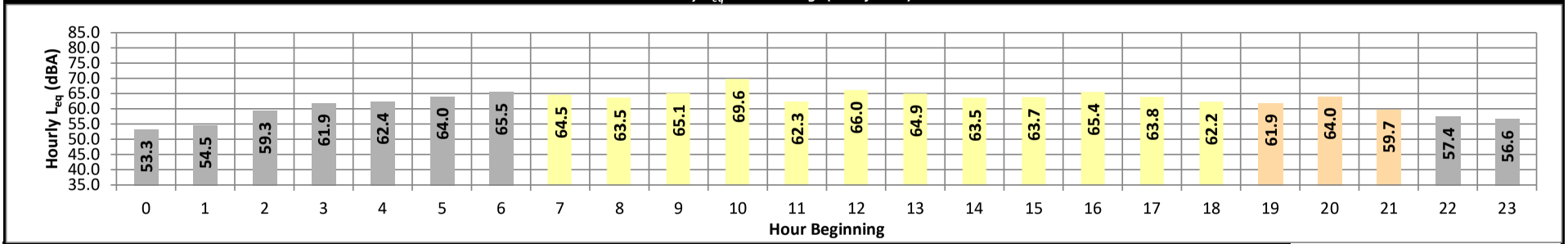
URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Wednesday, October 9, 2019 *Location:* L4 - Located along Mountain Street north of single family home at 14851 Noblewood Circle *Meter:* Piccolo I *JN:* 12770

Project: Lake and Mountain Development *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	53.3	72.1	36.1	65.0	63.0	60.0	58.0	48.0	43.0	36.0	36.0	36.0	53.3	10.0	63.3
	1	54.5	72.8	36.1	66.0	64.0	61.0	59.0	49.0	40.0	36.0	36.0	36.0	54.5	10.0	64.5
	2	59.3	79.7	36.1	70.0	68.0	65.0	63.0	57.0	49.0	39.0	37.0	36.0	59.3	10.0	69.3
	3	61.9	81.5	42.0	71.0	69.0	67.0	65.0	61.0	57.0	48.0	47.0	43.0	61.9	10.0	71.9
	4	62.4	81.1	42.3	71.0	70.0	68.0	66.0	62.0	58.0	50.0	48.0	45.0	62.4	10.0	72.4
	5	64.0	86.4	42.1	72.0	70.0	68.0	67.0	63.0	59.0	51.0	49.0	46.0	64.0	10.0	74.0
	6	65.5	83.6	43.8	74.0	73.0	70.0	69.0	66.0	61.0	53.0	51.0	47.0	65.5	10.0	75.5
Day	7	64.5	86.5	40.1	74.0	72.0	69.0	68.0	64.0	60.0	50.0	48.0	44.0	64.5	0.0	64.5
	8	63.5	87.6	40.5	72.0	70.0	68.0	66.0	62.0	57.0	47.0	45.0	43.0	63.5	0.0	63.5
	9	65.1	95.4	39.1	72.0	70.0	68.0	66.0	61.0	57.0	47.0	45.0	42.0	65.1	0.0	65.1
	10	69.6	100.1	38.4	71.0	70.0	67.0	66.0	61.0	56.0	47.0	45.0	41.0	69.6	0.0	69.6
	11	62.3	79.3	39.0	72.0	70.0	68.0	66.0	61.0	57.0	47.0	45.0	40.0	62.3	0.0	62.3
	12	66.0	91.5	43.7	76.0	72.0	69.0	68.0	63.0	59.0	51.0	49.0	46.0	66.0	0.0	66.0
	13	64.9	86.3	41.9	74.0	72.0	70.0	68.0	64.0	59.0	51.0	48.0	46.0	64.9	0.0	64.9
	14	63.5	82.0	43.8	73.0	70.0	68.0	67.0	63.0	59.0	51.0	49.0	46.0	63.5	0.0	63.5
	15	63.7	85.4	41.1	73.0	71.0	69.0	67.0	63.0	58.0	49.0	48.0	45.0	63.7	0.0	63.7
	16	65.4	91.0	43.6	72.0	70.0	68.0	67.0	63.0	59.0	50.0	48.0	45.0	65.4	0.0	65.4
	17	63.8	85.3	40.9	73.0	70.0	68.0	66.0	63.0	59.0	50.0	48.0	45.0	63.8	0.0	63.8
	18	62.2	81.2	39.1	71.0	69.0	67.0	66.0	62.0	58.0	48.0	46.0	42.0	62.2	0.0	62.2
Evening	19	61.9	84.8	36.1	71.0	69.0	66.0	65.0	61.0	56.0	46.0	44.0	39.0	61.9	5.0	66.9
	20	64.0	91.1	36.1	73.0	70.0	66.0	65.0	60.0	54.0	43.0	40.0	38.0	64.0	5.0	69.0
	21	59.7	87.1	36.1	69.0	67.0	64.0	63.0	58.0	50.0	41.0	40.0	38.0	59.7	5.0	64.7
Night	22	57.4	79.7	36.1	67.0	65.0	62.0	61.0	54.0	45.0	36.0	36.0	36.0	57.4	10.0	67.4
	23	56.6	80.8	36.1	68.0	64.0	61.0	59.0	50.0	41.0	36.0	36.0	36.0	56.6	10.0	66.6

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	62.2	79.3	38.4	71.0	69.0	67.0	66.0	61.0	56.0	47.0	45.0	40.0
	Max	69.6	100.1	43.8	76.0	72.0	70.0	68.0	64.0	60.0	51.0	49.0	46.0
Energy Average		65.0	Average:		72.8	70.5	68.3	66.8	62.5	58.2	49.0	47.0	43.8
Evening	Min	59.7	84.8	36.1	69.0	67.0	64.0	63.0	58.0	50.0	41.0	40.0	38.0
	Max	64.0	91.1	36.1	73.0	70.0	66.0	65.0	61.0	56.0	46.0	44.0	39.0
Energy Average		62.2	Average:		71.0	68.7	65.3	64.3	59.7	53.3	43.3	41.3	38.3
Night	Min	53.3	72.1	36.1	65.0	63.0	60.0	58.0	48.0	40.0	36.0	36.0	36.0
	Max	65.5	86.4	43.8	74.0	73.0	70.0	69.0	66.0	61.0	53.0	51.0	47.0
Energy Average		61.1	Average:		69.3	67.3	64.7	63.0	56.7	50.3	42.8	41.8	40.1

L_{eq} (dBA)

24-Hour	*Daytime*	*Nighttime*
63.6	**64.6**	**61.1**

24-Hour CNEL (dBA)

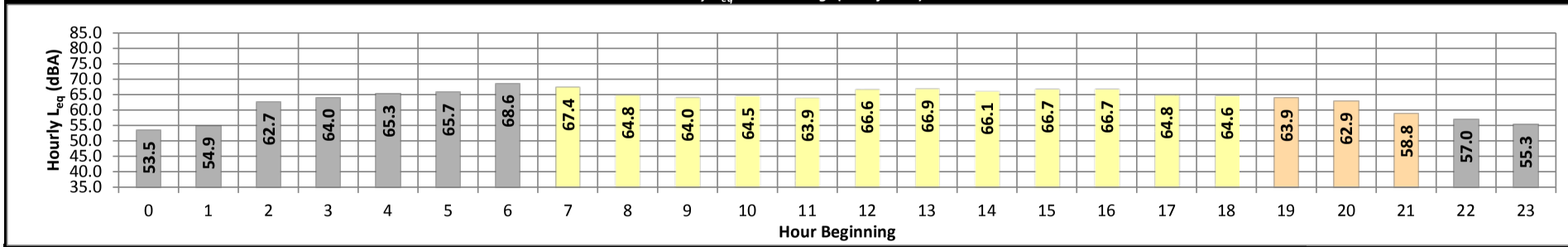
68.5

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Wednesday, October 09, 2019
Project: Lake and Mountain Development
Location: L5 - Located along Mountain St. north of single family home at 14859 Noblewood Cir.
Meter: Piccolo I
JN: 12770
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	53.5	75.5	36.1	68.0	64.0	53.0	49.0	43.0	39.0	36.0	36.0	36.0	53.5	10.0	63.5
	1	54.9	81.3	36.1	68.0	62.0	53.0	50.0	43.0	40.0	36.0	36.0	36.0	54.9	10.0	64.9
	2	62.7	88.0	36.1	75.0	72.0	67.0	63.0	49.0	43.0	38.0	36.0	36.0	62.7	10.0	72.7
	3	64.0	83.0	39.8	76.0	75.0	71.0	68.0	55.0	49.0	44.0	43.0	41.0	64.0	10.0	74.0
	4	65.3	83.9	40.9	77.0	75.0	73.0	71.0	58.0	51.0	45.0	44.0	43.0	65.3	10.0	75.3
	5	65.7	85.1	42.4	76.0	75.0	73.0	71.0	62.0	53.0	47.0	46.0	44.0	65.7	10.0	75.7
	6	68.6	84.5	45.3	77.0	76.0	75.0	74.0	69.0	61.0	49.0	48.0	47.0	68.6	10.0	78.6
Day	7	67.4	82.0	39.8	77.0	76.0	74.0	73.0	67.0	57.0	46.0	44.0	42.0	67.4	0.0	67.4
	8	64.8	87.4	38.7	76.0	74.0	72.0	70.0	60.0	51.0	43.0	42.0	40.0	64.8	0.0	64.8
	9	64.0	79.9	39.1	76.0	74.0	71.0	69.0	58.0	49.0	42.0	41.0	40.0	64.0	0.0	64.0
	10	64.5	79.4	43.1	75.0	74.0	71.0	70.0	62.0	56.0	49.0	48.0	46.0	64.5	0.0	64.5
	11	63.9	88.8	38.4	75.0	74.0	71.0	68.0	57.0	49.0	43.0	41.0	39.0	63.9	0.0	63.9
	12	66.6	84.9	41.9	77.0	75.0	73.0	71.0	65.0	57.0	47.0	46.0	44.0	66.6	0.0	66.6
	13	66.9	82.6	40.9	77.0	76.0	73.0	72.0	66.0	56.0	45.0	44.0	42.0	66.9	0.0	66.9
	14	66.1	85.9	40.9	76.0	75.0	72.0	71.0	65.0	55.0	46.0	44.0	42.0	66.1	0.0	66.1
	15	66.7	93.2	39.0	76.0	75.0	73.0	71.0	64.0	54.0	44.0	42.0	40.0	66.7	0.0	66.7
	16	66.7	86.3	40.0	76.0	75.0	73.0	71.0	66.0	57.0	46.0	44.0	41.0	66.7	0.0	66.7
	17	64.8	79.6	39.1	74.0	73.0	71.0	70.0	64.0	54.0	45.0	43.0	42.0	64.8	0.0	64.8
	18	64.6	80.6	39.1	75.0	73.0	71.0	70.0	63.0	53.0	44.0	43.0	40.0	64.6	0.0	64.6
Evening	19	63.9	80.1	36.1	75.0	74.0	71.0	69.0	60.0	50.0	43.0	42.0	39.0	63.9	5.0	68.9
	20	62.9	83.9	36.1	74.0	72.0	70.0	68.0	55.0	47.0	40.0	39.0	36.0	62.9	5.0	67.9
	21	58.8	78.9	36.1	71.0	69.0	66.0	62.0	50.0	46.0	41.0	39.0	36.0	58.8	5.0	63.8
Night	22	57.0	81.4	36.1	71.0	68.0	59.0	53.0	45.0	42.0	36.0	36.0	36.0	57.0	10.0	67.0
	23	55.3	78.4	36.1	69.0	65.0	56.0	50.0	43.0	40.0	36.0	36.0	36.0	55.3	10.0	65.3

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	63.9	79.4	38.4	74.0	73.0	71.0	68.0	57.0	49.0	42.0	41.0	39.0
	Max	67.4	93.2	43.1	77.0	76.0	74.0	73.0	67.0	57.0	49.0	48.0	46.0
Energy Average		65.8	Average:		75.8	74.5	72.1	70.5	63.1	54.0	45.0	43.5	41.5
Evening	Min	58.8	78.9	36.1	71.0	69.0	66.0	62.0	50.0	46.0	40.0	39.0	36.0
	Max	63.9	83.9	36.1	75.0	74.0	71.0	69.0	60.0	50.0	43.0	42.0	39.0
Energy Average		62.4	Average:		73.3	71.7	69.0	66.3	55.0	47.7	41.3	40.0	37.0
Night	Min	53.5	75.5	36.1	68.0	62.0	53.0	49.0	43.0	39.0	36.0	36.0	36.0
	Max	68.6	88.0	45.3	77.0	76.0	75.0	74.0	69.0	61.0	49.0	48.0	47.0
Energy Average		63.5	Average:		73.0	70.2	64.4	61.0	51.9	46.4	40.8	40.1	39.4

L_{eq} (dBA)

24-Hour	Daytime	Nighttime
64.7	65.3	63.5

24-Hour CNEL (dBA)

70.4

URBAN CROSSROADS

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APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE LEVEL CONTOURS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: n/o Nichols Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,660 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-0.21	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-17.45	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-21.40	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.9	67.0	65.3	59.2	67.8	68.4
Medium Trucks:	62.5	61.0	54.6	53.1	61.6	61.8
Heavy Trucks:	62.9	61.5	52.5	53.7	62.1	62.2
Vehicle Noise:	70.6	68.9	65.8	61.0	69.6	70.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	56	121	262	564
CNEL:	61	130	281	605

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: s/o Nichols Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,150 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.92	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-16.32	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.28	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.0	68.1	66.4	60.3	68.9	69.6
Medium Trucks:	63.6	62.1	55.8	54.2	62.7	62.9
Heavy Trucks:	64.0	62.6	53.6	54.8	63.2	63.3
Vehicle Noise:	71.7	70.0	66.9	62.2	70.7	71.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	67	144	311	670
CNEL:	72	155	334	719

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: s/o Alberhill Ranch Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,200 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.02	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-16.22	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.18	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.1	68.2	66.5	60.4	69.0	69.7
Medium Trucks:	63.7	62.2	55.9	54.3	62.8	63.0
Heavy Trucks:	64.1	62.7	53.7	54.9	63.3	63.4
Vehicle Noise:	71.8	70.1	67.0	62.3	70.8	71.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	68	147	316	680
CNEL:	73	157	339	731

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: n/o Mountain St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,190 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.00	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-16.24	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.20	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.1	68.2	66.5	60.4	69.0	69.6
Medium Trucks:	63.7	62.2	55.8	54.3	62.8	63.0
Heavy Trucks:	64.1	62.7	53.7	54.9	63.3	63.4
Vehicle Noise:	71.8	70.1	67.0	62.2	70.8	71.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	68	146	315	678
CNEL:	73	157	338	728

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: s/o Mountain St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,090 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.79	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-16.45	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.40	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.9	68.0	66.3	60.2	68.8	69.4
Medium Trucks:	63.5	62.0	55.6	54.1	62.6	62.8
Heavy Trucks:	63.9	62.5	53.5	54.7	63.1	63.2
Vehicle Noise:	71.6	69.9	66.8	62.0	70.6	71.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	66	142	305	657
CNEL:	71	152	328	706

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: s/o Lakeshore Dr.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,770 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.07	0.93	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-17.17	0.96	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-21.12	0.95	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.0	68.1	66.3	60.3	68.9	69.5
Medium Trucks:	63.6	62.1	55.7	54.2	62.6	62.9
Heavy Trucks:	64.0	62.6	53.6	54.8	63.2	63.3
Vehicle Noise:	71.7	70.0	66.9	62.1	70.7	71.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	55	119	257	554
CNEL:	60	128	276	595

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: Lake & Mountain
Road Name: Lincoln St. | Job Number: 12770
Road Segment: s/o Grand Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	500 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-4.45	0.93	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-21.69	0.96	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-25.64	0.95	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.8	59.9	58.1	52.1	60.7	61.3
Medium Trucks:	55.8	54.3	47.9	46.4	54.8	55.1
Heavy Trucks:	57.1	55.7	46.6	47.9	56.3	56.4
Vehicle Noise:	63.8	62.1	58.8	54.2	62.8	63.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	17	36	77	165
CNEL:	18	38	82	177

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: Lake & Mountain
Road Name: Nichols Rd. | Job Number: 12770
Road Segment: e/o Lake St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	6,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	650 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-4.28	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-21.52	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-25.47	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.9	63.0	61.2	55.1	63.8	64.4
Medium Trucks:	58.4	56.9	50.6	49.0	57.5	57.7
Heavy Trucks:	58.9	57.4	48.4	49.6	58.0	58.1
Vehicle Noise:	66.6	64.8	61.8	57.0	65.5	66.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	30	65	140	302
CNEL:	32	70	150	324

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: Lake & Mountain
Road Name: Alberhill Ranch Rd. | Job Number: 12770
Road Segment: e/o Lake St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	150 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 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:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.230

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-9.68	1.78	-1.20	-4.58	0.000	0.000
Medium Trucks:	77.72	-26.92	1.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-30.87	1.82	-1.20	-5.57	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.4	55.5	53.7	47.7	56.3	56.9
Medium Trucks:	51.4	49.9	43.6	42.0	50.5	50.7
Heavy Trucks:	52.7	51.3	42.3	43.5	51.9	52.0
Vehicle Noise:	59.4	57.7	54.4	49.9	58.4	58.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	7	14	31	66
CNEL:	7	15	33	71

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: Lake & Mountain
Road Name: Lakeshore Drive | Job Number: 12770
Road Segment: e/o Lake St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,000 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-2.41	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-19.65	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-23.60	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.7	64.8	63.1	57.0	65.6	66.2
Medium Trucks:	60.3	58.8	52.4	50.9	59.4	59.6
Heavy Trucks:	60.7	59.3	50.3	51.5	59.9	60.0
Vehicle Noise:	68.4	66.7	63.6	58.8	67.4	67.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	40	87	187	402
CNEL:	43	93	200	432

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: Lake & Mountain
Road Name: Lakeshore Drive | Job Number: 12770
Road Segment: e/o Terra Cotta Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,310 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-1.24	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-18.47	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-22.43	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.9	66.0	64.2	58.2	66.8	67.4
Medium Trucks:	61.5	60.0	53.6	52.1	60.5	60.8
Heavy Trucks:	61.9	60.5	51.4	52.7	61.0	61.2
Vehicle Noise:	69.6	67.8	64.8	60.0	68.6	69.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	48	104	223	481
CNEL:	52	111	240	517

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | Project Name: Lake & Mountain
Road Name: Grand Av. | Job Number: 12770
Road Segment: w/o Lincoln St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,070 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-1.66	0.93	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-18.90	0.96	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-22.85	0.95	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.5	64.6	62.9	56.8	65.4	66.0
Medium Trucks:	60.3	58.8	52.4	50.9	59.4	59.6
Heavy Trucks:	61.2	59.7	50.7	51.9	60.3	60.4
Vehicle Noise:	68.4	66.6	63.5	58.8	67.3	67.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	33	72	154	333
CNEL:	36	77	166	357

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing (2019) | *Project Name:* Lake & Mountain
Road Name: Grand Av. | *Job Number:* 12770
Road Segment: e/o Lincoln St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,280 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.88	0.93	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-18.12	0.96	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-22.07	0.95	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.3	65.4	63.6	57.6	66.2	66.8
Medium Trucks:	61.1	59.6	53.2	51.7	60.1	60.4
Heavy Trucks:	61.9	60.5	51.5	52.7	61.1	61.2
Vehicle Noise:	69.2	67.4	64.3	59.6	68.1	68.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	37	81	174	375
CNEL:	40	87	187	402

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P | *Project Name:* Lake & Mountain
Road Name: Lake St. | *Job Number:* 12770
Road Segment: n/o Nichols Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,710 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-0.08	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	81.00	-17.32	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-21.27	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.1	67.2	65.4	59.3	68.0	68.6
Medium Trucks:	62.6	61.1	54.8	53.2	61.7	61.9
Heavy Trucks:	63.1	61.6	52.6	53.8	62.2	62.3
Vehicle Noise:	70.8	69.0	66.0	61.2	69.7	70.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	57	124	267	575
CNEL:	62	133	287	618

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P | *Project Name:* Lake & Mountain
Road Name: Lake St. | *Job Number:* 12770
Road Segment: s/o Nichols Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,220 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.05	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	81.00	-16.18	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-20.14	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.2	68.3	66.5	60.5	69.1	69.7
Medium Trucks:	63.8	62.3	55.9	54.4	62.8	63.0
Heavy Trucks:	64.2	62.8	53.7	55.0	63.3	63.5
Vehicle Noise:	71.9	70.1	67.1	62.3	70.9	71.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	68	147	318	684
CNEL:	73	158	341	735

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P | *Project Name:* Lake & Mountain
Road Name: Lake St. | *Job Number:* 12770
Road Segment: s/o Alberhill Ranch Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,290 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.19	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	81.00	-16.05	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-20.00	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.3	68.4	66.7	60.6	69.2	69.8
Medium Trucks:	63.9	62.4	56.0	54.5	63.0	63.2
Heavy Trucks:	64.3	62.9	53.9	55.1	63.5	63.6
Vehicle Noise:	72.0	70.3	67.2	62.4	71.0	71.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	70	150	324	698
CNEL:	75	162	348	750

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: n/o Mountain St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,340 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.28	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-15.95	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-19.91	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.4	68.5	66.7	60.7	69.3	69.9
Medium Trucks:	64.0	62.5	56.1	54.6	63.0	63.3
Heavy Trucks:	64.4	63.0	54.0	55.2	63.6	63.7
Vehicle Noise:	72.1	70.4	67.3	62.5	71.1	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	71	153	329	709
CNEL:	76	164	353	761

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: s/o Mountain St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,290 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.19	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-16.05	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.00	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.3	68.4	66.7	60.6	69.2	69.8
Medium Trucks:	63.9	62.4	56.0	54.5	63.0	63.2
Heavy Trucks:	64.3	62.9	53.9	55.1	63.5	63.6
Vehicle Noise:	72.0	70.3	67.2	62.4	71.0	71.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	70	150	324	698
CNEL:	75	162	348	750

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: s/o Lakeshore Dr.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,280 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.17	0.93	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-16.07	0.96	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-20.02	0.95	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.1	69.2	67.4	61.4	70.0	70.6
Medium Trucks:	64.7	63.2	56.8	55.3	63.7	64.0
Heavy Trucks:	65.1	63.7	54.7	55.9	64.3	64.4
Vehicle Noise:	72.8	71.1	68.0	63.2	71.8	72.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	66	141	305	656
CNEL:	70	152	327	705

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P | Project Name: Lake & Mountain
Road Name: Lincoln St. | Job Number: 12770
Road Segment: s/o Grand Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	520 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-4.28	0.93	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-21.52	0.96	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-25.47	0.95	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.0	60.1	58.3	52.2	60.9	61.5
Medium Trucks:	56.0	54.4	48.1	46.5	55.0	55.2
Heavy Trucks:	57.3	55.9	46.8	48.1	56.4	56.5
Vehicle Noise:	64.0	62.2	59.0	54.4	63.0	63.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	17	37	79	170
CNEL:	18	39	84	181

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P | Project Name: Lake & Mountain
Road Name: Nichols Rd. | Job Number: 12770
Road Segment: e/o Lake St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	6,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	680 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-4.08	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-21.32	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-25.28	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.0	63.1	61.4	55.3	64.0	64.6
Medium Trucks:	58.6	57.1	50.8	49.2	57.7	57.9
Heavy Trucks:	59.1	57.6	48.6	49.8	58.2	58.3
Vehicle Noise:	66.7	65.0	61.9	57.2	65.7	66.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	31	67	144	311
CNEL:	33	72	155	334

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P | Project Name: Lake & Mountain
Road Name: Alberhill Ranch Rd. | Job Number: 12770
Road Segment: e/o Lake St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	170 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 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:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.230

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-9.14	1.78	-1.20	-4.58	0.000	0.000
Medium Trucks:	77.72	-26.37	1.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-30.33	1.82	-1.20	-5.57	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.0	56.1	54.3	48.2	56.9	57.5
Medium Trucks:	52.0	50.5	44.1	42.5	51.0	51.2
Heavy Trucks:	53.3	51.9	42.8	44.1	52.4	52.6
Vehicle Noise:	60.0	58.2	55.0	50.4	59.0	59.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	7	15	33	72
CNEL:	8	17	36	77

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P | Project Name: Lake & Mountain
Road Name: Lakeshore Drive | Job Number: 12770
Road Segment: e/o Lake St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,090 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-2.03	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-19.27	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-23.23	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.1	65.2	63.4	57.4	66.0	66.6
Medium Trucks:	60.7	59.2	52.8	51.3	59.7	60.0
Heavy Trucks:	61.1	59.7	50.6	51.9	60.2	60.4
Vehicle Noise:	68.8	67.0	64.0	59.2	67.8	68.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	43	92	198	426
CNEL:	46	99	212	457

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P | Project Name: Lake & Mountain
Road Name: Lakeshore Drive | Job Number: 12770
Road Segment: e/o Terra Cotta Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,350 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-1.11	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-18.34	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-22.30	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.0	66.1	64.4	58.3	66.9	67.5
Medium Trucks:	61.6	60.1	53.7	52.2	60.7	60.9
Heavy Trucks:	62.0	60.6	51.6	52.8	61.2	61.3
Vehicle Noise:	69.7	68.0	64.9	60.1	68.7	69.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	49	106	228	491
CNEL:	53	114	245	528

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P
Road Name: Grand Av.
Road Segment: w/o Lincoln St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,120	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	53	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-1.46	0.93	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-18.70	0.96	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-22.65	0.95	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.7	64.8	63.1	57.0	65.6	66.2
Medium Trucks:	60.5	59.0	52.6	51.1	59.6	59.8
Heavy Trucks:	61.4	59.9	50.9	52.1	60.5	60.6
Vehicle Noise:	68.6	66.8	63.7	59.0	67.5	68.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	34	74	159	343
CNEL:	37	79	171	368

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: E+P
Road Name: Grand Av.
Road Segment: e/o Lincoln St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,370	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	53	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.58	0.93	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-17.82	0.96	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-21.78	0.95	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.6	65.7	63.9	57.9	66.5	67.1
Medium Trucks:	61.4	59.9	53.5	52.0	60.4	60.7
Heavy Trucks:	62.2	60.8	51.8	53.0	61.4	61.5
Vehicle Noise:	69.4	67.7	64.5	59.9	68.4	68.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	39	85	182	392
CNEL:	42	91	195	421

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: Lake St.
Road Segment: n/o Nichols Rd.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,300	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,730	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-0.03	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	81.00	-17.27	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-21.22	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.1	67.2	65.4	59.4	68.0	68.6
Medium Trucks:	62.7	61.2	54.8	53.3	61.7	62.0
Heavy Trucks:	63.1	61.7	52.6	53.9	62.3	62.4
Vehicle Noise:	70.8	69.1	66.0	61.2	69.8	70.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	58	125	269	579
CNEL:	62	134	289	622

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: Lake St.
Road Segment: s/o Nichols Rd.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,400	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,240	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.09	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	81.00	-16.14	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-20.10	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.2	68.3	66.6	60.5	69.1	69.7
Medium Trucks:	63.8	62.3	55.9	54.4	62.9	63.1
Heavy Trucks:	64.2	62.8	53.8	55.0	63.4	63.5
Vehicle Noise:	71.9	70.2	67.1	62.3	70.9	71.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	69	148	319	688
CNEL:	74	159	343	739

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: Lake St.
Road Segment: s/o Alberhill Ranch Rd.

Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,290 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.19	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-16.05	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.00	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.3	68.4	66.7	60.6	69.2	69.8
Medium Trucks:	63.9	62.4	56.0	54.5	63.0	63.2
Heavy Trucks:	64.3	62.9	53.9	55.1	63.5	63.6
Vehicle Noise:	72.0	70.3	67.2	62.4	71.0	71.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	70	150	324	698
CNEL:	75	162	348	750

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: Lake St.
Road Segment: n/o Mountain St.

Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,290 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.19	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-16.05	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.00	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.3	68.4	66.7	60.6	69.2	69.8
Medium Trucks:	63.9	62.4	56.0	54.5	63.0	63.2
Heavy Trucks:	64.3	62.9	53.9	55.1	63.5	63.6
Vehicle Noise:	72.0	70.3	67.2	62.4	71.0	71.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	70	150	324	698
CNEL:	75	162	348	750

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: Lake St.
Road Segment: s/o Mountain St.

Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,180 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.98	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-16.26	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.22	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.1	68.2	66.4	60.4	69.0	69.6
Medium Trucks:	63.7	62.2	55.8	54.3	62.7	63.0
Heavy Trucks:	64.1	62.7	53.7	54.9	63.3	63.4
Vehicle Noise:	71.8	70.1	67.0	62.2	70.8	71.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	68	146	314	676
CNEL:	73	156	337	726

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: Lake St.
Road Segment: s/o Lakeshore Dr.

Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,250 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.11	0.93	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-16.13	0.96	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-20.08	0.95	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.0	69.1	67.4	61.3	69.9	70.6
Medium Trucks:	64.6	63.1	56.8	55.2	63.7	63.9
Heavy Trucks:	65.1	63.6	54.6	55.8	64.2	64.3
Vehicle Noise:	72.7	71.0	67.9	63.2	71.7	72.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	65	140	302	650
CNEL:	70	151	324	699

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: Lincoln St.
Road Segment: s/o Grand Av.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	520 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-4.28	0.93	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	77.72	-21.52	0.96	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-25.47	0.95	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	62.0	60.1	58.3	52.2	60.9	61.5
Medium Trucks:	56.0	54.4	48.1	46.5	55.0	55.2
Heavy Trucks:	57.3	55.9	46.8	48.1	56.4	56.5
Vehicle Noise:	64.0	62.2	59.0	54.4	63.0	63.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	17	37	79	170
CNEL:	18	39	84	181

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: Nichols Rd.
Road Segment: e/o Lake St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	6,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	680 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-4.08	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	81.00	-21.32	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-25.28	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	65.0	63.1	61.4	55.3	64.0	64.6
Medium Trucks:	58.6	57.1	50.8	49.2	57.7	57.9
Heavy Trucks:	59.1	57.6	48.6	49.8	58.2	58.3
Vehicle Noise:	66.7	65.0	61.9	57.2	65.7	66.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	31	67	144	311
CNEL:	33	72	155	334

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: Alberhill Ranch Rd.
Road Segment: e/o Lake St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	160 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 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:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.230

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-9.40	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	77.72	-26.64	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-30.59	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	57.7	55.8	54.0	48.0	56.6	57.2
Medium Trucks:	51.7	50.2	43.8	42.3	50.7	51.0
Heavy Trucks:	53.0	51.6	42.6	43.8	52.2	52.3
Vehicle Noise:	59.7	58.0	54.7	50.2	58.7	59.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	7	15	32	69
CNEL:	7	16	34	74

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: Lakeshore Drive
Road Segment: e/o Lake St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,040 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-2.24	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	81.00	-19.48	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-23.43	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.9	65.0	63.2	57.2	65.8	66.4
Medium Trucks:	60.5	59.0	52.6	51.1	59.5	59.8
Heavy Trucks:	60.9	59.5	50.4	51.7	60.0	60.2
Vehicle Noise:	68.6	66.8	63.8	59.0	67.6	68.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	41	89	192	413
CNEL:	44	96	206	443

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: Lakeshore Drive
Road Segment: e/o Terra Cotta Rd.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,370	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-1.04	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	81.00	-18.28	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-22.24	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.1	66.2	64.4	58.4	67.0	67.6
Medium Trucks:	61.7	60.2	53.8	52.3	60.7	61.0
Heavy Trucks:	62.1	60.7	51.6	52.9	61.2	61.4
Vehicle Noise:	69.8	68.0	65.0	60.2	68.8	69.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	50	107	230	496
CNEL:	53	115	247	533

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: Grand Av.
Road Segment: w/o Lincoln St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,100	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,110	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	53	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.50	0.93	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-18.74	0.96	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-22.69	0.95	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.7	64.8	63.0	57.0	65.6	66.2
Medium Trucks:	60.5	59.0	52.6	51.1	59.5	59.7
Heavy Trucks:	61.3	59.9	50.9	52.1	60.5	60.6
Vehicle Noise:	68.5	66.8	63.6	59.0	67.5	68.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	34	73	158	341
CNEL:	37	79	170	366

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA
Road Name: Grand Av.
Road Segment: e/o Lincoln St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,300	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,330	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	53	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.71	0.93	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-17.95	0.96	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-21.91	0.95	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.5	65.6	63.8	57.8	66.4	67.0
Medium Trucks:	61.3	59.7	53.4	51.8	60.3	60.5
Heavy Trucks:	62.1	60.7	51.6	52.9	61.2	61.4
Vehicle Noise:	69.3	67.6	64.4	59.7	68.3	68.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	38	83	179	385
CNEL:	41	89	191	413

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP
Road Name: Lake St.
Road Segment: n/o Nichols Rd.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,780	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.10	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	81.00	-17.14	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-21.10	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.2	67.3	65.6	59.5	68.1	68.7
Medium Trucks:	62.8	61.3	54.9	53.4	61.9	62.1
Heavy Trucks:	63.2	61.8	52.8	54.0	62.4	62.5
Vehicle Noise:	70.9	69.2	66.1	61.3	69.9	70.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	59	127	274	590
CNEL:	63	137	294	634

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: s/o Nichols Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,310 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.23	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-16.01	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-19.97	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.4	68.5	66.7	60.6	69.3	69.9
Medium Trucks:	63.9	62.4	56.1	54.5	63.0	63.2
Heavy Trucks:	64.4	62.9	53.9	55.2	63.5	63.6
Vehicle Noise:	72.1	70.3	67.3	62.5	71.0	71.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	70	151	326	702
CNEL:	75	163	350	755

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: s/o Alberhill Ranch Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,380 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.36	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-15.88	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-19.84	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.5	68.6	66.8	60.8	69.4	70.0
Medium Trucks:	64.1	62.6	56.2	54.7	63.1	63.4
Heavy Trucks:	64.5	63.1	54.0	55.3	63.6	63.8
Vehicle Noise:	72.2	70.4	67.4	62.6	71.2	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	72	154	333	717
CNEL:	77	166	357	770

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: n/o Mountain St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,430 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.45	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-15.79	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-19.75	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.6	68.7	66.9	60.9	69.5	70.1
Medium Trucks:	64.2	62.7	56.3	54.7	63.2	63.4
Heavy Trucks:	64.6	63.2	54.1	55.4	63.7	63.9
Vehicle Noise:	72.3	70.5	67.5	62.7	71.2	71.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	73	157	337	727
CNEL:	78	168	362	781

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: s/o Mountain St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,380 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.36	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-15.88	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-19.84	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.5	68.6	66.8	60.8	69.4	70.0
Medium Trucks:	64.1	62.6	56.2	54.7	63.1	63.4
Heavy Trucks:	64.5	63.1	54.0	55.3	63.6	63.8
Vehicle Noise:	72.2	70.4	67.4	62.6	71.2	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	72	154	333	717
CNEL:	77	166	357	770

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP
Road Name: Lake St.
Road Segment: s/o Lakeshore Dr.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,360 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.32	0.93	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-15.92	0.96	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-19.87	0.95	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.3	69.4	67.6	61.5	70.2	70.8
Medium Trucks:	64.8	63.3	57.0	55.4	63.9	64.1
Heavy Trucks:	65.3	63.8	54.8	56.1	64.4	64.5
Vehicle Noise:	73.0	71.2	68.2	63.4	71.9	72.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	67	145	312	671
CNEL:	72	155	335	721

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP
Road Name: Lincoln St.
Road Segment: s/o Grand Av.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	540 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-4.12	0.93	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-21.35	0.96	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-25.31	0.95	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.1	60.2	58.5	52.4	61.0	61.6
Medium Trucks:	56.1	54.6	48.2	46.7	55.2	55.4
Heavy Trucks:	57.4	56.0	47.0	48.2	56.6	56.7
Vehicle Noise:	64.1	62.4	59.1	54.6	63.1	63.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	17	37	81	174
CNEL:	19	40	86	186

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP
Road Name: Nichols Rd.
Road Segment: e/o Lake St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	700 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-3.96	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-21.20	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-25.15	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.2	63.3	61.5	55.5	64.1	64.7
Medium Trucks:	58.8	57.2	50.9	49.3	57.8	58.0
Heavy Trucks:	59.2	57.8	48.7	50.0	58.3	58.4
Vehicle Noise:	66.9	65.1	62.1	57.3	65.8	66.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	32	68	147	317
CNEL:	34	73	158	340

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP
Road Name: Alberhill Ranch Rd.
Road Segment: e/o Lake St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	180 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 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:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.230

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-8.89	1.78	-1.20	-4.58	0.000	0.000
Medium Trucks:	77.72	-26.13	1.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-30.08	1.82	-1.20	-5.57	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.2	56.3	54.5	48.5	57.1	57.7
Medium Trucks:	52.2	50.7	44.3	42.8	51.3	51.5
Heavy Trucks:	53.5	52.1	43.1	44.3	52.7	52.8
Vehicle Noise:	60.2	58.5	55.2	50.7	59.2	59.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	7	16	35	74
CNEL:	8	17	37	80

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP
Road Name: Lakeshore Drive
Road Segment: e/o Lake St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,130 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-1.88	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-19.12	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-23.07	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.3	65.4	63.6	57.5	66.2	66.8
Medium Trucks:	60.8	59.3	53.0	51.4	59.9	60.1
Heavy Trucks:	61.3	59.8	50.8	52.0	60.4	60.5
Vehicle Noise:	69.0	67.2	64.2	59.4	67.9	68.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	44	94	202	436
CNEL:	47	101	217	469

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP
Road Name: Lakeshore Drive
Road Segment: e/o Terra Cotta Rd.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,410 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-0.92	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-18.15	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-22.11	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.2	66.3	64.5	58.5	67.1	67.7
Medium Trucks:	61.8	60.3	53.9	52.4	60.8	61.1
Heavy Trucks:	62.2	60.8	51.8	53.0	61.4	61.5
Vehicle Noise:	69.9	68.2	65.1	60.3	68.9	69.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	51	109	235	505
CNEL:	54	117	252	543

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP
Road Name: Grand Av.
Road Segment: w/o Lincoln St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,160 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-1.31	0.93	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-18.54	0.96	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-22.50	0.95	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.9	65.0	63.2	57.2	65.8	66.4
Medium Trucks:	60.7	59.2	52.8	51.2	59.7	59.9
Heavy Trucks:	61.5	60.1	51.0	52.3	60.7	60.8
Vehicle Noise:	68.7	67.0	63.8	59.2	67.7	68.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	35	76	163	351
CNEL:	38	81	175	377

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP
Road Name: Grand Av.
Road Segment: e/o Lincoln St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,420 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.43	0.93	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-17.67	0.96	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-21.62	0.95	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.8	65.9	64.1	58.0	66.7	67.3
Medium Trucks:	61.5	60.0	53.7	52.1	60.6	60.8
Heavy Trucks:	62.4	61.0	51.9	53.2	61.5	61.7
Vehicle Noise:	69.6	67.9	64.7	60.0	68.6	69.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	40	87	186	402
CNEL:	43	93	200	431

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: n/o Nichols Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,830 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.22	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-17.02	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.98	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.3	67.4	65.7	59.6	68.2	68.9
Medium Trucks:	62.9	61.4	55.1	53.5	62.0	62.2
Heavy Trucks:	63.3	61.9	52.9	54.1	62.5	62.6
Vehicle Noise:	71.0	69.3	66.2	61.5	70.0	70.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	60	130	279	601
CNEL:	65	139	300	646

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: s/o Nichols Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,320 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.25	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-15.99	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-19.95	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.4	68.5	66.7	60.7	69.3	69.9
Medium Trucks:	64.0	62.5	56.1	54.5	63.0	63.2
Heavy Trucks:	64.4	63.0	53.9	55.2	63.5	63.7
Vehicle Noise:	72.1	70.3	67.3	62.5	71.0	71.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	70	152	327	705
CNEL:	76	163	351	757

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: s/o Alberhill Ranch Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,380 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.36	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-15.88	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-19.84	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.5	68.6	66.8	60.8	69.4	70.0
Medium Trucks:	64.1	62.6	56.2	54.7	63.1	63.4
Heavy Trucks:	64.5	63.1	54.0	55.3	63.6	63.8
Vehicle Noise:	72.2	70.4	67.4	62.6	71.2	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	72	154	333	717
CNEL:	77	166	357	770

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: n/o Mountain St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,380 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.36	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-15.88	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-19.84	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.5	68.6	66.8	60.8	69.4	70.0
Medium Trucks:	64.1	62.6	56.2	54.7	63.1	63.4
Heavy Trucks:	64.5	63.1	54.0	55.3	63.6	63.8
Vehicle Noise:	72.2	70.4	67.4	62.6	71.2	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	72	154	333	717
CNEL:	77	166	357	770

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: s/o Mountain St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,260 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.13	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-16.11	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.06	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.3	68.4	66.6	60.5	69.2	69.8
Medium Trucks:	63.8	62.3	56.0	54.4	62.9	63.1
Heavy Trucks:	64.3	62.8	53.8	55.1	63.4	63.5
Vehicle Noise:	72.0	70.2	67.2	62.4	70.9	71.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	69	149	321	692
CNEL:	74	160	345	744

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: s/o Lakeshore Dr.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,340 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.28	0.93	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-15.95	0.96	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-19.91	0.95	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.2	69.3	67.5	61.5	70.1	70.7
Medium Trucks:	64.8	63.3	56.9	55.4	63.8	64.1
Heavy Trucks:	65.2	63.8	54.8	56.0	64.4	64.5
Vehicle Noise:	72.9	71.2	68.1	63.3	71.9	72.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	67	144	310	668
CNEL:	72	155	333	717

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC | Project Name: Lake & Mountain
Road Name: Lincoln St. | Job Number: 12770
Road Segment: s/o Grand Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	530 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-4.20	0.93	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-21.44	0.96	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-25.39	0.95	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.0	60.1	58.4	52.3	60.9	61.5
Medium Trucks:	56.0	54.5	48.2	46.6	55.1	55.3
Heavy Trucks:	57.4	55.9	46.9	48.1	56.5	56.6
Vehicle Noise:	64.1	62.3	59.0	54.5	63.0	63.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	17	37	80	172
CNEL:	18	40	85	184

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC | Project Name: Lake & Mountain
Road Name: Nichols Rd. | Job Number: 12770
Road Segment: e/o Lake St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	790 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-3.43	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-20.67	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-24.63	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.7	63.8	62.0	56.0	64.6	65.2
Medium Trucks:	59.3	57.8	51.4	49.9	58.3	58.6
Heavy Trucks:	59.7	58.3	49.2	50.5	58.8	59.0
Vehicle Noise:	67.4	65.6	62.6	57.8	66.4	66.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	34	74	159	344
CNEL:	37	80	171	369

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC
Road Name: Alberhill Ranch Rd.
Road Segment: e/o Lake St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,000 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	200 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 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:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.230

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-8.43	1.78	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	77.72	-25.67	1.82	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-29.62	1.82	-1.20	*-5.57*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.7	56.8	55.0	48.9	57.6	58.2
Medium Trucks:	52.7	51.2	44.8	43.3	51.7	51.9
Heavy Trucks:	54.0	52.6	43.5	44.8	53.1	53.3
Vehicle Noise:	60.7	59.0	55.7	51.1	59.7	60.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	8	17	37	80
CNEL:	9	18	40	85

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC
Road Name: Lakeshore Drive
Road Segment: e/o Lake St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,080 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-2.07	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	81.00	-19.31	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-23.27	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.1	65.2	63.4	57.3	66.0	66.6
Medium Trucks:	60.6	59.1	52.8	51.2	59.7	59.9
Heavy Trucks:	61.1	59.6	50.6	51.9	60.2	60.3
Vehicle Noise:	68.8	67.0	64.0	59.2	67.7	68.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	42	91	196	423
CNEL:	45	98	211	455

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC
Road Name: Lakeshore Drive
Road Segment: e/o Terra Cotta Rd.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,410 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-0.92	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	81.00	-18.15	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-22.11	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.2	66.3	64.5	58.5	67.1	67.7
Medium Trucks:	61.8	60.3	53.9	52.4	60.8	61.1
Heavy Trucks:	62.2	60.8	51.8	53.0	61.4	61.5
Vehicle Noise:	69.9	68.2	65.1	60.3	68.9	69.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	51	109	235	505
CNEL:	54	117	252	543

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC
Road Name: Grand Av.
Road Segment: w/o Lincoln St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,130 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-1.42	0.93	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-18.66	0.96	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-22.61	0.95	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.8	64.9	63.1	57.0	65.7	66.3
Medium Trucks:	60.5	59.0	52.7	51.1	59.6	59.8
Heavy Trucks:	61.4	60.0	50.9	52.2	60.5	60.7
Vehicle Noise:	68.6	66.9	63.7	59.0	67.6	68.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	35	74	160	345
CNEL:	37	80	172	370

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC | Project Name: Lake & Mountain
Road Name: Grand Av. | Job Number: 12770
Road Segment: e/o Lincoln St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,370 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.58	0.93	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-17.82	0.96	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-21.78	0.95	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.6	65.7	63.9	57.9	66.5	67.1
Medium Trucks:	61.4	59.9	53.5	52.0	60.4	60.7
Heavy Trucks:	62.2	60.8	51.8	53.0	61.4	61.5
Vehicle Noise:	69.4	67.7	64.5	59.9	68.4	68.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	39	85	182	392
CNEL:	42	91	195	421

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: n/o Nichols Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,880 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.33	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-16.91	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-20.86	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.5	67.6	65.8	59.7	68.4	69.0
Medium Trucks:	63.0	61.5	55.2	53.6	62.1	62.3
Heavy Trucks:	63.5	62.0	53.0	54.3	62.6	62.7
Vehicle Noise:	71.2	69.4	66.4	61.6	70.1	70.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	61	132	284	612
CNEL:	66	142	305	658

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: s/o Nichols Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,390 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.38	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-15.86	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-19.82	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.5	68.6	66.8	60.8	69.4	70.0
Medium Trucks:	64.1	62.6	56.2	54.7	63.1	63.4
Heavy Trucks:	64.5	63.1	54.1	55.3	63.7	63.8
Vehicle Noise:	72.2	70.5	67.4	62.6	71.2	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	72	155	334	719
CNEL:	77	166	358	772

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC | Project Name: Lake & Mountain
Road Name: Lake St. | Job Number: 12770
Road Segment: s/o Alberhill Ranch Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,470 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.52	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-15.72	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-19.68	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.6	68.8	67.0	60.9	69.6	70.2
Medium Trucks:	64.2	62.7	56.4	54.8	63.3	63.5
Heavy Trucks:	64.7	63.2	54.2	55.4	63.8	63.9
Vehicle Noise:	72.4	70.6	67.6	62.8	71.3	71.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	73	158	341	735
CNEL:	79	170	366	789

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC
Road Name: Lake St.
Road Segment: n/o Mountain St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,520 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.61	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-15.63	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-19.59	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.7	68.8	67.1	61.0	69.6	70.2
Medium Trucks:	64.3	62.8	56.5	54.9	63.4	63.6
Heavy Trucks:	64.7	63.3	54.3	55.5	63.9	64.0
Vehicle Noise:	72.4	70.7	67.6	62.9	71.4	71.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	74	160	346	744
CNEL:	80	172	371	800

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC
Road Name: Lake St.
Road Segment: s/o Mountain St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,460 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.50	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-15.74	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-19.69	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.6	68.7	67.0	60.9	69.5	70.1
Medium Trucks:	64.2	62.7	56.3	54.8	63.3	63.5
Heavy Trucks:	64.6	63.2	54.2	55.4	63.8	63.9
Vehicle Noise:	72.3	70.6	67.5	62.8	71.3	71.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	73	158	340	733
CNEL:	79	170	365	787

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC
Road Name: Lake St.
Road Segment: s/o Lakeshore Dr.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,450 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.48	0.93	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-15.76	0.96	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-19.71	0.95	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.4	69.5	67.7	61.7	70.3	70.9
Medium Trucks:	65.0	63.5	57.1	55.6	64.0	64.3
Heavy Trucks:	65.4	64.0	55.0	56.2	64.6	64.7
Vehicle Noise:	73.1	71.4	68.3	63.5	72.1	72.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	69	148	320	688
CNEL:	74	159	343	740

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC
Road Name: Lincoln St.
Road Segment: s/o Grand Av.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	550 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	53 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-4.04	0.93	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-21.27	0.96	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-25.23	0.95	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.2	60.3	58.5	52.5	61.1	61.7
Medium Trucks:	56.2	54.7	48.3	46.8	55.2	55.5
Heavy Trucks:	57.5	56.1	47.1	48.3	56.7	56.8
Vehicle Noise:	64.2	62.5	59.2	54.7	63.2	63.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	18	38	82	176
CNEL:	19	41	87	188

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC
Road Name: Nichols Rd.
Road Segment: e/o Lake St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	810 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-3.32	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-20.56	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-24.52	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.8	63.9	62.1	56.1	64.7	65.3
Medium Trucks:	59.4	57.9	51.5	50.0	58.4	58.7
Heavy Trucks:	59.8	58.4	49.4	50.6	59.0	59.1
Vehicle Noise:	67.5	65.8	62.7	57.9	66.5	66.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	35	75	162	349
CNEL:	38	81	174	375

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC
Road Name: Alberhill Ranch Rd.
Road Segment: e/o Lake St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	220 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 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:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.230

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-8.02	1.78	-1.20	-4.58	0.000	0.000
Medium Trucks:	77.72	-25.25	1.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-29.21	1.82	-1.20	-5.57	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	59.1	57.2	55.4	49.4	58.0	58.6
Medium Trucks:	53.1	51.6	45.2	43.7	52.1	52.4
Heavy Trucks:	54.4	53.0	43.9	45.2	53.5	53.7
Vehicle Noise:	61.1	59.4	56.1	51.5	60.1	60.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	9	18	39	85
CNEL:	9	20	42	91

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC
Road Name: Lakeshore Drive
Road Segment: e/o Lake St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,170 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-1.73	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-18.97	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-22.92	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.4	65.5	63.7	57.7	66.3	66.9
Medium Trucks:	61.0	59.5	53.1	51.6	60.0	60.3
Heavy Trucks:	61.4	60.0	50.9	52.2	60.6	60.7
Vehicle Noise:	69.1	67.4	64.3	59.5	68.1	68.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	45	96	207	446
CNEL:	48	103	223	480

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC
Road Name: Lakeshore Drive
Road Segment: e/o Terra Cotta Rd.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,450 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-0.79	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-18.03	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-21.99	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.3	66.4	64.7	58.6	67.2	67.8
Medium Trucks:	61.9	60.4	54.1	52.5	61.0	61.2
Heavy Trucks:	62.3	60.9	51.9	53.1	61.5	61.6
Vehicle Noise:	70.0	68.3	65.2	60.5	69.0	69.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	52	111	239	515
CNEL:	55	119	257	553

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC
Road Name: Grand Av.
Road Segment: w/o Lincoln St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,180	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	53	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.23	0.93	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-18.47	0.96	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-22.43	0.95	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.0	65.1	63.3	57.2	65.9	66.5
Medium Trucks:	60.7	59.2	52.9	51.3	59.8	60.0
Heavy Trucks:	61.6	60.2	51.1	52.4	60.7	60.9
Vehicle Noise:	68.8	67.1	63.9	59.2	67.8	68.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	36	77	165	355
CNEL:	38	82	177	381

Saturday, October 19, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC
Road Name: Grand Av.
Road Segment: e/o Lincoln St.
Project Name: Lake & Mountain
Job Number: 12770

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,600	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	1,460	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	53	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	50.0	feet
Centerline Dist. to Observer:	50.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	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:	42.694
Medium Trucks:	42.486
Heavy Trucks:	42.506

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.31	0.93	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-17.55	0.96	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-21.50	0.95	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.9	66.0	64.2	58.2	66.8	67.4
Medium Trucks:	61.7	60.2	53.8	52.2	60.7	60.9
Heavy Trucks:	62.5	61.1	52.0	53.3	61.7	61.8
Vehicle Noise:	69.7	68.0	64.8	60.2	68.7	69.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	41	88	190	409
CNEL:	44	95	204	439

Saturday, October 19, 2019

APPENDIX 9.1:

OPERATIONAL NOISE LEVEL CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL

10/23/2019

Observer Location: **R1**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	106.0	feet	***Barrier Height:***	**5.0 feet**
Noise Distance to Barrier:	5.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	101.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,533.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,515.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	106.0	-26.5	-26.5	-26.5	-26.5	-26.5	-26.5
Shielding (Barrier Attenuation)	5.0	-10.6	-10.6	-10.6	-10.6	-10.6	-10.6
Raw (Distance + Barrier)		40.1	37.3	39.0	40.3	40.6	41.1
39 Minute Hourly Adjustment		**38.2**	**35.4**	**37.1**	**38.4**	**38.7**	**39.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/23/2019

Observer Location: **R1**
Source: Drive-Through Speakerphone
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	215.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	76.0	feet	*Noise Source Height:*	3.0 feet
Barrier Distance to Observer:	139.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,533.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,533.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	62.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	215.0	-23.1	-23.1	-23.1	-23.1	-23.1	-23.1
Shielding (Barrier Attenuation)	76.0	-13.4	-13.4	-13.4	-13.4	-13.4	-13.4
Raw (Distance + Barrier)		25.5	24.4	25.6	27.1	28.8	29.9
60 Minute Hourly Adjustment		**25.5**	**24.4**	**25.6**	**27.1**	**28.8**	**29.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

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

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	84.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	70.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	14.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,533.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,533.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	69.0	75.0	82.0	87.0	88.5
Distance Attenuation	84.0	-24.5	-24.5	-24.5	-24.5	-24.5	-24.5
Shielding (Barrier Attenuation)	70.0	-10.2	-10.2	-10.2	-10.2	-10.2	-10.2
Raw (Distance + Barrier)		42.6	34.3	40.3	47.3	52.3	53.8
20 Minute Hourly Adjustment		**37.8**	**29.5**	**35.5**	**42.5**	**47.5**	**49.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R1**
Source: Parking Lot
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	81.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	81.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,533.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,533.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	81.0	-24.2	-24.2	-24.2	-24.2	-24.2	-24.2
Shielding (Barrier Attenuation)	81.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		35.9	32.5	36.5	39.5	42.9	55.3
60 Minute Hourly Adjustment		**35.9**	**32.5**	**36.5**	**39.5**	**42.9**	**55.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R1**
Source: Gas Station Activity
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	566.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	566.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,533.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,533.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	68.2	65.6	66.9	69.5	74.4	82.4
Distance Attenuation	566.0	-41.1	-41.1	-41.1	-41.1	-41.1	-41.1
Shielding (Barrier Attenuation)	566.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		27.1	24.5	25.8	28.4	33.3	41.3
60 Minute Hourly Adjustment		**27.1**	**24.5**	**25.8**	**28.4**	**33.3**	**41.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R1**
Source: Car Wash Tunnel
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	483.0 feet	***Barrier Height:***	**20.0 feet**
Noise Distance to Barrier:	143.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	340.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,533.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,515.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	88.3	81.6	92.0	92.6	93.3	93.8
Distance Attenuation	483.0	-33.7	-33.7	-33.7	-33.7	-33.7	-33.7
Shielding (Barrier Attenuation)	143.0	-8.9	-8.9	-8.9	-8.9	-8.9	-8.9
Raw (Distance + Barrier)		45.7	39.0	49.4	50.0	50.7	51.2
60 Minute Hourly Adjustment		**45.7**	**39.0**	**49.4**	**50.0**	**50.7**	**51.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R1**
Source: Car Wash Vacuum Activity
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	357.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	68.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	289.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,533.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,533.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	74.6	74.2	75.4	77.2	78.0	78.8
Distance Attenuation	357.0	-37.1	-37.1	-37.1	-37.1	-37.1	-37.1
Shielding (Barrier Attenuation)	68.0	-13.9	-13.9	-13.9	-13.9	-13.9	-13.9
Raw (Distance + Barrier)		23.6	23.2	24.4	26.2	27.0	27.8
60 Minute Hourly Adjustment		**23.6**	**23.2**	**24.4**	**26.2**	**27.0**	**27.8**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R2**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	274.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	244.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	30.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,525.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,525.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	274.0	-34.8	-34.8	-34.8	-34.8	-34.8	-34.8
Shielding (Barrier Attenuation)	244.0	-6.2	-6.2	-6.2	-6.2	-6.2	-6.2
Raw (Distance + Barrier)		36.2	33.4	35.1	36.4	36.7	37.2
39 Minute Hourly Adjustment		**34.3**	**31.5**	**33.2**	**34.5**	**34.8**	**35.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R2**
Source: Drive-Through Speakerphone
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	381.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	351.0 feet	*Noise Source Height:*	3.0 feet
Barrier Distance to Observer:	30.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,525.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,525.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	62.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	381.0	-28.1	-28.1	-28.1	-28.1	-28.1	-28.1
Shielding (Barrier Attenuation)	351.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0
Raw (Distance + Barrier)		27.9	26.8	28.0	29.5	31.2	32.3
60 Minute Hourly Adjustment		**27.9**	**26.8**	**28.0**	**29.5**	**31.2**	**32.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

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

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	436.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	406.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	30.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,525.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,525.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	69.0	75.0	82.0	87.0	88.5
Distance Attenuation	436.0	-38.8	-38.8	-38.8	-38.8	-38.8	-38.8
Shielding (Barrier Attenuation)	406.0	-5.8	-5.8	-5.8	-5.8	-5.8	-5.8
Raw (Distance + Barrier)		32.7	24.4	30.4	37.4	42.4	43.9
20 Minute Hourly Adjustment		**27.9**	**19.6**	**25.6**	**32.6**	**37.6**	**39.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R2**
Source: Parking Lot
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	230.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	200.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	30.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,525.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,525.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	230.0	-33.3	-33.3	-33.3	-33.3	-33.3	-33.3
Shielding (Barrier Attenuation)	200.0	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5
Raw (Distance + Barrier)		20.3	16.9	20.9	23.9	27.3	39.7
60 Minute Hourly Adjustment		**20.3**	**16.9**	**20.9**	**23.9**	**27.3**	**39.7**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R2**
Source: Gas Station Activity
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	320.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	279.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	41.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,525.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,525.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	68.2	65.6	66.9	69.5	74.4	82.4
Distance Attenuation	320.0	-36.1	-36.1	-36.1	-36.1	-36.1	-36.1
Shielding (Barrier Attenuation)	279.0	-6.2	-6.2	-6.2	-6.2	-6.2	-6.2
Raw (Distance + Barrier)		25.9	23.3	24.6	27.2	32.1	40.1
60 Minute Hourly Adjustment		**25.9**	**23.3**	**24.6**	**27.2**	**32.1**	**40.1**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/23/2019

Observer Location: **R2**
Source: Car Wash Tunnel
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	306.0	feet	***Barrier Height:***	**6.0**	**feet**
Noise Distance to Barrier:	277.0	feet	*Noise Source Height:*	8.0	feet
Barrier Distance to Observer:	29.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	1,525.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0	
Barrier Elevation:	1,525.0	feet			

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	88.3	81.6	92.0	92.6	93.3	93.8
Distance Attenuation	306.0	-29.7	-29.7	-29.7	-29.7	-29.7	-29.7
Shielding (Barrier Attenuation)	277.0	-5.9	-5.9	-5.9	-5.9	-5.9	-5.9
Raw (Distance + Barrier)		52.7	46.0	56.4	57.0	57.7	58.2
60 Minute Hourly Adjustment		**52.7**	**46.0**	**56.4**	**57.0**	**57.7**	**58.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/23/2019

Observer Location: **R2**
Source: Car Wash Vacuum Activity
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	303.0	feet	***Barrier Height:***	**0.0**	**feet**
Noise Distance to Barrier:	276.0	feet	*Noise Source Height:*	5.0	feet
Barrier Distance to Observer:	27.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	1,525.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0	
Barrier Elevation:	1,525.0	feet			

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	74.6	74.2	75.4	77.2	78.0	78.8
Distance Attenuation	303.0	-35.6	-35.6	-35.6	-35.6	-35.6	-35.6
Shielding (Barrier Attenuation)	276.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		39.0	38.6	39.8	41.6	42.4	43.2
60 Minute Hourly Adjustment		**39.0**	**38.6**	**39.8**	**41.6**	**42.4**	**43.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R3**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	179.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	145.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	34.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,484.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,484.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	179.0	-31.1	-31.1	-31.1	-31.1	-31.1	-31.1
Shielding (Barrier Attenuation)	145.0	-7.3	-7.3	-7.3	-7.3	-7.3	-7.3
Raw (Distance + Barrier)		38.8	36.0	37.7	39.0	39.3	39.8
39 Minute Hourly Adjustment		**36.9**	**34.1**	**35.8**	**37.1**	**37.4**	**37.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R3**
Source: Drive-Through Speakerphone
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	229.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	191.0	feet	*Noise Source Height:*	3.0 feet
Barrier Distance to Observer:	38.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,484.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,484.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	62.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	229.0	-23.7	-23.7	-23.7	-23.7	-23.7	-23.7
Shielding (Barrier Attenuation)	191.0	-6.3	-6.3	-6.3	-6.3	-6.3	-6.3
Raw (Distance + Barrier)		32.0	30.9	32.1	33.6	35.3	36.4
60 Minute Hourly Adjustment		**32.0**	**30.9**	**32.1**	**33.6**	**35.3**	**36.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/23/2019

Observer Location: **R3**
Source: Trash Enclosure
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	404.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	367.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	37.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,484.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,484.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	69.0	75.0	82.0	87.0	88.5
Distance Attenuation	404.0	-38.1	-38.1	-38.1	-38.1	-38.1	-38.1
Shielding (Barrier Attenuation)	367.0	-5.2	-5.2	-5.2	-5.2	-5.2	-5.2
Raw (Distance + Barrier)		34.0	25.7	31.7	38.7	43.7	45.2
20 Minute Hourly Adjustment		**29.2**	**20.9**	**26.9**	**33.9**	**38.9**	**40.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/23/2019

Observer Location: **R3**
Source: Parking Lot
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	145.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	115.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	30.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,484.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,484.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	145.0	-29.2	-29.2	-29.2	-29.2	-29.2	-29.2
Shielding (Barrier Attenuation)	115.0	-7.9	-7.9	-7.9	-7.9	-7.9	-7.9
Raw (Distance + Barrier)		23.0	19.6	23.6	26.6	30.0	42.4
60 Minute Hourly Adjustment		**23.0**	**19.6**	**23.6**	**26.6**	**30.0**	**42.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/23/2019

Observer Location: **R3**
Source: Gas Station Activity
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	190.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	152.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	38.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,484.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,484.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	68.2	65.6	66.9	69.5	74.4	82.4
Distance Attenuation	190.0	-31.6	-31.6	-31.6	-31.6	-31.6	-31.6
Shielding (Barrier Attenuation)	152.0	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4
Raw (Distance + Barrier)		29.2	26.6	27.9	30.5	35.4	43.4
60 Minute Hourly Adjustment		**29.2**	**26.6**	**27.9**	**30.5**	**35.4**	**43.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/23/2019

Observer Location: **R3**
Source: Car Wash Tunnel
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	401.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	364.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	37.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,484.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,484.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	88.3	81.6	92.0	92.6	93.3	93.8
Distance Attenuation	401.0	-32.1	-32.1	-32.1	-32.1	-32.1	-32.1
Shielding (Barrier Attenuation)	364.0	-5.4	-5.4	-5.4	-5.4	-5.4	-5.4
Raw (Distance + Barrier)		50.8	44.1	54.5	55.1	55.8	56.3
60 Minute Hourly Adjustment		**50.8**	**44.1**	**54.5**	**55.1**	**55.8**	**56.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R3**
Source: Car Wash Vacuum Activity
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	440.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	404.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	36.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,484.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,484.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	74.6	74.2	75.4	77.2	78.0	78.8
Distance Attenuation	440.0	-38.9	-38.9	-38.9	-38.9	-38.9	-38.9
Shielding (Barrier Attenuation)	404.0	-5.2	-5.2	-5.2	-5.2	-5.2	-5.2
Raw (Distance + Barrier)		30.5	30.1	31.3	33.1	33.9	34.7
60 Minute Hourly Adjustment		**30.5**	**30.1**	**31.3**	**33.1**	**33.9**	**34.7**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R4**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	251.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	219.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	32.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,486.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,486.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	251.0	-34.0	-34.0	-34.0	-34.0	-34.0	-34.0
Shielding (Barrier Attenuation)	219.0	-5.7	-5.7	-5.7	-5.7	-5.7	-5.7
Raw (Distance + Barrier)		37.5	34.7	36.4	37.7	38.0	38.5
39 Minute Hourly Adjustment		**35.6**	**32.8**	**34.5**	**35.8**	**36.1**	**36.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R4**
Source: Drive-Through Speakerphone
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	236.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	236.0 feet	*Noise Source Height:*	3.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,486.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,486.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	62.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	236.0	-23.9	-23.9	-23.9	-23.9	-23.9	-23.9
Shielding (Barrier Attenuation)	236.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
Raw (Distance + Barrier)		28.1	27.0	28.2	29.7	31.4	32.5
60 Minute Hourly Adjustment		**28.1**	**27.0**	**28.2**	**29.7**	**31.4**	**32.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R4**
Source: Trash Enclosure
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	354.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	354.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,486.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,486.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	69.0	75.0	82.0	87.0	88.5
Distance Attenuation	354.0	-37.0	-37.0	-37.0	-37.0	-37.0	-37.0
Shielding (Barrier Attenuation)	354.0	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
Raw (Distance + Barrier)		30.2	21.9	27.9	34.9	39.9	41.4
20 Minute Hourly Adjustment		**25.4**	**17.1**	**23.1**	**30.1**	**35.1**	**36.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R4**
Source: Parking Lot
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	268.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	268.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,486.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,486.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	268.0	-34.6	-34.6	-34.6	-34.6	-34.6	-34.6
Shielding (Barrier Attenuation)	268.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
Raw (Distance + Barrier)		15.5	12.1	16.1	19.1	22.5	34.9
60 Minute Hourly Adjustment		**15.5**	**12.1**	**16.1**	**19.1**	**22.5**	**34.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R4**
Source: Gas Station Activity
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	325.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	325.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,486.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,486.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	68.2	65.6	66.9	69.5	74.4	82.4
Distance Attenuation	325.0	-36.3	-36.3	-36.3	-36.3	-36.3	-36.3
Shielding (Barrier Attenuation)	325.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
Raw (Distance + Barrier)		21.9	19.3	20.6	23.2	28.1	36.1
60 Minute Hourly Adjustment		**21.9**	**19.3**	**20.6**	**23.2**	**28.1**	**36.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R4**
Source: Car Wash Tunnel
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	479.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	479.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,486.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,486.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	88.3	81.6	92.0	92.6	93.3	93.8
Distance Attenuation	479.0	-33.6	-33.6	-33.6	-33.6	-33.6	-33.6
Shielding (Barrier Attenuation)	479.0	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
Raw (Distance + Barrier)		44.6	37.9	48.3	48.9	49.6	50.1
60 Minute Hourly Adjustment		**44.6**	**37.9**	**48.3**	**48.9**	**49.6**	**50.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R4**
Source: Car Wash Vacuum Activity
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	454.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	454.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,486.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,486.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	74.6	74.2	75.4	77.2	78.0	78.8
Distance Attenuation	454.0	-39.2	-39.2	-39.2	-39.2	-39.2	-39.2
Shielding (Barrier Attenuation)	454.0	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
Raw (Distance + Barrier)		25.3	24.9	26.1	27.9	28.7	29.5
60 Minute Hourly Adjustment		**25.3**	**24.9**	**26.1**	**27.9**	**28.7**	**29.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R5**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	512.0	feet	***Barrier Height:***	**5.0**	**feet**
Noise Distance to Barrier:	5.0	feet	*Noise Source Height:*	5.0	feet
Barrier Distance to Observer:	507.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	1,490.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0	
Barrier Elevation:	1,490.0	feet			

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	512.0	-40.2	-40.2	-40.2	-40.2	-40.2	-40.2
Shielding (Barrier Attenuation)	5.0	-17.7	-17.7	-17.7	-17.7	-17.7	-17.7
Raw (Distance + Barrier)		19.3	16.5	18.2	19.5	19.8	20.3
39 Minute Hourly Adjustment		**17.4**	**14.6**	**16.3**	**17.6**	**17.9**	**18.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R5**
Source: Drive-Through Speakerphone
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	512.0	feet	***Barrier Height:***	**0.0**	**feet**
Noise Distance to Barrier:	512.0	feet	*Noise Source Height:*	3.0	feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	1,490.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0	
Barrier Elevation:	1,490.0	feet			

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	62.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	512.0	-30.7	-30.7	-30.7	-30.7	-30.7	-30.7
Shielding (Barrier Attenuation)	512.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		31.3	30.2	31.4	32.9	34.6	35.7
60 Minute Hourly Adjustment		**31.3**	**30.2**	**31.4**	**32.9**	**34.6**	**35.7**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R5**
Source: Trash Enclosure
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	485.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	16.0	feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	469.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,490.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,490.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	69.0	75.0	82.0	87.0	88.5
Distance Attenuation	485.0	-39.7	-39.7	-39.7	-39.7	-39.7	-39.7
Shielding (Barrier Attenuation)	16.0	-16.5	-16.5	-16.5	-16.5	-16.5	-16.5
Raw (Distance + Barrier)		21.1	12.8	18.8	25.8	30.8	32.3
20 Minute Hourly Adjustment		**16.3**	**8.0**	**14.0**	**21.0**	**26.0**	**27.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R5**
Source: Parking Lot
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	458.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	458.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,490.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,490.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	458.0	-39.2	-39.2	-39.2	-39.2	-39.2	-39.2
Shielding (Barrier Attenuation)	458.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		20.9	17.5	21.5	24.5	27.9	40.3
60 Minute Hourly Adjustment		**20.9**	**17.5**	**21.5**	**24.5**	**27.9**	**40.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R5**
Source: Gas Station Activity
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	626.0 feet	***Barrier Height:***	**20.0 feet**
Noise Distance to Barrier:	63.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	563.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,490.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,490.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	68.2	65.6	66.9	69.5	74.4	82.4
Distance Attenuation	626.0	-42.0	-42.0	-42.0	-42.0	-42.0	-42.0
Shielding (Barrier Attenuation)	63.0	-5.8	-5.8	-5.8	-5.8	-5.8	-5.8
Raw (Distance + Barrier)		20.4	17.8	19.1	21.7	26.6	34.6
60 Minute Hourly Adjustment		**20.4**	**17.8**	**19.1**	**21.7**	**26.6**	**34.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R5**
Source: Car Wash Tunnel
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	678.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	678.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,490.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,490.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	88.3	81.6	92.0	92.6	93.3	93.8
Distance Attenuation	678.0	-36.6	-36.6	-36.6	-36.6	-36.6	-36.6
Shielding (Barrier Attenuation)	678.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		51.7	45.0	55.4	56.0	56.7	57.2
60 Minute Hourly Adjustment		**51.7**	**45.0**	**55.4**	**56.0**	**56.7**	**57.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R5**
Source: Car Wash Vacuum Activity
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	589.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	589.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,490.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,490.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	74.6	74.2	75.4	77.2	78.0	78.8
Distance Attenuation	589.0	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4
Shielding (Barrier Attenuation)	589.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		33.2	32.8	34.0	35.8	36.6	37.4
60 Minute Hourly Adjustment		**33.2**	**32.8**	**34.0**	**35.8**	**36.6**	**37.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R6**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	106.0 feet	***Barrier Height:***	**5.0 feet**
Noise Distance to Barrier:	5.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	101.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,518.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,518.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	106.0	-26.5	-26.5	-26.5	-26.5	-26.5	-26.5
Shielding (Barrier Attenuation)	5.0	-14.6	-14.6	-14.6	-14.6	-14.6	-14.6
Raw (Distance + Barrier)		36.1	33.3	35.0	36.3	36.6	37.1
39 Minute Hourly Adjustment		**34.2**	**31.4**	**33.1**	**34.4**	**34.7**	**35.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/23/2019

Observer Location: **R6**
Source: Drive-Through Speakerphone
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	280.0 feet	***Barrier Height:***	**20.0 feet**
Noise Distance to Barrier:	133.0 feet	*Noise Source Height:*	3.0 feet
Barrier Distance to Observer:	147.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,518.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,518.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	62.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	280.0	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4
Shielding (Barrier Attenuation)	133.0	-13.4	-13.4	-13.4	-13.4	-13.4	-13.4
Raw (Distance + Barrier)		23.2	22.1	23.3	24.8	26.5	27.6
60 Minute Hourly Adjustment		**23.2**	**22.1**	**23.3**	**24.8**	**26.5**	**27.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/23/2019

Observer Location: **R6**
Source: Trash Enclosure
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	245.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	245.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,518.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,518.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	69.0	75.0	82.0	87.0	88.5
Distance Attenuation	245.0	-33.8	-33.8	-33.8	-33.8	-33.8	-33.8
Shielding (Barrier Attenuation)	245.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		43.5	35.2	41.2	48.2	53.2	54.7
20 Minute Hourly Adjustment		**38.7**	**30.4**	**36.4**	**43.4**	**48.4**	**49.9**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/23/2019

Observer Location: **R6**
Source: Parking Lot
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	163.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	163.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,518.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,518.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	163.0	-30.3	-30.3	-30.3	-30.3	-30.3	-30.3
Shielding (Barrier Attenuation)	163.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		29.8	26.4	30.4	33.4	36.8	49.2
60 Minute Hourly Adjustment		**29.8**	**26.4**	**30.4**	**33.4**	**36.8**	**49.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/23/2019

Observer Location: **R6**
Source: Gas Station Activity
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	444.0 feet	***Barrier Height:***	**20.0 feet**
Noise Distance to Barrier:	270.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	174.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,518.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,518.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	68.2	65.6	66.9	69.5	74.4	82.4
Distance Attenuation	444.0	-39.0	-39.0	-39.0	-39.0	-39.0	-39.0
Shielding (Barrier Attenuation)	270.0	-11.3	-11.3	-11.3	-11.3	-11.3	-11.3
Raw (Distance + Barrier)		17.9	15.3	16.6	19.2	24.1	32.1
60 Minute Hourly Adjustment		**17.9**	**15.3**	**16.6**	**19.2**	**24.1**	**32.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R6**
Source: Car Wash Tunnel
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	403.0	feet	***Barrier Height:***	**20.0**	**feet**
Noise Distance to Barrier:	246.0	feet	*Noise Source Height:*	8.0	feet
Barrier Distance to Observer:	157.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	1,518.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0	
Barrier Elevation:	1,518.0	feet			

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	88.3	81.6	92.0	92.6	93.3	93.8
Distance Attenuation	403.0	-32.1	-32.1	-32.1	-32.1	-32.1	-32.1
Shielding (Barrier Attenuation)	246.0	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2
Raw (Distance + Barrier)		45.0	38.3	48.7	49.3	50.0	50.5
60 Minute Hourly Adjustment		**45.0**	**38.3**	**48.7**	**49.3**	**50.0**	**50.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/23/2019

Observer Location: **R6**
Source: Car Wash Vacuum Activity
Condition: Operational

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	264.0	feet	***Barrier Height:***	**20.0**	**feet**
Noise Distance to Barrier:	115.0	feet	*Noise Source Height:*	5.0	feet
Barrier Distance to Observer:	149.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	1,518.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0	
Barrier Elevation:	1,518.0	feet			

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	74.6	74.2	75.4	77.2	78.0	78.8
Distance Attenuation	264.0	-34.5	-34.5	-34.5	-34.5	-34.5	-34.5
Shielding (Barrier Attenuation)	115.0	-13.4	-13.4	-13.4	-13.4	-13.4	-13.4
Raw (Distance + Barrier)		26.7	26.3	27.5	29.3	30.1	30.9
60 Minute Hourly Adjustment		**26.7**	**26.3**	**27.5**	**29.3**	**30.1**	**30.9**

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APPENDIX 9.2:

MITIGATED OPERATIONAL NOISE LEVEL CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R1**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	106.0	feet	***Barrier Height:***	**5.0 feet**
Noise Distance to Barrier:	5.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	101.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,533.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,515.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	106.0	-26.5	-26.5	-26.5	-26.5	-26.5	-26.5
Shielding (Barrier Attenuation)	5.0	-10.6	-10.6	-10.6	-10.6	-10.6	-10.6
Raw (Distance + Barrier)		40.1	37.3	39.0	40.3	40.6	41.1
39 Minute Hourly Adjustment		**38.2**	**35.4**	**37.1**	**38.4**	**38.7**	**39.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R1**
Source: Drive-Through Speakerphone
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	215.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	76.0	feet	*Noise Source Height:*	3.0 feet
Barrier Distance to Observer:	139.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,533.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,533.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	62.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	215.0	-23.1	-23.1	-23.1	-23.1	-23.1	-23.1
Shielding (Barrier Attenuation)	76.0	-13.4	-13.4	-13.4	-13.4	-13.4	-13.4
Raw (Distance + Barrier)		25.5	24.4	25.6	27.1	28.8	29.9
60 Minute Hourly Adjustment		**25.5**	**24.4**	**25.6**	**27.1**	**28.8**	**29.9**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/22/2019

Observer Location: **R1**
Source: Trash Enclosure
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	84.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	70.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	14.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,533.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,533.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	69.0	75.0	82.0	87.0	88.5
Distance Attenuation	84.0	-24.5	-24.5	-24.5	-24.5	-24.5	-24.5
Shielding (Barrier Attenuation)	70.0	-10.2	-10.2	-10.2	-10.2	-10.2	-10.2
Raw (Distance + Barrier)		42.6	34.3	40.3	47.3	52.3	53.8
20 Minute Hourly Adjustment		**37.8**	**29.5**	**35.5**	**42.5**	**47.5**	**49.0**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/22/2019

Observer Location: **R1**
Source: Parking Lot
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	81.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	81.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,533.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,533.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	81.0	-24.2	-24.2	-24.2	-24.2	-24.2	-24.2
Shielding (Barrier Attenuation)	81.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		35.9	32.5	36.5	39.5	42.9	55.3
60 Minute Hourly Adjustment		**35.9**	**32.5**	**36.5**	**39.5**	**42.9**	**55.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R1**
Source: Gas Station Activity
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	566.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	566.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,533.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,533.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	68.2	65.6	66.9	69.5	74.4	82.4
Distance Attenuation	566.0	-41.1	-41.1	-41.1	-41.1	-41.1	-41.1
Shielding (Barrier Attenuation)	566.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		27.1	24.5	25.8	28.4	33.3	41.3
60 Minute Hourly Adjustment		**27.1**	**24.5**	**25.8**	**28.4**	**33.3**	**41.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R1**
Source: Car Wash Tunnel
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	483.0 feet	***Barrier Height:***	**20.0 feet**
Noise Distance to Barrier:	143.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	340.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,533.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,515.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	78.3	71.6	82.0	82.6	83.3	83.8
Distance Attenuation	483.0	-33.7	-33.7	-33.7	-33.7	-33.7	-33.7
Shielding (Barrier Attenuation)	143.0	-8.9	-8.9	-8.9	-8.9	-8.9	-8.9
Raw (Distance + Barrier)		35.7	29.0	39.4	40.0	40.7	41.2
60 Minute Hourly Adjustment		**35.7**	**29.0**	**39.4**	**40.0**	**40.7**	**41.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R1**
Source: Car Wash Vacuum Activity
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	357.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	68.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	289.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,533.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,533.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	74.6	74.2	75.4	77.2	78.0	78.8
Distance Attenuation	357.0	-37.1	-37.1	-37.1	-37.1	-37.1	-37.1
Shielding (Barrier Attenuation)	68.0	-13.9	-13.9	-13.9	-13.9	-13.9	-13.9
Raw (Distance + Barrier)		23.6	23.2	24.4	26.2	27.0	27.8
60 Minute Hourly Adjustment		**23.6**	**23.2**	**24.4**	**26.2**	**27.0**	**27.8**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R2**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	274.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	244.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	30.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,525.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,525.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	274.0	-34.8	-34.8	-34.8	-34.8	-34.8	-34.8
Shielding (Barrier Attenuation)	244.0	-6.2	-6.2	-6.2	-6.2	-6.2	-6.2
Raw (Distance + Barrier)		36.2	33.4	35.1	36.4	36.7	37.2
39 Minute Hourly Adjustment		**34.3**	**31.5**	**33.2**	**34.5**	**34.8**	**35.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R2**
Source: Drive-Through Speakerphone
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	381.0	feet	***Barrier Height:***	**6.0**	**feet**
Noise Distance to Barrier:	351.0	feet	*Noise Source Height:*	3.0	feet
Barrier Distance to Observer:	30.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	1,525.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0	
Barrier Elevation:	1,525.0	feet			

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	62.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	381.0	-28.1	-28.1	-28.1	-28.1	-28.1	-28.1
Shielding (Barrier Attenuation)	351.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0
Raw (Distance + Barrier)		27.9	26.8	28.0	29.5	31.2	32.3
60 Minute Hourly Adjustment		**27.9**	**26.8**	**28.0**	**29.5**	**31.2**	**32.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R2**
Source: Trash Enclosure
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	436.0	feet	***Barrier Height:***	**6.0**	**feet**
Noise Distance to Barrier:	406.0	feet	*Noise Source Height:*	4.0	feet
Barrier Distance to Observer:	30.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	1,525.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0	
Barrier Elevation:	1,525.0	feet			

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	69.0	75.0	82.0	87.0	88.5
Distance Attenuation	436.0	-38.8	-38.8	-38.8	-38.8	-38.8	-38.8
Shielding (Barrier Attenuation)	406.0	-5.8	-5.8	-5.8	-5.8	-5.8	-5.8
Raw (Distance + Barrier)		32.7	24.4	30.4	37.4	42.4	43.9
20 Minute Hourly Adjustment		**27.9**	**19.6**	**25.6**	**32.6**	**37.6**	**39.1**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/22/2019

Observer Location: **R2**
Source: Parking Lot
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	230.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	200.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	30.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,525.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,525.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	230.0	-33.3	-33.3	-33.3	-33.3	-33.3	-33.3
Shielding (Barrier Attenuation)	200.0	-6.5	-6.5	-6.5	-6.5	-6.5	-6.5
Raw (Distance + Barrier)		20.3	16.9	20.9	23.9	27.3	39.7
60 Minute Hourly Adjustment		**20.3**	**16.9**	**20.9**	**23.9**	**27.3**	**39.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/22/2019

Observer Location: **R2**
Source: Gas Station Activity
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	320.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	279.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	41.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,525.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,525.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	68.2	65.6	66.9	69.5	74.4	82.4
Distance Attenuation	320.0	-36.1	-36.1	-36.1	-36.1	-36.1	-36.1
Shielding (Barrier Attenuation)	279.0	-6.2	-6.2	-6.2	-6.2	-6.2	-6.2
Raw (Distance + Barrier)		25.9	23.3	24.6	27.2	32.1	40.1
60 Minute Hourly Adjustment		**25.9**	**23.3**	**24.6**	**27.2**	**32.1**	**40.1**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/22/2019

Observer Location: **R2**
Source: Car Wash Tunnel
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	306.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	277.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	29.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,525.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,525.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	78.3	71.6	82.0	82.6	83.3	83.8
Distance Attenuation	306.0	-29.7	-29.7	-29.7	-29.7	-29.7	-29.7
Shielding (Barrier Attenuation)	277.0	-5.9	-5.9	-5.9	-5.9	-5.9	-5.9
Raw (Distance + Barrier)		42.7	36.0	46.4	47.0	47.7	48.2
60 Minute Hourly Adjustment		**42.7**	**36.0**	**46.4**	**47.0**	**47.7**	**48.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/22/2019

Observer Location: **R2**
Source: Car Wash Vacuum Activity
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	303.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	276.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	27.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,525.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,525.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	74.6	74.2	75.4	77.2	78.0	78.8
Distance Attenuation	303.0	-35.6	-35.6	-35.6	-35.6	-35.6	-35.6
Shielding (Barrier Attenuation)	276.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		39.0	38.6	39.8	41.6	42.4	43.2
60 Minute Hourly Adjustment		**39.0**	**38.6**	**39.8**	**41.6**	**42.4**	**43.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R3**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	179.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	145.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	34.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,484.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,484.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	179.0	-31.1	-31.1	-31.1	-31.1	-31.1	-31.1
Shielding (Barrier Attenuation)	145.0	-7.3	-7.3	-7.3	-7.3	-7.3	-7.3
Raw (Distance + Barrier)		38.8	36.0	37.7	39.0	39.3	39.8
39 Minute Hourly Adjustment		**36.9**	**34.1**	**35.8**	**37.1**	**37.4**	**37.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R3**
Source: Drive-Through Speakerphone
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	229.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	191.0	feet	*Noise Source Height:*	3.0 feet
Barrier Distance to Observer:	38.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,484.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,484.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	62.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	229.0	-23.7	-23.7	-23.7	-23.7	-23.7	-23.7
Shielding (Barrier Attenuation)	191.0	-6.3	-6.3	-6.3	-6.3	-6.3	-6.3
Raw (Distance + Barrier)		32.0	30.9	32.1	33.6	35.3	36.4
60 Minute Hourly Adjustment		**32.0**	**30.9**	**32.1**	**33.6**	**35.3**	**36.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R3**
Source: Trash Enclosure
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	404.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	367.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	37.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,484.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,484.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	69.0	75.0	82.0	87.0	88.5
Distance Attenuation	404.0	-38.1	-38.1	-38.1	-38.1	-38.1	-38.1
Shielding (Barrier Attenuation)	367.0	-5.2	-5.2	-5.2	-5.2	-5.2	-5.2
Raw (Distance + Barrier)		34.0	25.7	31.7	38.7	43.7	45.2
20 Minute Hourly Adjustment		**29.2**	**20.9**	**26.9**	**33.9**	**38.9**	**40.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R3**
Source: Parking Lot
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	145.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	115.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	30.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,484.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,484.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	145.0	-29.2	-29.2	-29.2	-29.2	-29.2	-29.2
Shielding (Barrier Attenuation)	115.0	-7.9	-7.9	-7.9	-7.9	-7.9	-7.9
Raw (Distance + Barrier)		23.0	19.6	23.6	26.6	30.0	42.4
60 Minute Hourly Adjustment		**23.0**	**19.6**	**23.6**	**26.6**	**30.0**	**42.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/22/2019

Observer Location: **R3**
Source: Gas Station Activity
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	190.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	152.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	38.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,484.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,484.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	68.2	65.6	66.9	69.5	74.4	82.4
Distance Attenuation	190.0	-31.6	-31.6	-31.6	-31.6	-31.6	-31.6
Shielding (Barrier Attenuation)	152.0	-7.4	-7.4	-7.4	-7.4	-7.4	-7.4
Raw (Distance + Barrier)		29.2	26.6	27.9	30.5	35.4	43.4
60 Minute Hourly Adjustment		**29.2**	**26.6**	**27.9**	**30.5**	**35.4**	**43.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/22/2019

Observer Location: **R3**
Source: Car Wash Tunnel
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	401.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	364.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	37.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,484.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,484.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	78.3	71.6	82.0	82.6	83.3	83.8
Distance Attenuation	401.0	-32.1	-32.1	-32.1	-32.1	-32.1	-32.1
Shielding (Barrier Attenuation)	364.0	-5.4	-5.4	-5.4	-5.4	-5.4	-5.4
Raw (Distance + Barrier)		40.8	34.1	44.5	45.1	45.8	46.3
60 Minute Hourly Adjustment		**40.8**	**34.1**	**44.5**	**45.1**	**45.8**	**46.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R3**
Source: Car Wash Vacuum Activity
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	440.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	404.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	36.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,484.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,484.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	74.6	74.2	75.4	77.2	78.0	78.8
Distance Attenuation	440.0	-38.9	-38.9	-38.9	-38.9	-38.9	-38.9
Shielding (Barrier Attenuation)	404.0	-5.2	-5.2	-5.2	-5.2	-5.2	-5.2
Raw (Distance + Barrier)		30.5	30.1	31.3	33.1	33.9	34.7
60 Minute Hourly Adjustment		**30.5**	**30.1**	**31.3**	**33.1**	**33.9**	**34.7**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R4**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	251.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	219.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	32.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,486.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,486.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	251.0	-34.0	-34.0	-34.0	-34.0	-34.0	-34.0
Shielding (Barrier Attenuation)	219.0	-5.7	-5.7	-5.7	-5.7	-5.7	-5.7
Raw (Distance + Barrier)		37.5	34.7	36.4	37.7	38.0	38.5
39 Minute Hourly Adjustment		**35.6**	**32.8**	**34.5**	**35.8**	**36.1**	**36.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R4**
Source: Drive-Through Speakerphone
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	236.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	236.0	feet	*Noise Source Height:*	3.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,486.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,486.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	62.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	236.0	-23.9	-23.9	-23.9	-23.9	-23.9	-23.9
Shielding (Barrier Attenuation)	236.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
Raw (Distance + Barrier)		28.1	27.0	28.2	29.7	31.4	32.5
60 Minute Hourly Adjustment		**28.1**	**27.0**	**28.2**	**29.7**	**31.4**	**32.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R4**
Source: Trash Enclosure
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	354.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	354.0	feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,486.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,486.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	69.0	75.0	82.0	87.0	88.5
Distance Attenuation	354.0	-37.0	-37.0	-37.0	-37.0	-37.0	-37.0
Shielding (Barrier Attenuation)	354.0	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
Raw (Distance + Barrier)		30.2	21.9	27.9	34.9	39.9	41.4
20 Minute Hourly Adjustment		**25.4**	**17.1**	**23.1**	**30.1**	**35.1**	**36.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R4**
Source: Parking Lot
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	268.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	268.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,486.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,486.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	268.0	-34.6	-34.6	-34.6	-34.6	-34.6	-34.6
Shielding (Barrier Attenuation)	268.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
Raw (Distance + Barrier)		15.5	12.1	16.1	19.1	22.5	34.9
60 Minute Hourly Adjustment		**15.5**	**12.1**	**16.1**	**19.1**	**22.5**	**34.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R4**
Source: Gas Station Activity
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	325.0 feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	325.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,486.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,486.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	68.2	65.6	66.9	69.5	74.4	82.4
Distance Attenuation	325.0	-36.3	-36.3	-36.3	-36.3	-36.3	-36.3
Shielding (Barrier Attenuation)	325.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
Raw (Distance + Barrier)		21.9	19.3	20.6	23.2	28.1	36.1
60 Minute Hourly Adjustment		**21.9**	**19.3**	**20.6**	**23.2**	**28.1**	**36.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R4**
Source: Car Wash Tunnel
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	479.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	479.0	feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,486.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,486.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	78.3	71.6	82.0	82.6	83.3	83.8
Distance Attenuation	479.0	-33.6	-33.6	-33.6	-33.6	-33.6	-33.6
Shielding (Barrier Attenuation)	479.0	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
Raw (Distance + Barrier)		34.6	27.9	38.3	38.9	39.6	40.1
60 Minute Hourly Adjustment		**34.6**	**27.9**	**38.3**	**38.9**	**39.6**	**40.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R4**
Source: Car Wash Vacuum Activity
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	454.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	454.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,486.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,486.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	74.6	74.2	75.4	77.2	78.0	78.8
Distance Attenuation	454.0	-39.2	-39.2	-39.2	-39.2	-39.2	-39.2
Shielding (Barrier Attenuation)	454.0	-10.1	-10.1	-10.1	-10.1	-10.1	-10.1
Raw (Distance + Barrier)		25.3	24.9	26.1	27.9	28.7	29.5
60 Minute Hourly Adjustment		**25.3**	**24.9**	**26.1**	**27.9**	**28.7**	**29.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R5**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	512.0	feet	***Barrier Height:***	**5.0 feet**
Noise Distance to Barrier:	5.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	507.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,490.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,490.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	512.0	-40.2	-40.2	-40.2	-40.2	-40.2	-40.2
Shielding (Barrier Attenuation)	5.0	-17.7	-17.7	-17.7	-17.7	-17.7	-17.7
Raw (Distance + Barrier)		19.3	16.5	18.2	19.5	19.8	20.3
39 Minute Hourly Adjustment		**17.4**	**14.6**	**16.3**	**17.6**	**17.9**	**18.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R5**
Source: Drive-Through Speakerphone
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	512.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	512.0	feet	*Noise Source Height:*	3.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,490.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,490.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	62.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	512.0	-30.7	-30.7	-30.7	-30.7	-30.7	-30.7
Shielding (Barrier Attenuation)	512.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		31.3	30.2	31.4	32.9	34.6	35.7
60 Minute Hourly Adjustment		**31.3**	**30.2**	**31.4**	**32.9**	**34.6**	**35.7**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R5**
Source: Trash Enclosure
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	485.0	feet	***Barrier Height:***	**6.0 feet**
Noise Distance to Barrier:	16.0	feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	469.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,490.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,490.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	69.0	75.0	82.0	87.0	88.5
Distance Attenuation	485.0	-39.7	-39.7	-39.7	-39.7	-39.7	-39.7
Shielding (Barrier Attenuation)	16.0	-16.5	-16.5	-16.5	-16.5	-16.5	-16.5
Raw (Distance + Barrier)		21.1	12.8	18.8	25.8	30.8	32.3
20 Minute Hourly Adjustment		**16.3**	**8.0**	**14.0**	**21.0**	**26.0**	**27.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R5**
Source: Parking Lot
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	458.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	458.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,490.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,490.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	458.0	-39.2	-39.2	-39.2	-39.2	-39.2	-39.2
Shielding (Barrier Attenuation)	458.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		20.9	17.5	21.5	24.5	27.9	40.3
60 Minute Hourly Adjustment		**20.9**	**17.5**	**21.5**	**24.5**	**27.9**	**40.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R5**
Source: Gas Station Activity
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	626.0 feet	***Barrier Height:***	**20.0 feet**
Noise Distance to Barrier:	63.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	563.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,490.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,490.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	68.2	65.6	66.9	69.5	74.4	82.4
Distance Attenuation	626.0	-42.0	-42.0	-42.0	-42.0	-42.0	-42.0
Shielding (Barrier Attenuation)	63.0	-5.8	-5.8	-5.8	-5.8	-5.8	-5.8
Raw (Distance + Barrier)		20.4	17.8	19.1	21.7	26.6	34.6
60 Minute Hourly Adjustment		**20.4**	**17.8**	**19.1**	**21.7**	**26.6**	**34.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R5**
Source: Car Wash Tunnel
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	678.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	678.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,490.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,490.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	78.3	71.6	82.0	82.6	83.3	83.8
Distance Attenuation	678.0	-36.6	-36.6	-36.6	-36.6	-36.6	-36.6
Shielding (Barrier Attenuation)	678.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		41.7	35.0	45.4	46.0	46.7	47.2
60 Minute Hourly Adjustment		**41.7**	**35.0**	**45.4**	**46.0**	**46.7**	**47.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R5**
Source: Car Wash Vacuum Activity
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	589.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	589.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,490.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,490.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	74.6	74.2	75.4	77.2	78.0	78.8
Distance Attenuation	589.0	-41.4	-41.4	-41.4	-41.4	-41.4	-41.4
Shielding (Barrier Attenuation)	589.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		33.2	32.8	34.0	35.8	36.6	37.4
60 Minute Hourly Adjustment		**33.2**	**32.8**	**34.0**	**35.8**	**36.6**	**37.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R6**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	106.0	feet	***Barrier Height:***	**5.0 feet**
Noise Distance to Barrier:	5.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	101.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,518.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,518.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	106.0	-26.5	-26.5	-26.5	-26.5	-26.5	-26.5
Shielding (Barrier Attenuation)	5.0	-14.6	-14.6	-14.6	-14.6	-14.6	-14.6
Raw (Distance + Barrier)		36.1	33.3	35.0	36.3	36.6	37.1
39 Minute Hourly Adjustment		**34.2**	**31.4**	**33.1**	**34.4**	**34.7**	**35.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R6**
Source: Drive-Through Speakerphone
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	280.0	feet	***Barrier Height:***	**20.0**	**feet**
Noise Distance to Barrier:	133.0	feet	*Noise Source Height:*	3.0	feet
Barrier Distance to Observer:	147.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	1,518.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0	
Barrier Elevation:	1,518.0	feet			

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	62.0	60.9	62.1	63.6	65.3	66.4
Distance Attenuation	280.0	-25.4	-25.4	-25.4	-25.4	-25.4	-25.4
Shielding (Barrier Attenuation)	133.0	-13.4	-13.4	-13.4	-13.4	-13.4	-13.4
Raw (Distance + Barrier)		23.2	22.1	23.3	24.8	26.5	27.6
60 Minute Hourly Adjustment		**23.2**	**22.1**	**23.3**	**24.8**	**26.5**	**27.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/22/2019

Observer Location: **R6**
Source: Trash Enclosure
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	245.0	feet	***Barrier Height:***	**0.0**	**feet**
Noise Distance to Barrier:	245.0	feet	*Noise Source Height:*	4.0	feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0	feet
Observer Elevation:	1,518.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0	
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0	
Barrier Elevation:	1,518.0	feet			

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.3	69.0	75.0	82.0	87.0	88.5
Distance Attenuation	245.0	-33.8	-33.8	-33.8	-33.8	-33.8	-33.8
Shielding (Barrier Attenuation)	245.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		43.5	35.2	41.2	48.2	53.2	54.7
20 Minute Hourly Adjustment		**38.7**	**30.4**	**36.4**	**43.4**	**48.4**	**49.9**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/22/2019

Observer Location: **R6**
Source: Parking Lot
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	163.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	163.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,518.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,518.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	60.1	56.7	60.7	63.7	67.1	79.5
Distance Attenuation	163.0	-30.3	-30.3	-30.3	-30.3	-30.3	-30.3
Shielding (Barrier Attenuation)	163.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		29.8	26.4	30.4	33.4	36.8	49.2
60 Minute Hourly Adjustment		**29.8**	**26.4**	**30.4**	**33.4**	**36.8**	**49.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/22/2019

Observer Location: **R6**
Source: Gas Station Activity
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	444.0 feet	***Barrier Height:***	**20.0 feet**
Noise Distance to Barrier:	270.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	174.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,518.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,518.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	68.2	65.6	66.9	69.5	74.4	82.4
Distance Attenuation	444.0	-39.0	-39.0	-39.0	-39.0	-39.0	-39.0
Shielding (Barrier Attenuation)	270.0	-11.3	-11.3	-11.3	-11.3	-11.3	-11.3
Raw (Distance + Barrier)		17.9	15.3	16.6	19.2	24.1	32.1
60 Minute Hourly Adjustment		**17.9**	**15.3**	**16.6**	**19.2**	**24.1**	**32.1**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/22/2019

Observer Location: **R6**
Source: Car Wash Tunnel
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	403.0	feet	***Barrier Height:***	**20.0 feet**
Noise Distance to Barrier:	246.0	feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	157.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,518.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,518.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	78.3	71.6	82.0	82.6	83.3	83.8
Distance Attenuation	403.0	-32.1	-32.1	-32.1	-32.1	-32.1	-32.1
Shielding (Barrier Attenuation)	246.0	-11.2	-11.2	-11.2	-11.2	-11.2	-11.2
Raw (Distance + Barrier)		35.0	28.3	38.7	39.3	40.0	40.5
60 Minute Hourly Adjustment		**35.0**	**28.3**	**38.7**	**39.3**	**40.0**	**40.5**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/22/2019

Observer Location: **R6**
Source: Car Wash Vacuum Activity
Condition: Operational-Mitigated

Project Name: Lake & Mountain
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	264.0	feet	***Barrier Height:***	**20.0 feet**
Noise Distance to Barrier:	115.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	149.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	1,518.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	1,510.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	1,518.0	feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	74.6	74.2	75.4	77.2	78.0	78.8
Distance Attenuation	264.0	-34.5	-34.5	-34.5	-34.5	-34.5	-34.5
Shielding (Barrier Attenuation)	115.0	-13.4	-13.4	-13.4	-13.4	-13.4	-13.4
Raw (Distance + Barrier)		26.7	26.3	27.5	29.3	30.1	30.9
60 Minute Hourly Adjustment		**26.7**	**26.3**	**27.5**	**29.3**	**30.1**	**30.9**

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APPENDIX 10.1:

TEMPORARY CONSTRUCTION NOISE BARRIER CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL

10/23/2019

Observer Location: **R1**
Source: Peak Construction Activity
Condition: Construction

Project Name: Lake & Mountain Shopping C
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	85.0 feet	***Barrier Height:***	**12.0 feet**
Noise Distance to Barrier:	25.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	60.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	0.0	0.0	0.0	0.0	0.0	76.7
Distance Attenuation	85.0	-9.0	-9.0	-9.0	-9.0	-9.0	-9.0
Shielding (Barrier Attenuation)	25.0	-9.2	-9.2	-9.2	-9.2	-9.2	-9.2

STATIONARY SOURCE NOISE PREDICTION MODEL

10/23/2019

Observer Location: **R5**
Source: Peak Construction Activity
Condition: Construction

Project Name: Lake & Mountain Shopping C
Job Number: 12770
Analyst: B. Lawson

NOISE MODEL INPUTS

Noise Distance to Observer	100.0 feet	***Barrier Height:***	**12.0 feet**
Noise Distance to Barrier:	10.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	90.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	0.0	0.0	0.0	0.0	0.0	76.7
Distance Attenuation	100.0	-10.5	-10.5	-10.5	-10.5	-10.5	-10.5
Shielding (Barrier Attenuation)	10.0	-10.2	-10.2	-10.2	-10.2	-10.2	-10.2

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APPENDIX 10.2:

SAMPLE TEMPORARY CONSTRUCTION NOISE BARRIER PHOTOS

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Temporary Construction Noise Barrier Examples

I-Beam & Acoustic Material 01

I-Beam & Acoustic Material 02

I-Beam & Acoustic Material 03

K-Rail Plywood & Acoustic Material

K-Rail Temporary Fence & Acoustic Material

K-Rail-Mounted Acoustic Material 01

Temporary Construction Noise Barrier Examples

Pillar & Acoustic Material

Straw Bales 01

Straw Bales 02

Temporary Fence & Acoustic Material 01

Temporary Fence & Acoustic Material 02