Oleander Business Park

Noise Impact Analysis

County of Riverside

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz
I-215	Interstate 215
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
L_{min}	Minimum level measured over the time interval
MARB/IPA	March Air Reserve Base / Inland Port Airport
mph	Miles per hour
OPR	Office of Planning and Research
PPV	Peak particle velocity
Project	Oleander Business Park
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, if any, for the proposed Oleander Business Park development ("Project"). The Project site is located on the northwest corner of Decker Road and Oleander Avenue in unincorporated County of Riverside. The Project is proposed to consist of up to approximately 710,736 square feet of high-cube warehouse and manufacturing uses divided over two buildings—Building A: approximately 347,369 square feet; and Building B: approximately 347,369 square feet. Up to 20 percent of the Project building areas are assumed to accommodate manufacturing occupancies.

The Project is anticipated to be constructed in a single phase and occupied by 2021. At the time this noise analysis was prepared, the future tenants of the proposed Project were unknown, and therefore, this noise study includes a conservative analysis of the proposed Project uses. This study has been prepared to satisfy applicable County of Riverside standards and thresholds of significance 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 seven study-area 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 *Oleander Business Park 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) and Opening Year 2021 conditions.

The analysis shows that the unmitigated Project-related traffic noise level increases under all with Project traffic scenarios would be *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 operation noise sources of the Oleander Business Park site, this analysis estimates the Project-related stationary-source noise levels at nearby sensitive receiver locations. The typical activities associated with the proposed Oleander Business Park are anticipated to include idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements. The operational noise analysis shows that the Project-related stationary-source noise levels at all receiver locations will satisfy the County of Riverside 65 dBA L_{eq} daytime and 45 dBA L_{eq} nighttime exterior noise level standards.

Further, this analysis demonstrates that the unmitigated Project operational noise levels will not contribute a long-term operational noise level impact to the existing ambient noise environment at any of the sensitive receiver locations. Therefore, Project operational noise level impacts associated with the proposed 24-hour seven days per week Project activities, such as the idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements, would be *less than significant*.

OPERATIONAL VIBRATION ANALYSIS

The operation of the Project site will include heavy trucks moving on site to and from the loading dock areas. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement conditions. According to the FTA *Transit Noise Impact and Vibration Assessment,* (3) trucks rarely create vibration that exceeds 70 VdB or 0.003 in/sec RMS (4) (unless there are bumps due to frequent potholes in the road). Trucks transiting on site will be travelling at very low speeds so it is expected that delivery truck vibration impacts at nearby homes will satisfy the 0.01 in/sec RMS vibration threshold of the County of Riverside, and therefore, would be *less than significant*.

CONSTRUCTION NOISE ANALYSIS

Construction-related noise impacts are expected to create temporary and intermittent high-level noise conditions at receivers surrounding the Project site. Using sample reference noise levels to represent the planned construction activities of the Oleander Business Park site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. Since the County of Riverside General Plan and Municipal Codes do not identify specific construction noise level thresholds, a threshold is identified based on the National Institute for Occupational Safety and Health (NIOSH) limits for construction noise. The Project-related short-term construction noise levels are expected to range from 33.2 to 51.4 dBA L_{eq} and will satisfy the 85 dBA L_{eq} threshold identified by the National Institute for Occupational Safety and Health (NIOSH) at all receiver locations. Therefore, based on the results of this analysis, all nearby sensitive receiver locations would experience *less than significant* impacts due to Project construction noise levels.

CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. This analysis shows the highest construction vibration levels are estimated at 0.0002 in/sec RMS, which is below the vibration standard of 0.01 in/sec RMS at all receiver locations.

Further, the Project-related construction vibration levels do not represent levels capable of causing building damage to nearby residential homes. The FTA identifies construction vibration levels capable of building damage ranging from 0.12 to 0.5 in/sec PPV. (3) The peak Project-construction vibration levels approaching 0.0002 in/sec PPV will remain below the FTA vibration levels for building damage at the residential homes near the Project site. Moreover, the impacts at the site of the closest sensitive receivers are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating adjacent to the Project site perimeter. Based on the preceding, Project construction-source vibration impacts would be *less than significant*.

CONSTRUCTION BLASTING ANALYSIS

To assess the potential Project blasting impacts, the worst-case airblast and vibration levels were calculated based on a 210 pound maximum charge weight using the closest distance of 1,282 feet from receiver location R6 to the closest potential Project blasting location, consistent with the methodology provided in the International Society of Explosives Engineers (ISEE's) *Blasters' Handbook* and information provided by the blasting contractor. The worst-case airblast and vibration levels are shown to satisfy the Office of Surface Mining and Reclamation Enforcement (OSMRE) airblast and vibration level thresholds without accounting for any additional attenuation provided by intervening topography and/or structures in the Project study area. Therefore, since airblast and vibration levels at the closest receiver location would remain below the airblast and vibration level thresholds based on reference ISEE data, Project-related blasting impacts are considered *less than significant.*

Further, the blasting contractor is required to design all blasts such that they remain below the significance thresholds identified by the USBM and OSMRE in addition to the permitting requirements of the State and Riverside County Sheriff's Department.

AIRPORT LAND USE COMPATIBILITY

The March Air Reserve Base/Inland Port Airport (MARB/IPA) is located approximately one mile northeast of the Project site. The *March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan* (MARB/IPA LUCP) includes the policies for determining the land use compatibility of the Project. In summary, the Project land uses are compatible with the MARB/IPA LUCP and would not be adversely affected by noise generated by MARB uses or activities.

SUMMARY OF CEQA SIGNIFICANCE FINDINGS

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

TABLE ES-1: SUMMARY OF SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-Site Traffic Noise	7	*Less Than Significant*	-
Operational Noise	9	*Less Than Significant*	-
Operational Vibration		*Less Than Significant*	-
Construction Noise	10	*Less Than Significant*	-
Construction Vibration		*Less Than Significant*	-
Construction Blasting		*Less Than Significant*	-
Airport Land Use Compatibility	3.6	*Less Than Significant*	-

1 INTRODUCTION

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

1.1 SITE LOCATION

The Project site is located within the Mead Valley area of the County of Riverside. More specifically, the Project site is located west of Decker Road, between Nandina Avenue and Oleander Avenue. Interstate 215 (I-215) exists in a north – south orientation approximately one-half mile easterly of the Project site. The Project site location is shown on Exhibit 1-A. The Project site comprises vacant, undeveloped property. To the north, south, and west of the Project site, properties are also vacant and undeveloped. Easterly of the Project site, across Decker Road, are warehouse/distribution center uses and vacant land. March Air Reserve Base/Inland Port Airport (MARB/IPA) is located roughly one-mile northeast of the Project site.

1.2 PROJECT DESCRIPTION

The Oleander Business Park Project (Project) proposes construction and operation of approximately 710,736 square feet of light industrial/manufacturing uses within an approximately 93.85-acre site (gross), located within the Mead Valley area of Riverside County. As part of the Project, Parcel Map 5128 (Parcel Map Book [P.M.B.] 8/54) comprising 4 parcels, would be reconfigured via Riverside County Lot Line Adjustment procedures. Project Parcel 1 (18.50 acres) would be developed with approximately 363,367 square feet of light industrial uses. Project Parcel 2 (approximately 17.26 acres) would be developed with approximately 347,369 square feet of light industrial uses. Project Parcels 3 and 4, totaling approximately 58.09 acres would remain vacant. The Project is anticipated to be constructed and occupied by 2021 (the Project Opening Year). The Project is assumed to be operational 24 hours per day, 7 days per week. At the time this analysis was prepared, specific Project tenants have not yet been identified.

The on-site Project-related noise sources are expected to include: idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements. This noise analysis is intended to describe noise level impacts associated with the expected typical operational activities at the Project site. Per the *Oleander Business Park Traffic Impact Analysis* prepared by Urban Crossroads, Inc. the Project is expected to generate a total of approximately 1,366 trip-ends per day (actual vehicles) and includes 376 truck trip-ends per day. (2) This noise study relies on the actual Project trips (as opposed to the passenger car equivalents) to accurately account for the effect of individual truck trips on the study area roadway network.

EXHIBIT 1-A: LOCATION MAP

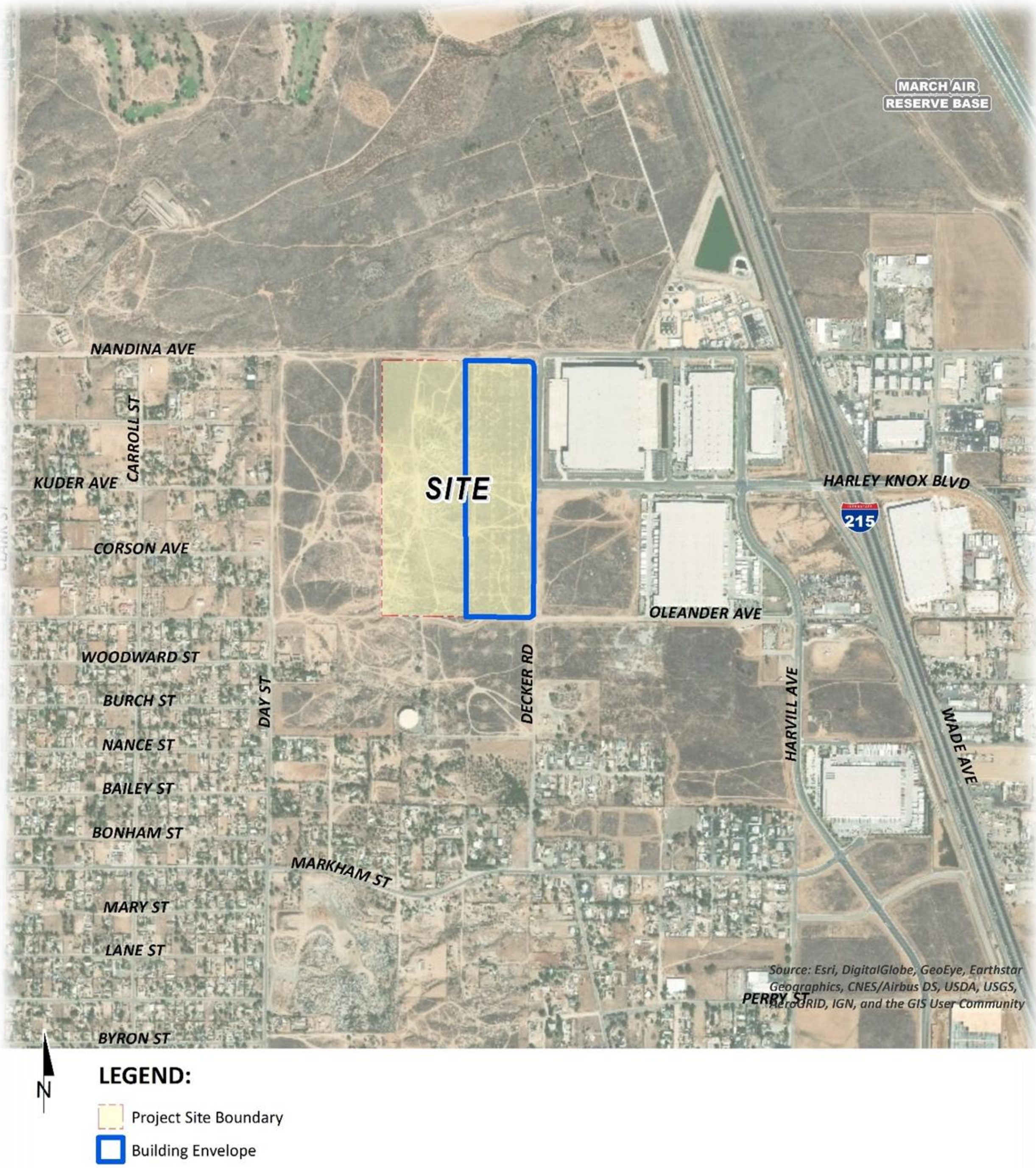
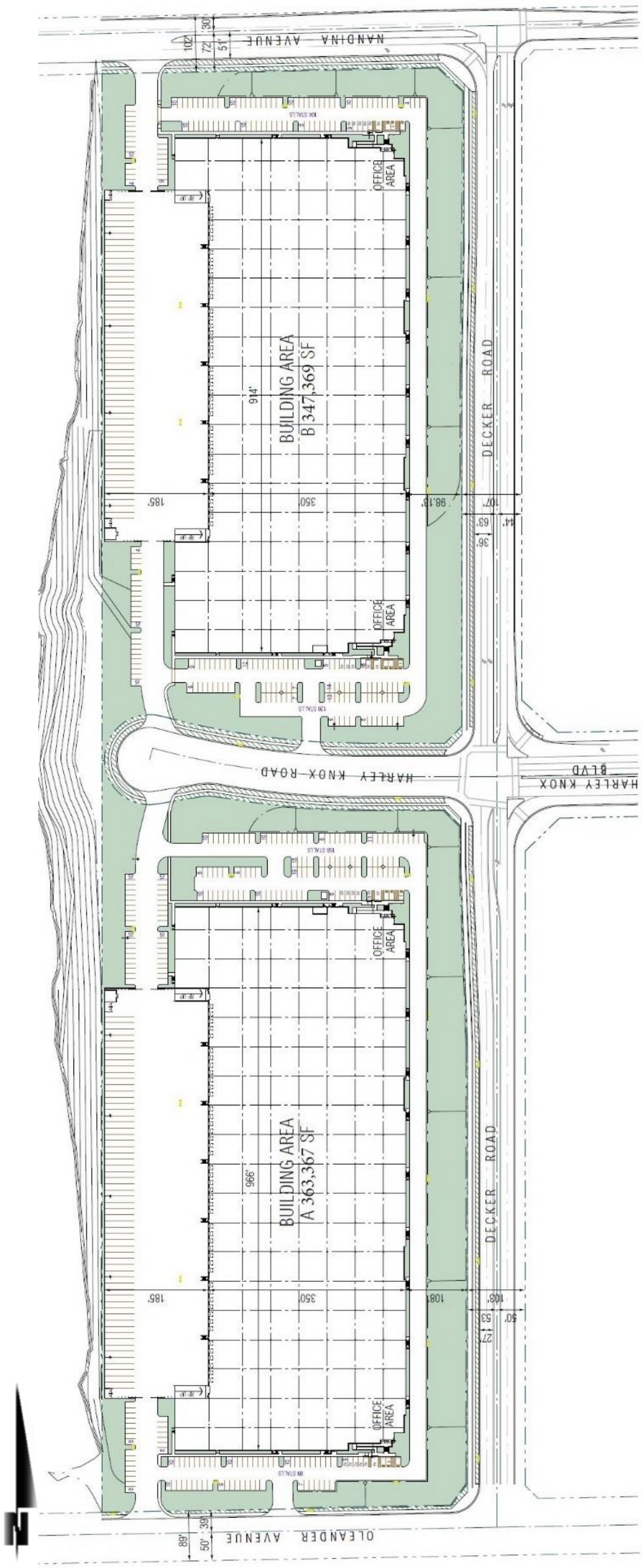


EXHIBIT 1-B: PROJECT DEVELOPMENT CONCEPT



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

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. (5) 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. (6) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

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

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

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. (7)

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. (5)

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. (7)

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. (7)

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. (8)

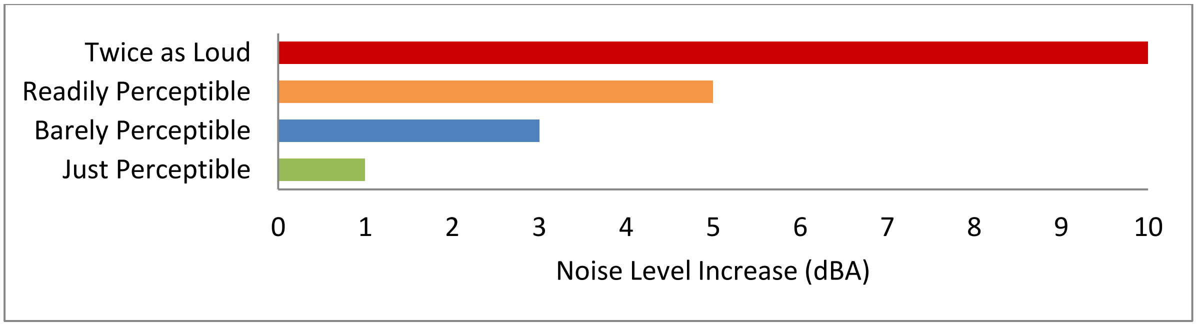
2.7 COMMUNITY RESPONSE TO NOISE

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. (9) 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. (9) 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*. (7)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



2.8 EXPOSURE TO HIGH NOISE LEVELS

The Occupational Safety and Health Administration (OSHA) sets legal limits on noise exposure in the workplace. The permissible exposure limit (PEL) for a worker over an eight-hour day is 90 dBA. The OSHA standard uses a 5 dBA exchange rate. This means that when the noise level is increased by 5 dBA, the amount of time a person can be exposed to a certain noise level to receive the same dose is cut in half. The National Institute for Occupational Safety and Health (NIOSH) has recommended that all worker exposures to noise should be controlled below a level equivalent to 85 dBA for eight hours to minimize occupational noise induced hearing loss. NIOSH also recommends a 3 dBA exchange rate so that every increase by 3 dBA doubles the amount of the noise and halves the recommended amount of exposure time. (10)

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

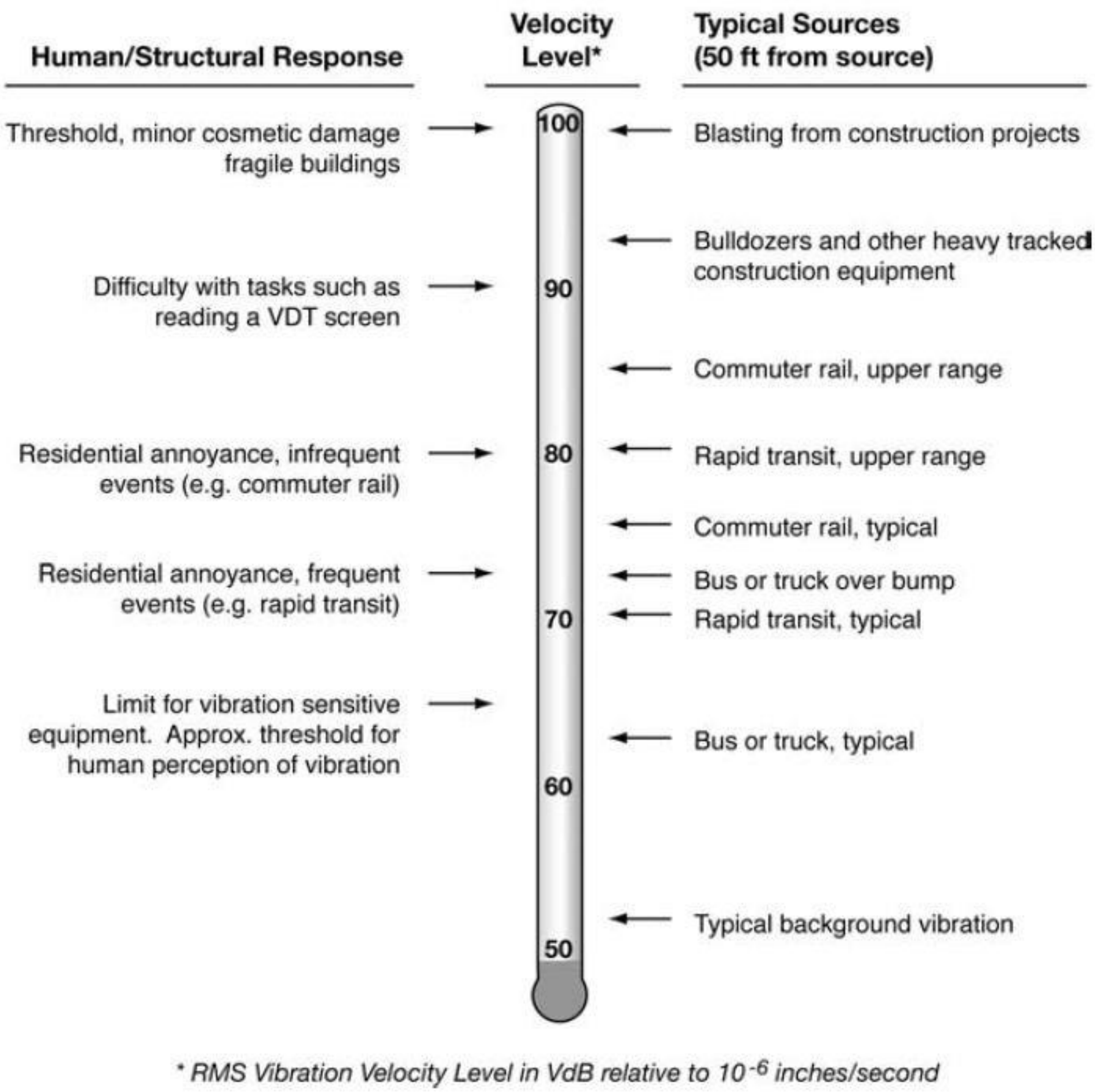
2.9 VIBRATION

Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment* (3), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

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

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

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



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

2.10 BLASTING FUNDAMENTALS

The intensity of the noise and vibration impacts associated with rock blasting depends on location, size, material, shape of the rock, and the methods used to crack it. While a blasting contractor can design the blasts to stay below a given vibration level that could cause damage to nearby structures, it is difficult to design blasts that produce noise levels which are not perceptible to receivers near the blast site. (11) The noise produced by blasting activities is referred to as air overpressure, or an “airblast,” which is generated when explosive energy in the form of gases escape from the detonating blast holes. Much like a point source, airblasts radiate outward in a spherical pattern and attenuate with each doubling of distance from the blast location, depending on the design of the blast and amount of containment.

Blasting activities generally include: the pre-drilling of holes in the hard rock area; preparation and placement of the charges in the drilled holes; a pre-blast horn signal; additional pre-blast horn signals immediately prior to the blast; and the blast itself. An additional horn signal is sounded to indicate the “all clear” after the blast and the blasting contractor has inspected the blasting area. The noise from the blast itself starts with a cracking sound from the detonator, located at a distance from the charges, and ends with the low crackling sound from each charge as they are subsequently set off. Blasts typically occur for only a few seconds, depending on their design. It is important to note that no other equipment will be operating during each blast in the blast area but will commence operation once the blasting contractor indicates it is safe to do so. The blasting information provided herein is based on the 18th Edition of the International Society of Explosives Engineers’ (ISEE’s) *Blasters’ Handbook*. (12)

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). (13) 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. (14) 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 COUNTY OF RIVERSIDE GENERAL PLAN NOISE ELEMENT

The County of Riverside General Plan Noise Element (Noise Element) establishes polices and requirements to control and abate environmental noise and thereby, protect citizens of County of Riverside from excessive exposure to noise. (15) The Noise Element 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 Element identifies several polices to minimize the impacts of excessive noise levels throughout the community and establishes noise level requirements for all land uses. To protect County of Riverside residents from excessive noise, the Noise Element contains the following policies related to the Project:

N 1.1 Protect noise-sensitive land uses from high levels of noise by restricting noise-producing land uses from these areas. If the noise-producing land use cannot be relocated, then noise buffers such as setbacks, landscaping, or block walls shall be used.

N 1.3 Consider the following uses noise-sensitive and discourage these uses in areas in excess of 65 CNEL:

- *Schools*
- *Hospitals*
- *Rest Homes*
- *Long Term Care Facilities*
- *Mental Care Facilities*
- *Residential Uses*
- *Libraries*
- *Passive Recreation Uses*
- *Places of Worship*

N 1.5 Prevent and mitigate the adverse impacts of excessive noise exposure on the residents, employees, visitors, and noise-sensitive uses of Riverside County.

N 4.1 Prohibit facility-related noise, received by any sensitive use, from exceeding the following worst-case noise levels:

a. 45 dBA 10-minute L_{eq} between 10:00 p.m. and 7:00 a.m.;

b. 65 dBA 10-minute L_{eq} between 7:00 a.m. and 10:00 p.m.

N 13.1 Minimize the impacts of construction noise on adjacent uses within acceptable standards.

N 13.2 Ensure that construction activities are regulated to establish hours of operation in order to prevent and/or mitigate the generation of excessive or adverse impacts on surrounding areas.

N 13.3 Condition subdivision approval adjacent to developed/occupied noise-sensitive land uses (see policy N 1.3) by requiring the developer to submit a construction-related noise mitigation plan to the [County] for review and approval prior to issuance of a grading permit. The plan must depict the location of construction equipment and how the noise from this equipment will be mitigated during construction of this project, through the use of such methods as:

i. Temporary noise attenuation fences;

ii. Preferential location and equipment; and

iii. Use of current noise suppression technology and equipment.

N 16.3 Prohibit exposure of residential dwellings to perceptible ground vibration from passing trains as perceived at the ground or second floor. Perceptible motion shall be presumed to be a motion velocity of 0.01 inches/second over a range of 1 to 100 Hz.

To ensure noise-sensitive land uses are protected from high levels of noise (N 1.1), Table N-1 of the Noise Element identifies guidelines to evaluate proposed developments based on exterior and interior noise level limits for land uses and requires a noise analysis to determine needed mitigation measures if necessary. The Noise Element identifies residential use as a noise-sensitive land use (N 1.3) and discourages new development in areas with 65 CNEL or greater existing ambient noise levels. To prevent and mitigate noise impacts for its residents (N 1.5), County of Riverside requires noise attenuation measures for sensitive land use exposed to noise levels higher than 65 CNEL. Policy N 4.1 of the Noise Element sets a stationary-source exterior noise limit not to be exceeded for a cumulative period of more than ten minutes in any hour of 65 dBA L_{eq} for daytime hours of 7:00 a.m. to 10:00 p.m., and 45 dBA L_{eq} during the noise-sensitive nighttime hours of 10:00 p.m. to 7:00 a.m. To prevent high levels of construction noise from impacting noise-sensitive land uses, policies N 13.1 through 13.3 identify construction noise mitigation requirements for new development located near existing noise-sensitive land uses. Policy 16.3 establishes the vibration perception threshold for rail-related vibration levels, used in this analysis as a threshold for determining potential vibration impacts due to Project construction. (15)

3.3.1 LAND USE COMPATIBILITY

The noise criteria identified in the County of Riverside Noise Element (Table N-1) are guidelines to evaluate the land use compatibility of transportation related noise. The compatibility criteria, shown on Exhibit 3-A, provides the County with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels.

The *Land Use Compatibility for Community Noise Exposure* matrix describes categories of compatibility and not specific noise standards. The warehouse/industrial use of the Project is considered *normally acceptable* with unmitigated exterior noise levels of less than 70 dBA CNEL based on the *Industrial, Manufacturing, Utilities, Agriculture* land use compatibility criteria shown on Exhibit 3-A. Residential designated land uses in the Project study area are considered *normally acceptable* with exterior noise levels below 60 dBA CNEL, and *conditionally acceptable* with exterior noise levels of up to 70 dBA CNEL. For *conditionally acceptable* exterior noise levels, of less than 75 dBA CNEL for Project land uses, *new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and the 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*. (15)

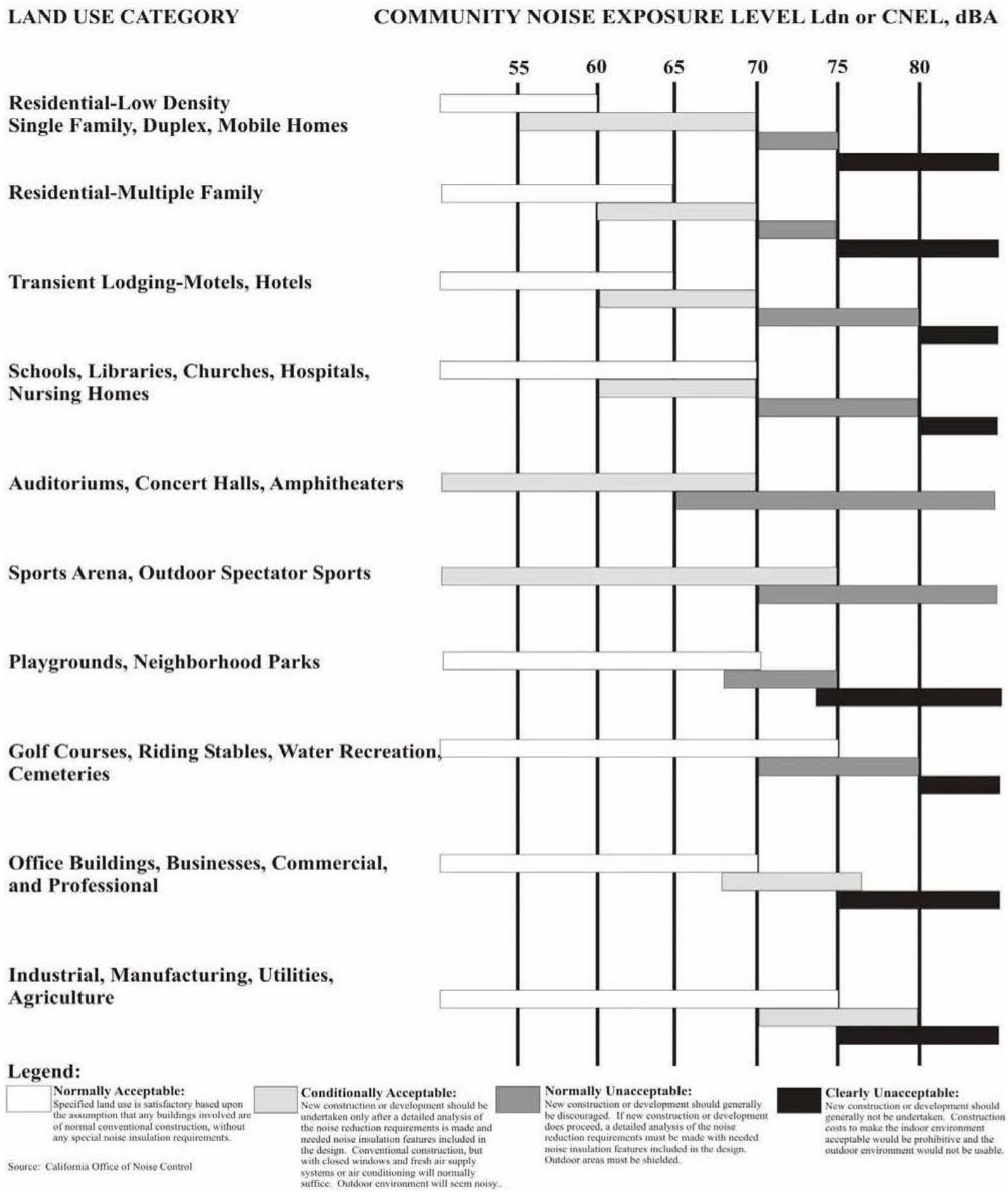
3.3.2 COUNTY OF RIVERSIDE STATIONARY NOISE STANDARDS

The County of Riverside has set exterior noise limits to control idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements associated with the development of the proposed Oleander Business Park. The County considers noise generated using motor vehicles to be a stationary noise source when operated on private property such as at a loading dock. These facility-related noises, as projected to any portion of any surrounding property containing a *habitable dwelling, hospital, school, library or nursing home*, must not exceed the following worst-case noise levels.

Policy N 4.1 of the Noise Element sets an exterior noise limit not to be exceeded for a cumulative period of more than ten minutes in any hour of 65 dBA L_{eq} for daytime hours of 7:00 a.m. to 10:00 p.m., and 45 dBA L_{eq} during the noise-sensitive nighttime hours of 10:00 p.m. to 7:00 a.m. (15)

Based on several discussions with the County of Riverside Department of Environmental Health (DEH), Office of Industrial Hygiene (OIH), it is important to recognize that the County of Riverside Municipal Code noise level standards, incorrectly identify maximum noise level (L_{max}) standards that should instead reflect the average L_{eq} noise levels. Moreover, the County of Riverside DEH OIH's April 15th, 2015 *Requirements for determining and mitigating, non-transportation noise source impacts to residential properties* also identifies operational (stationary-source) noise level limits using the L_{eq} metric consistent with the direction of the County of Riverside General Plan guidelines and standards Noise Element. Therefore, this report has been prepared consistent with the County of Riverside DEH OIH guidelines and standards using the L_{eq} noise level metric for stationary-source (operational) noise level evaluation.

EXHIBIT 3-A: LAND USE COMPATIBILITY FOR COMMUNITY NOISE EXPOSURE



Source: County of Riverside General Plan Noise Element, Table N-1.

3.4 CONSTRUCTION NOISE STANDARDS

To control noise impacts associated with the construction of the proposed Project, the County of Riverside has established limits to the hours of operation. Section 9.52.020 of the County's Noise Regulation ordinance indicates that noise associated with any private construction activity located within one-quarter of a mile from an inhabited dwelling is considered exempt between the hours of 6:00 a.m. and 6:00 p.m., during the months of June through September, and 7:00 a.m. and 6:00 p.m., during the months of October through May. (16) Neither the County's General Plan nor Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what CEQA constitutes a *substantial temporary or periodic noise increase*.

To evaluate whether the Project will generate potentially significant construction noise levels at off-site sensitive receiver locations, a construction-related noise level threshold is adopted from the *Criteria for Recommended Standard: Occupational Noise Exposure* prepared by the National Institute for Occupational Safety and Health (NIOSH). (17) A division of the U.S. Department of Health and Human Services, NIOSH identifies a noise level threshold based on the duration of exposure to the source. The construction related noise level threshold starts at 85 dBA for more than eight hours per day, and for every 3 dBA increase, the exposure time is cut in half. This results in noise level thresholds of 88 dBA for more than four hours per day, 92 dBA for more than one hour per day, 96 dBA for more than 30 minutes per day, and up to 100 dBA for more than 15 minutes per day. (17) For the purposes of this analysis, the lowest, more conservative construction noise level threshold of 85 dBA L_{eq} is used as an acceptable threshold for construction noise at the nearby sensitive receiver locations. Since this construction-related noise level threshold represents the energy average of the noise source over a given time, they are expressed as L_{eq} noise levels. Therefore, the noise level threshold of 85 dBA L_{eq} over a period of eight hours or more is used to evaluate the potential Project-related construction noise level impacts at the nearby sensitive receiver locations.

The Occupational Safety and Health Administration (OSHA) requires hearing protection be provided by employers in workplaces where the noise levels may, over long periods of exposure to high noise levels, endanger the hearing of their employees. Standard 29 CFR, Part 1910 indicates the noise levels under which a hearing conservation program is required to be provided to workers exposed to high noise levels. (10) This analysis does not evaluate the noise exposure of construction workers within the Project site based on CEQA requirements, and instead, evaluates the Project-related construction noise levels at the nearby sensitive receiver locations in the Project study area.

3.5 VIBRATION STANDARDS

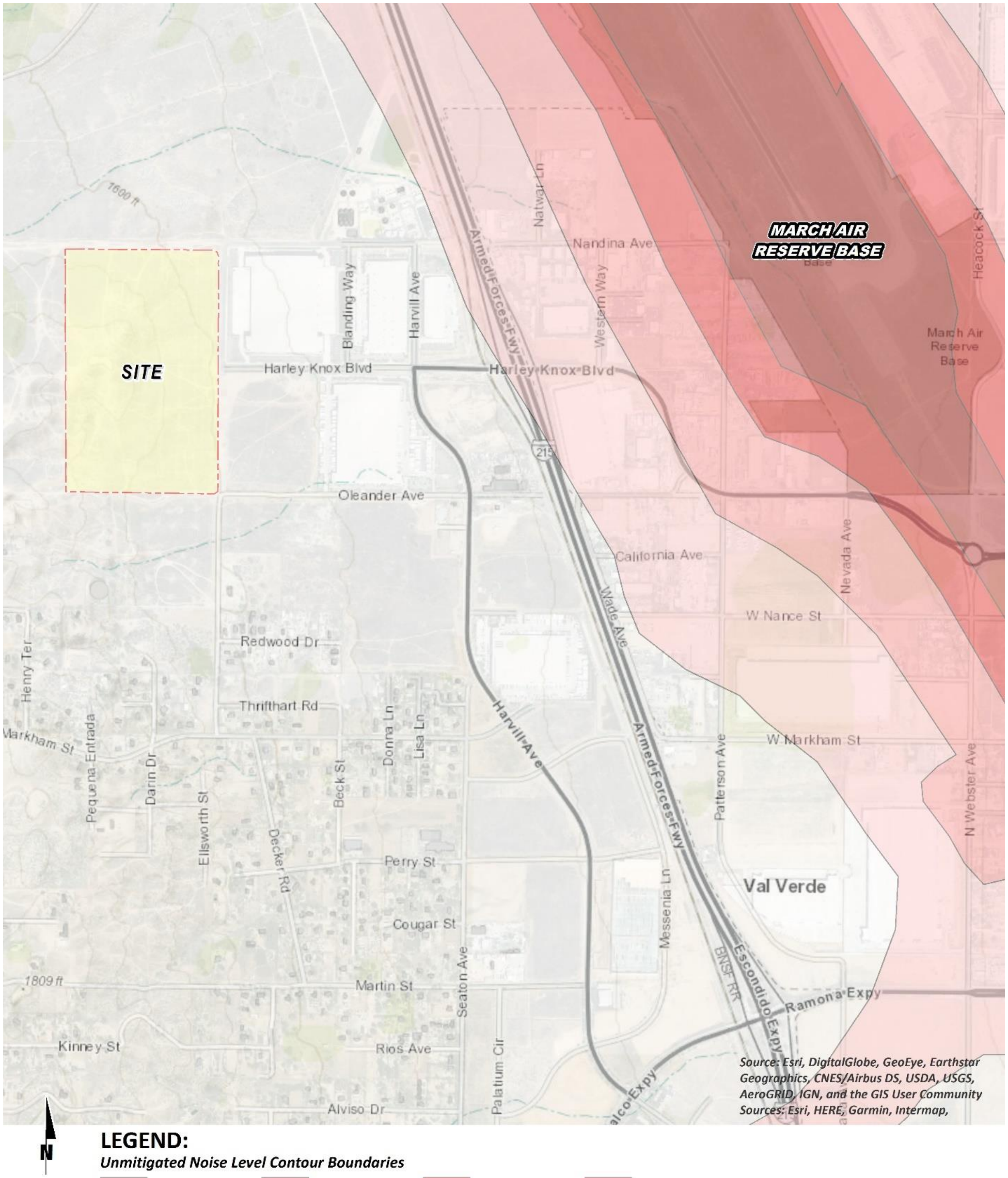
The County of Riverside does not have vibration standards for temporary construction, but the County's General Plan Noise Element does contain the human reaction to typical vibration levels. Vibration levels with peak particle velocity of 0.0787 inches per second are considered readily perceptible and above 0.1968 in/sec are considered annoying to people in buildings. Further, County of Riverside General Plan Policy N 16.3 identifies a motion velocity perception threshold for vibration due to passing trains of 0.01 inches per second (in/sec) over the range of one to 100 Hz, which is used in this noise study to assess potential impacts due to Project construction vibration levels. (15)

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

The March Air Reserve Base/Inland Port Airport (MARB/IPA) is located approximately one mile northeast of the Project site. The *March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan* (MARB/IPA LUCP) includes the policies for determining the land use compatibility of the Project. The MARB/IPA, Map MA-1, indicates that the Project site is located within Compatibility Zone C2, which Table MA-1 Compatibility Zone Factors indicates is considered to have a *moderate* noise impact. Further, the Project site is located outside of the 60 dBA CNEL noise level contour boundary. Moreover, the Basic Compatibility Criteria, listed in Table MA-2 of the MARB/IPA LUCP identifies no prohibited uses other than highly noise-sensitive outdoor nonresidential uses (e.g., sports stadiums, concert halls). (18) The MARB/IPA LUCP does not identify industrial-use specific noise compatibility standards, and therefore, the County of Riverside *Land Use Compatibility for Community Noise Exposure* matrix, previously discussed in Section 3.3, is used to assess potential aircraft-related noise levels at the Project site. The County of Riverside guidelines indicate that industrial uses, such as the Project, are considered *normally acceptable* with exterior noise levels of up to 70 dBA CNEL. (15)

The noise contour boundaries of MARB/IPA are presented on Exhibit 3-B of this report and show that the Project is considered *normally acceptable* land use since it is located outside of the 60 dBA CNEL contour. Further, Table MA-2 indicates that no uses are prohibited in this area except for highly noise-sensitive outdoor nonresidential uses (e.g., sports stadiums, concert halls).

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



LEGEND:

Unmitigated Noise Level Contour Boundaries

60 dBA CNEL | 65 dBA CNEL | 70 dBA CNEL | 75 dBA CNEL

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

3.7 BLASTING REGULATIONS

The blasting contractor is required to obtain blasting permit(s) from the State, and to notify Riverside County Sheriff's Department within 24 hours of planned blasting events. Further, blasting operations are required to satisfy the maximum airblast and vibration levels identified by the U.S. Bureau of Mines (USBM) and Office of Surface Mining and Reclamation Enforcement (OSMRE).

3.7.1 AIRBLAST LIMITS

The OSMRE *Blasting Performance Standards* (Chapter 30 of the Code of Federal Regulations) identifies the maximum air overpressure and vibration levels at the *location of any dwelling, public building, school, church, or community or institutional building.* (19) Section 816.64 indicates that blasting shall be restricted to between sunrise and sunset per OSMRE standards, *unless nighttime blasting is approved by the regulatory authority based upon a showing by the operator that the public will be protected from adverse noise and other impacts*. Section 816.67 identifies maximum airblast limits, in linear dB, based on different frequency levels. For this noise study, the lowest limit of 129 dB is used as a conservative threshold for analyzing blasting airblasts.

3.7.2 VIBRATION LIMITS

Vibration level limits are also identified in the OSMRE *Blasting Performance Standards*. Section 816.67(d)(2) identifies maximum vibration levels allowed at distance ranges from the blasting site. From zero to 300 feet, the maximum vibration level shall not exceed 1.25 inches per second (in/sec) PPV. Between 301 to 5,000 feet, maximum vibration levels shall not exceed 1.0 in/sec PPV, and at distances greater than 5,001 feet, the OSMRE maximum vibration level standard is 0.75 in/sec PPV. (19)

While additional blasting regulations can be imposed by the permitting agency, the OSMRE blasting regulations represent conservative thresholds for the purposes of this noise study to determine potential impacts related to blasting at nearby sensitive uses, based on the lowest OSMRE airblast limit of 129 dB, and 1.0 in/sec PPV for vibration, to present a conservative approach.

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. (20) 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 County of Riverside 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.

Other noise impacts of potential concern to the County (i.e., exposure to: railroad noise, highway noise, aircraft/airfield noise, and "other noise") are substantiated to be less-than-significant in the EIR Initial Study and are therefore not further evaluated here.

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.* (21)

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) (22) 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. (21) 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 NON-NOISE-SENSITIVE RECEIVERS

The County of Riverside General Plan Noise Element, Table N-1, *Land Use Compatibility for Community Noise Exposure* was used to establish the satisfactory noise levels of significance for non-noise-sensitive land uses in the Project study area. As previously shown on Exhibit 3-A, the *normally acceptable* exterior noise levels for non-noise-sensitive land uses is 70 dBA CNEL. Noise levels greater than 70 dBA CNEL are considered *conditionally acceptable* per the *Land Use Compatibility for Community Noise Exposure*. (15)

To determine if Project-related traffic noise level increases are significant at off-site non-noise-sensitive land uses, a *readily perceptible* 5 dBA and *barely perceptible* 3 dBA criteria were used. When the without Project noise levels at the non-noise-sensitive land uses are below the *normally acceptable* 70 dBA CNEL compatibility criteria, a *readily perceptible* 5 dBA or greater noise level increase is considered a significant impact. When the without Project noise levels are greater than the *normally acceptable* 70 dBA CNEL land use compatibility criteria, a *barely perceptible* 3 dBA or greater noise level increase is considered a significant impact since the noise level criteria is already exceeded. The noise level increases used to determine significant impacts for non-noise-sensitive land uses is generally consistent with the FICON noise level increase thresholds s for noise-sensitive land uses but instead rely on the County of Riverside General Plan

Noise Element, Table N-1, *Land Use Compatibility for Community Noise Exposure normally acceptable* 70 dBA CNEL exterior noise level criteria.

4.3 SIGNIFICANCE CRITERIA SUMMARY

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 4-2 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, etc.):
  - are less than 60 dBA CNEL and the Project creates a *readily perceptible* 5 dBA CNEL or greater Project-related noise level increase; or
  - range from 60 to 65 dBA CNEL and the Project creates a *barely perceptible* 3 dBA CNEL or greater Project-related noise level increase; or
  - already exceed 65 dBA CNEL, and the Project creates a community noise level increase of greater than 1.5 dBA CNEL (FICON, 1992).
- When the noise levels at existing and future non-noise-sensitive land uses (e.g., office, commercial, industrial):
  - are less than the County of Riverside General Plan Noise Element, Table N-1, *normally acceptable* 70 dBA CNEL and the Project creates a *readily perceptible* 5 dBA CNEL or greater Project related noise level increase; or
  - are greater than the County of Riverside General Plan Noise Element, Table N-1, *normally acceptable* 70 dBA CNEL and the Project creates a *barely perceptible* 3 dBA CNEL or greater Project noise level increase.

OPERATIONAL NOISE & VIBRATION

- If Project-related operational (stationary-source) noise levels exceed the exterior 65 dBA L_{eq} daytime or 45 dBA L_{eq} nighttime noise level standards at nearby sensitive receiver locations in the County of Riverside (County of Riverside General Plan Noise Element, Table N-2).
- If the existing ambient noise levels at the nearby noise-sensitive receivers near the Project site:
  - are less than 60 dBA L_{eq} and the Project creates a *readily perceptible* 5 dBA L_{eq} or greater Project-related noise level increase; or
  - range from 60 to 65 dBA L_{eq} and the Project creates a *barely perceptible* 3 dBA L_{eq} or greater Project-related noise level increase; or
  - already exceed 65 dBA L_{eq} and the Project creates a community noise level increase of greater than 1.5 dBA L_{eq} (FICON, 1992).
- If Project generated operational vibration levels exceed the County of Riverside vibration standard of 0.01 in/sec RMS at sensitive receiver locations (County of Riverside General Plan, Policy N 16.3).

CONSTRUCTION NOISE & VIBRATION

- If Project-related construction activities create noise levels which exceed the 85 dBA L_{eq} acceptable noise level threshold at the nearby sensitive receiver locations (NIOSH, Criteria for Recommended Standard: Occupational Noise Exposure);
- If short-term Project-generated construction vibration levels exceed the County of Riverside vibration standard of 0.01 in/sec RMS at sensitive receiver locations (County of Riverside General Plan Noise Element, Policy N 16.3).

TABLE 4-2: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Receiving Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site Traffic	Noise-Sensitive[1]	If ambient is < 60 dBA CNEL	≥ 5 dBA CNEL Project increase	
		If ambient is 60 - 65 dBA CNEL	≥ 3 dBA CNEL Project increase	
		If ambient is > 65 dBA CNEL	≥ 1.5 dBA CNEL Project increase	
	Non-Noise-Sensitive[1,2]	If ambient is < 70 dBA CNEL	≥ 5 dBA CNEL Project increase	
		If ambient is > 70 dBA CNEL	≥ 3 dBA CNEL Project increase	
Operational	Noise-Sensitive	Exterior Noise Level Standards[3]	65 dBA L_{eq}	45 dBA L_{eq}
		If ambient is < 60 dBA L_{eq}[1]	≥ 5 dBA L_{eq} Project increase	
		If ambient is 60 - 65 dBA L_{eq}[1]	≥ 3 dBA L_{eq} Project increase	
		If ambient is > 65 dBA L_{eq}[1]	≥ 1.5 dBA L_{eq} Project increase	
		Vibration Level Threshold[4]	0.01 in/sec RMS	
Construction	Noise-Sensitive	Noise Level Threshold[5]	85 dBA L_{eq}	
		Vibration Level Threshold[4]	0.01 in/sec RMS	

[1] Source: FICON, 1992.
[2] Source: County of Riverside General Plan Noise Element, Table N-1.
[3] Source: County of Riverside General Plan Noise Element, Table N-2.
[4] Source: County of Riverside General Plan Noise Element, Policy N 16.3.
[5] Acceptable threshold for construction noise based on the Criteria for Recommended Standard: Occupational Noise Exposure prepared by the National Institute for Occupational Safety and Health.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at six 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, May 29th, 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. (23)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (5) 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*. (3)

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. (3) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after Project noise levels and is necessary to assess potential noise impacts due to the Project's contribution to the ambient noise levels.

5.3 NOISE MEASUREMENT RESULTS

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

- Location L1 represents the noise levels on Nandina Avenue, west of the Project site, near existing residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 55.6 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 54.5 dBA L_{eq} with an average nighttime noise level of 46.3 dBA L_{eq}.
- Location L2 represents the noise levels on Kuder Avenue, west of the Project site, near existing rural-residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 56.3 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 55.4 dBA L_{eq} with an average nighttime noise level of 47.2 dBA L_{eq}.
- Location L3 represents the noise levels on Oleander Avenue, southwest of the Project site, near existing rural-residential homes. The 24-hour CNEL indicates that the overall exterior noise level is 65.9 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 56.2 dBA L_{eq} with an average nighttime noise level of 53.9 dBA L_{eq}.
- Location L4 represents the noise levels on Nance Street, southwest of the Project site, near existing rural-residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 60.9 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 56.2 dBA L_{eq} with an average nighttime noise level of 53.9 dBA L_{eq}.
- Location L5 represents the noise levels west of Decker Road, south of the Project site, near an existing Water Tank Reservoir. The 24-hour CNEL indicates that the overall exterior noise level is 57.8 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 55.7 dBA L_{eq} with an average nighttime noise level of 49.4 dBA L_{eq}.
- Location L6 represents the noise levels on Decker Road, south of the Project site, near existing rural-residential homes. The 24-hour CNEL indicates that the overall exterior noise level is 59.1 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 56.3 dBA L_{eq} with an average nighttime noise level of 50.8 dBA L_{eq}.

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

The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with I-215 and the MARB/IPA, in addition to background industrial land use activities. This includes the auto and heavy truck activities on study area roadway segments near the noise level measurement locations. The 24-hour existing noise level measurement results are shown on Table 5-1.

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

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]		CNEL
		Daytime	Nighttime	
L1	Located on Nandina Avenue, west of the Project site, near existing residential homes.	54.5	46.3	55.6
L2	Located on Kuder Avenue, west of the Project site, near existing rural-residential homes.	55.4	47.2	56.3
L3	Located on Oleander Avenue, southwest of the Project site, near existing rural-residential homes.	59.8	59.2	65.9
L4	Located on Nance Street, southwest of the Project site, near existing rural-residential homes.	56.2	53.9	60.9
L5	Located west of Decker Road, south of the Project site, near an existing Water Tank Reservoir.	55.7	49.4	57.8
L6	Located on Decker Road, south of the Project site, near existing rural-residential homes.	56.3	50.8	59.1

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

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

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 expected roadway noise level increases from vehicular traffic were calculated by Urban Crossroads, Inc. using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (24) 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. (25) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (26)

This methodology is consistent with the County of Riverside Office of Industrial Hygiene *Requirements for Determining and Mitigating Traffic Noise Impacts to Residential Structures*, which specifically requires the FHWA RD-77-108 model to be used in analysis within the County's jurisdiction. (27)

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 seven study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the County of Riverside General Plan Circulation Element, and the posted vehicle speeds. Where posted vehicle speeds are unavailable, the 40 mph speed identified in the County of Riverside Office of Industrial Hygiene Noise Study Guidelines is used. The ADT volumes used in this study are presented on Table 6-2 are based on the *Oleander Business Park Traffic Impact Analysis* prepared by Urban Crossroads, Inc., for the following traffic scenarios: Existing (2019) and Opening Year 2021. (2)

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Adjacent Planned (Existing if Different) Land Use[1]	Distance from Centerline to Nearest Adjacent Land Use (Feet)[2]	Vehicle Speed (mph)[3]
1	Harvill Av.	n/o Harley Knox Bl.	Light Industrial	59'	40
2	Harvill Av.	s/o Harley Knox Bl.	Light Industrial	59'	40
3	Nandina Av.	e/o Decker Rd.	Light Industrial (Vacant)	39'	40
4	Harley Knox Bl.	e/o Decker Rd.	Light Industrial (Vacant)	76'	45
5	Harley Knox Bl.	e/o Harvill Av.	Light Industrial (Vacant)	76'	45
6	Harley Knox Bl.	e/o I-215 NB Ramps	Light Industrial (Vacant)	76'	45
7	Oleander Av.	e/o Decker Rd.	Light Industrial (Vacant)	39'	40

[1] Source: Mead Valley Area Plan, Land Use Plan, Figure 3.
[2] Distance to adjacent land use is based upon the right-of-way distances for each functional roadway classification provided in the General Plan Circulation Element.
[3] Sources: Oleander Business Park Traffic Impact Analysis, prepared by Urban Crossroads, Inc. and the County of Riverside Office of Industrial Hygiene noise study guidelines.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes[1]			
			Existing 2019		Opening Year 2021	
			Without Project	With Project	Without Project	With Project
1	Harvill Av.	n/o Harley Knox Bl.	549	685	925	1,061
2	Harvill Av.	s/o Harley Knox Bl.	10,207	10,226	13,074	13,092
3	Nandina Av.	e/o Decker Rd.	n/a	236	159	295
4	Harley Knox Bl.	e/o Decker Rd.	n/a	1,193	1,691	2,784
5	Harley Knox Bl.	e/o Harvill Av.	10,880	12,128	16,678	17,925
6	Harley Knox Bl.	e/o I-215 NB Ramps	24,923	25,090	37,441	37,607
7	Oleander Av.	e/o Decker Rd.	n/a	236	1,651	1,787

[1] Source: Oleander Business Park Traffic Impact Analysis, Urban Crossroads, Inc.
"n/a" = The roadway segment has nominal volumes based on the Traffic Impact Analysis under the given scenario which are not adequate for without and with Project off-site traffic noise evaluation.

To quantify the off-site noise levels, the Project related truck trips were added to the heavy truck category in the FHWA noise prediction model. The addition of the Project related truck trips increases the percentage of heavy trucks in the vehicle mix. This approach recognizes that the FHWA noise prediction model is significantly influenced by the number of heavy trucks in the vehicle mix. Table 6-3 provides the time of day (daytime, evening, and nighttime) vehicle splits. The daily Project truck trip-ends were assigned to the individual off-site study area roadway segments based on the Project truck trip distribution percentages documented in the *Traffic Impact Analysis*. Using the Project truck trips in combination with the Project trip distribution, Urban Crossroads, Inc. calculated the number of additional Project truck trips and vehicle mix percentages for each of the study area roadway segments. Table 6-4 shows the traffic flow by vehicle type (vehicle mix) used for all without Project traffic scenarios, and Tables 6-5 to 6-6 show the vehicle mixes used for the with Project traffic scenarios. Due to the added Project truck trips, the increase in Project traffic volumes and the distributions of trucks on the study area road segments, the percentage of autos, medium trucks and heavy trucks will vary for each of the traffic scenarios. This explains why the existing and future traffic volumes and vehicle mixes vary between seemingly identical study area roadway segments.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

Vehicle Type	Time of Day Splits			Total of Time of Day Splits
	Daytime	Evening	Nighttime	
Autos	67.95%	8.88%	23.17%	100.00%
Medium Trucks	74.90%	4.86%	20.23%	100.00%
Heavy Trucks	69.19%	8.07%	22.74%	100.00%

Based on an existing vehicle count taken at Harvill Avenue and Harley Knox Boulevard (Oleander Business Park Traffic Impact Analysis, Urban Crossroads, Inc.). Vehicle mix percentage values rounded to the nearest one-hundredth.
"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

TABLE 6-4: WITHOUT PROJECT CONDITIONS VEHICLE MIX

Classification	Total % Traffic Flow			Total
	Autos	Medium Trucks	Heavy Trucks	
All Segments	85.75%	5.50%	8.75%	100.00%

Based on an existing vehicle count taken at Harvill Avenue and Harley Knox Boulevard (Oleander Business Park Traffic Impact Analysis, Urban Crossroads, Inc.). Vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-5: EXISTING WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Harvill Av.	n/o Harley Knox Bl.	83.18%	5.28%	11.54%	100.00%
2	Harvill Av.	s/o Harley Knox Bl.	85.59%	5.52%	8.89%	100.00%
3	Nandina Av.	e/o Decker Rd.	78.29%	4.87%	16.84%	100.00%
4	Harley Knox Bl.	e/o Decker Rd.	73.58%	4.74%	21.69%	100.00%
5	Harley Knox Bl.	e/o Harvill Av.	84.28%	5.43%	10.29%	100.00%
6	Harley Knox Bl.	e/o I-215 NB Ramps	85.77%	5.47%	8.75%	100.00%
7	Oleander Av.	e/o Decker Rd.	78.29%	4.87%	16.84%	100.00%

[1] Source: Oleander Business Park Traffic Impact Analysis, Urban Crossroads, Inc.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-6: OPENING YEAR WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Harvill Av.	n/o Harley Knox Bl.	84.09%	5.36%	10.55%	100.00%
2	Harvill Av.	s/o Harley Knox Bl.	85.63%	5.51%	8.86%	100.00%
3	Nandina Av.	e/o Decker Rd.	79.78%	5.00%	15.22%	100.00%
4	Harley Knox Bl.	e/o Decker Rd.	80.54%	5.17%	14.29%	100.00%
5	Harley Knox Bl.	e/o Harvill Av.	84.75%	5.45%	9.79%	100.00%
6	Harley Knox Bl.	e/o I-215 NB Ramps	85.77%	5.48%	8.75%	100.00%
7	Oleander Av.	e/o Decker Rd.	84.77%	5.41%	9.82%	100.00%

[1] Source: Oleander Business Park Traffic Impact Analysis, Urban Crossroads, Inc.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

6.3 CONSTRUCTION EQUIPMENT VIBRATION ASSESSMENT

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

However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 6-7. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential Project construction vibration levels using the following vibration assessment methods defined by the FTA. The FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 6-7: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

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

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

7 OFF-SITE TRANSPORTATION NOISE IMPACTS

To assess the off-site transportation CNEL noise level impacts associated with the proposed Project, noise contours were developed based on the *Oleander Business Park 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 present-day noise conditions, without and with the proposed Project.
- Opening Year 2021 Without / With Project:
    - This scenario below refers to the background noise conditions at future Year 2021 without and with the proposed Project plus ambient growth, 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 7-4 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 of the following timeframes: Existing (2019) and Opening Year 2021. Appendix 7.1 includes a summary of the traffic noise level contours for each of the traffic scenarios.

TABLE 7-1: EXISTING WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Harvill Av.	n/o Harley Knox Bl.	Light Industrial	59.4	RW	RW	RW
2	Harvill Av.	s/o Harley Knox Bl.	Light Industrial	72.1	81	175	377
3	Nandina Av.	e/o Decker Rd.	Light Industrial (Vacant)	n/a	n/a	n/a	n/a
4	Harley Knox Bl.	e/o Decker Rd.	Light Industrial (Vacant)	n/a	n/a	n/a	n/a
5	Harley Knox Bl.	e/o Harvill Av.	Light Industrial (Vacant)	72.1	104	224	483
6	Harley Knox Bl.	e/o I-215 NB Ramps	Light Industrial (Vacant)	75.7	181	390	840
7	Oleander Av.	e/o Decker Rd.	Light Industrial (Vacant)	n/a	n/a	n/a	n/a

[1] Source: Mead Valley Area Plan, Land Use Plan, Figure 3.
[2] 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.
"RW" = Location of the respective noise contour falls within the right-of-way of the road; "n/a" = The roadway segment has nominal volumes based on the Traffic Impact Analysis under the given scenario which are not adequate for without and with Project off-site traffic noise evaluation.

TABLE 7-2: EXISTING WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Harvill Av.	n/o Harley Knox Bl.	Light Industrial	61.2	RW	RW	71
2	Harvill Av.	s/o Harley Knox Bl.	Light Industrial	72.1	82	177	381
3	Nandina Av.	e/o Decker Rd.	Light Industrial (Vacant)	60.0	RW	RW	39
4	Harley Knox Bl.	e/o Decker Rd.	Light Industrial (Vacant)	65.4	RW	81	174
5	Harley Knox Bl.	e/o Harvill Av.	Light Industrial (Vacant)	73.0	121	260	559
6	Harley Knox Bl.	e/o I-215 NB Ramps	Light Industrial (Vacant)	75.7	182	392	844
7	Oleander Av.	e/o Decker Rd.	Light Industrial (Vacant)	60.0	RW	RW	39

[1] Source: Mead Valley Area Plan, Land Use Plan, Figure 3.
[2] 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.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-3: OPENING YEAR WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Harvill Av.	n/o Harley Knox Bl.	Light Industrial	61.7	RW	RW	76
2	Harvill Av.	s/o Harley Knox Bl.	Light Industrial	73.2	96	207	445
3	Nandina Av.	e/o Decker Rd.	Light Industrial (Vacant)	56.2	RW	RW	RW
4	Harley Knox Bl.	e/o Decker Rd.	Light Industrial (Vacant)	64.0	RW	RW	140
5	Harley Knox Bl.	e/o Harvill Av.	Light Industrial (Vacant)	73.9	138	298	643
6	Harley Knox Bl.	e/o I-215 NB Ramps	Light Industrial (Vacant)	77.4	237	511	1102
7	Oleander Av.	e/o Decker Rd.	Light Industrial (Vacant)	66.4	RW	48	103

[1] Source: Mead Valley Area Plan, Land Use Plan, Figure 3.
[2] 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.
"RW" = Location of the respective noise contour falls within the right-of-way of the road; "n/a" = The roadway segment does not exist under the given scenario.

TABLE 7-4: OPENING YEAR WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Harvill Av.	n/o Harley Knox Bl.	Light Industrial	62.8	RW	RW	91
2	Harvill Av.	s/o Harley Knox Bl.	Light Industrial	73.2	97	208	448
3	Nandina Av.	e/o Decker Rd.	Light Industrial (Vacant)	60.7	RW	RW	43
4	Harley Knox Bl.	e/o Decker Rd.	Light Industrial (Vacant)	67.7	RW	114	246
5	Harley Knox Bl.	e/o Harvill Av.	Light Industrial (Vacant)	74.6	153	329	709
6	Harley Knox Bl.	e/o I-215 NB Ramps	Light Industrial (Vacant)	77.4	238	513	1105
7	Oleander Av.	e/o Decker Rd.	Light Industrial (Vacant)	67.0	RW	53	115

[1] Source: Mead Valley Area Plan, Land Use Plan, Figure 3.
[2] 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.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

7.2 EXISTING CONDITIONS 2019 PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

An analysis of Existing 2019 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 Year 2021 cumulative conditions.

Table 7-1 shows the Existing 2019 without Project conditions CNEL noise levels. The Existing 2019 without Project exterior noise levels are expected to range from 59.4 to 75.7 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing 2019 with Project conditions will range from 60.0 to 75.7 dBA CNEL. Table 7-5 shows that the Project off-site traffic noise level increases are estimated at1.8 dBA CNEL on Harvill Avenue north of Harley Knox Boulevard and 1.0 dBA or less on the other six study area roadway segments

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

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)[1]			Noise-Sensitive Land Use?
			No Project	With Project	Project Addition	
1	Harvill Av.	n/o Harley Knox Bl.	59.4	61.2	1.8	No
2	Harvill Av.	s/o Harley Knox Bl.	72.1	72.1	0.1	No
3	Nandina Av.	e/o Decker Rd.	n/a	60.0	n/a	No
4	Harley Knox Bl.	e/o Decker Rd.	n/a	65.4	n/a	No
5	Harley Knox Bl.	e/o Harvill Av.	72.1	73.0	1.0	No
6	Harley Knox Bl.	e/o I-215 NB Ramps	75.7	75.7	0.0	No
7	Oleander Av.	e/o Decker Rd.	n/a	60.0	n/a	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. Values rounded to the nearest one-tenth.
"n/a" = The roadway segment has nominal volumes based on the Traffic Impact Analysis under the given scenario which are not adequate for without and with Project off-site traffic noise evaluation.

7.3 OPENING YEAR 2021 PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-3 presents the Opening Year 2021 without Project conditions CNEL noise levels. The EAC without Project exterior noise levels are expected to range from 56.2 to 77.4dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography.

Table 7-4 shows the Opening Year 2021 with Project conditions will range from 60.7 to 77.4dBA CNEL. Table 7-8 shows that the Project off-site traffic noise level increases of 4.5 dBA CNEL or less. Based on the significance criteria for off-site traffic noise presented in Table 4-2, land uses adjacent to the study area roadway segments would experience *less than significant* noise level impacts due to unmitigated Project-related traffic noise levels.

TABLE 7-6: UNMITIGATED OPENING YEAR 2021 WITH PROJECT TRAFFIC NOISE IMPACTS

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)[1]			Noise-Sensitive Land Use?	Threshold Exceeded?[2]
			No Project	With Project	Project Addition		
1	Harvill Av.	n/o Harley Knox Bl.	61.7	62.8	1.2	No	No
2	Harvill Av.	s/o Harley Knox Bl.	73.2	73.2	0.0	No	No
3	Nandina Av.	e/o Decker Rd.	56.2	60.7	4.5	No	No
4	Harley Knox Bl.	e/o Decker Rd.	64.0	67.7	3.7	No	No
5	Harley Knox Bl.	e/o Harvill Av.	73.9	74.6	0.6	No	No
6	Harley Knox Bl.	e/o I-215 NB Ramps	77.4	77.4	0.0	No	No
7	Oleander Av.	e/o Decker Rd.	66.4	67.0	0.7	No	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. Values rounded to the nearest one-tenth.
[2] Significance Criteria (Section 4).

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8 SENSITIVE RECEIVER LOCATIONS

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

Receiver locations are located in outdoor living areas (e.g., backyards) at 10 feet from any existing or proposed barriers or at the building façade, whichever is closer to the Project site, based on FHWA guidance, and consistent with additional guidance provided by Caltrans and the FTA, as previously described in Section 5.2. Sensitive receiver locations in the Project study area include residential 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 2,573 feet west of the Project site, R1 represents existing residential homes west of Day Street. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the existing residential homes located west of the Project site at roughly 2,012 feet, on the west side of Day Street. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents the existing residential homes on the north side of Old Oleander Avenue at approximately 2,006 feet west of the Project site. A 24-hour noise measurement near this location, L3, is used to describe the existing ambient noise environment.

R4: Location R4 represents the existing residential homes located roughly 1,702 feet southwest of the Project site, east of Day Street. A 24-hour noise measurement near this location, L4, is used to describe the existing ambient noise environment.

R5: Located approximately 1,764 feet southwest of the Project site, R5 represents existing residential homes on the east side of Day Street. A 24-hour noise measurement was taken near this location, L4, to describe the existing ambient noise environment.

R6: Location R6 represents the existing residential homes located southeast of the Project site at roughly 1,282 feet on Redwood Drive. A 24-hour noise measurement was taken near this location, L6, to describe the existing ambient noise environment.

EXHIBIT 8-A: SENSITIVE RECEIVER LOCATIONS

9 OPERATIONAL NOISE IMPACTS

This section analyzes the potential stationary-source operational noise impacts at the nearby receiver locations, identified in Section 8, resulting from operation of the proposed Oleander Business Park Project. Exhibit 9-A identifies the noise source locations used to assess the operational noise levels. Appendix 9.1 includes the detailed calculations for the Project operational noise levels presented in this section.

9.1 OPERATIONAL NOISE SOURCES

At the time this noise analysis was prepared, the future tenants of the proposed Project were unknown. The on-site Project-related noise sources are expected to include: idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements. This noise analysis is intended to describe noise level impacts associated with the expected typical 24-hour seven day per week operational activities at the Project site.

9.2 REFERENCE NOISE LEVELS

To estimate the Project operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. 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 idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements all operating continuously. These sources of noise activity will likely vary throughout the day.

9.2.1 MEASUREMENT PROCEDURES

The reference noise level measurements presented in this section were collected using a Larson Davis LxT Type 1 precisions sound level meter (serial number 01146). The LxT sound level meter was calibrated using a Larson-Davis calibrator, Model CAL 200, was programmed in "slow" mode to record noise levels in "A" weighted form and was located at approximately five feet above the ground elevation for each measurement. 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. (23)

9.2.2 TRUCK IDLING, DELIVERIES, BACKUP ALARMS, UNLOADING/LOADING, AND DOCKING

Short-term reference noise level measurements were collected on Wednesday, January 7th, 2015, by Urban Crossroads, Inc. at the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino. The noise level measurements represent the typical weekday dry goods logistics warehouse operation in a single building, of roughly 285,000 square feet, with a loading dock area on the western side of the building façade. Up to ten trucks were observed in the loading dock area including a combination of tractor trailer semi-trucks, two-axle delivery trucks, and background forklift operations.

The unloading/docking activity noise level measurement was taken over a fifteen-minute period and represents multiple noise sources taken from the center of loading dock activities generating a reference noise level of 62.8 dBA L_{eq} at a uniform reference distance of 50 feet. At this measurement location, the noise sources associated with employees unloading a docked truck container included the squeaking of the truck's shocks when weight was removed from the truck, employees playing music over a radio, as well as a forklift horn and backup alarm. In addition, during the noise level measurement a truck entered the loading dock area and proceeded to reverse and dock in a nearby loading bay, adding truck engine, idling, and air brakes noise, in addition to on-going idling of an already docked truck.

9.2.3 Entry Gate & Truck Movements

An entry gate and truck movements reference noise level measurement was taken at the southern entry gate of the Motivational Fulfillment & Logistics Services distribution facility over a 15-minute period and represents multiple noise sources producing a reference noise level of 56.0 dBA L_{eq} at 50 feet. The noise sources included at this measurement location account for the rattling and squeaking during normal opening and closing operations, the gate closure equipment, truck engines idling outside the entry gate, truck movements through the entry gate, and background truck court activities and forklift backup alarm noise.

9.2.4 Roof-Top Air Conditioning Units

To assess the impacts created by the roof-top air conditioning units at the Project buildings, reference noise levels measurements were taken over a four-day total duration at the Santee Walmart on July 27th, 2015. Located at 170 Town Center Parkway in the City of Santee, the noise level measurements describe mechanical roof-top air conditioning units on the roof of an existing Walmart store, with additional roof-top units operating in the background. The reference noise level represents Lennox SCA120 series 10-ton model packaged air conditioning units. At 5 feet from the closest roof-top air conditioning unit, the highest exterior noise level from all four days of the measurement period was measured at 77.2 dBA L_{eq}. Using the uniform reference distance of 50 feet, the noise level is 57.2 dBA L_{eq}. The operating conditions of the reference noise level measurement reflect peak summer cooling requirements with measured temperatures approaching 96 degrees Fahrenheit (°F) with average daytime temperatures of 82°F. The roof-top air condition units were observed to operate the most during the daytime hours for a total of 39 minutes per hour. The noise attenuation provided by a parapet wall is not reflected in this reference noise level measurement.

9.2.5 Parking Lot Vehicle Movements (Autos)

To determine the noise levels associated with parking lot vehicle movements, Urban Crossroads collected reference noise level measurements over a 24-hour period on May 17th, 2017 at the parking lot for the Panasonic Avionics Corporation in the City of Lake Forest. The peak hour of activity measured over the 24-hour noise level measurement period occurred between 12:00 p.m. to 1:00 p.m., or the typical lunch hour for employees working in the area. The measured reference noise level at 50 feet from parking lot vehicle movements was measured at 41.7 dBA L_{eq}. The parking lot noise levels are mainly due to cars pulling in and out of spaces during peak lunch hour activity and employees talking. Noise associated with parking lot vehicle movements is expected to operate for the entire hour (60 minutes).

TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source	Duration (hh:mm:ss)	Ref. Distance (Feet)	Noise Source Height (Feet)	Reference Noise Level (dBA L_{eq})	
				@ Ref. Dist.	@ 50 Feet
Truck Unloading/Docking Activity[1]	00:15:00	30'	8'	67.2	62.8
Entry Gate & Truck Movements[1]	00:15:00	20'	8'	64.0	56.0
Roof-Top Air Conditioning Units[2]	96:00:00	5'	5'	77.2	57.2
Parking Lot Vehicle Movements[3]	01:00:00	10'	5'	52.2	41.7

[1] Reference noise level measurements were collected from the existing operations of the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino on Wednesday, January 7, 2015.
[2] As measured by Urban Crossroads, Inc. on 7/27/2015 at the Santee Walmart located at 170 Town Center Parkway.
[3] As measured by Urban Crossroads, Inc. on 5/17/2017 at the Panasonic Avionics Corporation parking lot in the City of Lake Forest.

9.3 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed Project operations that include idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the Project site and the Project-related noise level increases that would be experienced at each of the sensitive receiver locations. 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. Table 9-2 shows the individual operational noise levels of each noise source at each of the nearby sensitive receiver locations. As indicated on Table 9-2, the Project-only operational noise levels will range from 30.0 to 34.5 dBA L_{eq} at the sensitive receiver locations. The Project operational noise level calculations do not account for any existing or planned noise barriers.

EXHIBIT 9-A: OPERATIONAL NOISE SOURCE LOCATIONS

LEGEND:

- Roof-Top Air Conditioning Unit
- Parking Lot Vehicle Movements
- Distribution/Warehouse Activity
- Entry Gate & Truck Movement Activity

TABLE 9-2: UNMITIGATED PROJECT-ONLY OPERATIONAL NOISE LEVELS

Receiver Location[1]	Noise Levels by Noise Source (dBA L_{eq})[2]				Combined Operational Noise Levels (dBA L_{eq})
	Truck Unloading/ Docking Activity	Entry Gate & Truck Movements	Roof-Top Air Conditioning Units	Parking Lot Vehicle Movements	
R1	28.4	21.6	21.4	15.7	30.0
R2	30.4	23.6	23.1	17.2	32.0
R3	30.6	23.8	23.2	17.2	32.2
R4	31.7	25.1	24.2	18.2	33.3
R5	30.9	24.8	24.1	18.0	32.7
R6	32.3	26.4	27.8	20.0	34.5

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

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level thresholds based on the County of Riverside exterior noise level standards at nearby noise-sensitive receiver locations. Table 9-3 shows the operational noise levels associated with Oleander Business Park Project will satisfy the County of Riverside 65 dBA L_{eq} daytime and 45 dBA L_{eq} nighttime exterior noise level standards at all nearby receiver locations. Therefore, the operational noise impacts are considered *less than significant*, at the nearby noise-sensitive receiver locations.

TABLE 9-3: UNMITIGATED OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Noise Level at Receiver Locations (dBA L_{eq})[2]	Threshold Exceeded?[3]	
		Daytime (65 dBA L_{eq})	Nighttime (45 dBA L_{eq})
R1	30.0	No	No
R2	32.0	No	No
R3	32.2	No	No
R4	33.3	No	No
R5	32.7	No	No
R6	34.5	No	No

[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 estimated Project operational noise levels meet 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.

9.4 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. (5) Instead, they must be logarithmically added using the following base equation:

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

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 9-4 and 9-5, respectively.

As indicated on Tables 9-4 and 9-5, the Project will generate an unmitigated daytime operational noise level increase of up to 0.0 dBA L_{eq} and an unmitigated nighttime operational noise level increase of up to 0.1 dBA L_{eq} at the nearby receiver locations. Since the Project-related operational noise level contributions 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 9-4: PROJECT DAYTIME NOISE LEVEL CONTRIBUTIONS

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Threshold[7]	Threshold Exceeded?[7]
R1	30.0	L1	54.5	54.5	0.0	5.0	No
R2	32.0	L2	55.4	55.4	0.0	5.0	No
R3	32.2	L3	59.8	59.8	0.0	5.0	No
R4	33.3	L4	56.2	56.2	0.0	5.0	No
R5	32.7	L4	56.2	56.2	0.0	5.0	No
R6	34.5	L6	56.3	56.3	0.0	5.0	No

[1] See Exhibit 9-A for the sensitive receiver locations.
[2] Total Project operational noise levels as shown on Table 9-3.
[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] Significance Criteria as defined in Section 4.

TABLE 9-5: PROJECT NIGHTTIME NOISE LEVEL CONTRIBUTIONS

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Threshold[7]	Threshold Exceeded?[7]
R1	30.0	L1	46.3	46.4	0.1	5.0	No
R2	32.0	L2	47.2	47.3	0.1	5.0	No
R3	32.2	L3	59.2	59.2	0.0	5.0	No
R4	33.3	L4	53.9	53.9	0.0	5.0	No
R5	32.7	L4	53.9	53.9	0.0	5.0	No
R6	34.5	L6	50.8	50.9	0.1	5.0	No

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

9.5 REFLECTION

Field studies conducted by the FHWA have shown that the reflection from barriers and buildings does not substantially increase noise levels. (28) If all the noise striking a structure was reflected back to a given receiving point, the increase would be theoretically limited to 3 dBA. Further, not all of the acoustical energy is reflected back to same point. Some of the energy would go over the structure, some is reflected to points other than the given receiving point, some is scattered by ground coverings (e.g., grass and other plants), and some is blocked by intervening structures and/or obstacles (e.g., the noise source itself). Additionally, some of the reflected energy is lost due to the longer path that the noise must travel. FHWA measurements made to quantify reflective increases in traffic noise have not shown an increase of greater than 1-2 dBA; an increase that is not perceptible to the average human ear.

9.6 OPERATIONAL VIBRATION IMPACTS

To assess the potential vibration impacts from truck haul trips associated with operational activities the County of Riverside threshold for vibration of 0.01 in/sec RMS is used. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement conditions.

According to the FTA *Transit Noise Impact and Vibration Assessment,* (29) trucks rarely create vibration that exceeds 70 VdB or 0.003 in/sec RMS (4) (unless there are bumps due to frequent potholes in the road. Trucks transiting on site will be travelling at very low speeds so it is expected that delivery truck vibration impacts at nearby homes will satisfy the County of Riverside vibration threshold of 0.01 in/sec RMS, and therefore, will be *less than significant*.

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10 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 10-A shows the construction noise source locations in relation to the nearby sensitive receiver locations previously described in Section 8.

10.1 CONSTRUCTION NOISE LEVELS

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

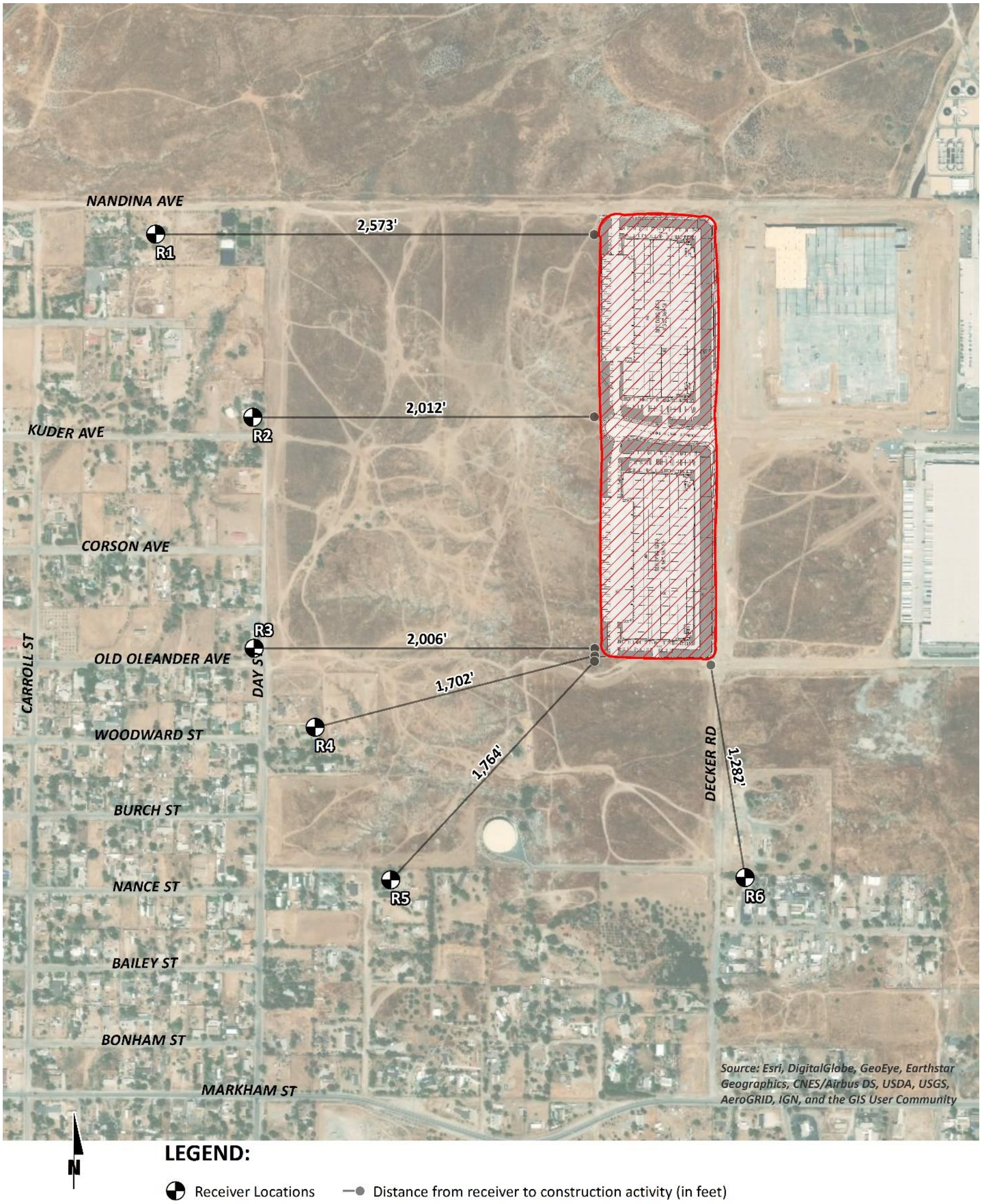
- Site Preparation
- Grading
- Building Construction
- Architectural Coating
- Paving
- Blasting

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 more than 80 dBA when measured at 50 feet. However, these noise levels diminish with distance from the construction site at a rate of 6 dBA per doubling of distance. For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver, and would be further reduced to 68 dBA at 200 feet from the source to the receiver. The construction stages are based on the *Oleander Business Park Air Quality Impact Analysis*. (30)

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 of 30 feet and 50 feet, all construction noise level measurements presented on Table 10-1 have been adjusted for consistency to describe a uniform reference distance of 50 feet.

EXHIBIT 10-A: CONSTRUCTION NOISE SOURCE LOCATIONS



LEGEND:

Receiver Locations — Distance from receiver to construction activity (in feet)

Construction Activity

TABLE 10-1: CONSTRUCTION REFERENCE NOISE LEVELS

ID	Noise Source	Duration (h:mm:ss)	Reference Distance From Source (Feet)	Reference Noise Levels @ Reference Distance (dBA L_{eq})	Reference Noise Levels @ 50 Feet (dBA L_{eq})[6]
1	Truck Pass-Bys & Dozer Activity[1]	0:01:15	30'	63.6	59.2
2	Dozer Activity[1]	0:01:00	30'	68.6	64.2
3	Construction Vehicle Maintenance Activities[2]	0:01:00	30'	71.9	67.5
4	Foundation Trenching[2]	0:01:01	30'	72.6	68.2
5	Rough Grading Activities[2]	0:05:00	30'	77.9	73.5
6	Framing[3]	0:02:00	30'	66.7	62.3
7	Dozer Pass-By[4]	0:00:32	30'	84.0	79.6
8	Concrete Mixer Truck Movements[5]	0:01:00	50'	71.2	71.2
9	Concrete Paver Activities[5]	0:01:00	30'	70.0	65.6
10	Concrete Mixer Pour & Paving Activities[5]	0:01:00	30'	70.3	65.9
11	Concrete Mixer Backup Alarms & Air Brakes[5]	0:00:20	50'	71.6	71.6
12	Concrete Mixer Pour Activities[5]	1:00:00	50'	67.7	67.7

[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] As measured by Urban Crossroads, Inc. on 10/30/15 during grading operations within an industrial construction site located in the City of Ontario.
[5] 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.
[6] 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

Using the reference construction equipment noise levels, calculations of the Project construction noise level impacts at the nearby sensitive receiver locations were completed. Tables 10-2 to 10-6 present the short-term construction noise levels for each stage of construction. Table 10-7 provides a summary of the construction noise levels by stage at the nearby noise-sensitive receiver locations. Based on the stages of construction, the noise impacts associated with the proposed Project are expected to create temporarily high noise levels at the nearby receiver locations. To assess the worst-case construction noise levels, this analysis shows the highest noise impacts when the equipment with the highest reference noise level is operating at the closest point from the edge of primary construction activity to each receiver location.

TABLE 10-2: SITE PREPARATION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Dozer Pass-By	79.6
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	79.6

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	2,573'	-34.2	0.0	45.4
R2	2,012'	-32.1	0.0	47.5
R3	2,006'	-32.1	0.0	47.5
R4	1,702'	-30.6	0.0	49.0
R5	1,764'	-31.0	0.0	48.6
R6	1,282'	-28.2	0.0	51.4

[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/berms in the Project study area.

TABLE 10-3: GRADING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Rough Grading Activities	73.5
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	73.5

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	2,573'	-34.2	0.0	39.3
R2	2,012'	-32.1	0.0	41.4
R3	2,006'	-32.1	0.0	41.4
R4	1,702'	-30.6	0.0	42.9
R5	1,764'	-31.0	0.0	42.5
R6	1,282'	-28.2	0.0	45.3

[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/berms in the Project study area.

TABLE 10-4: BUILDING CONSTRUCTION EQUIPMENT NOISE LEVELS

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

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	2,573'	-34.2	0.0	34.0
R2	2,012'	-32.1	0.0	36.1
R3	2,006'	-32.1	0.0	36.1
R4	1,702'	-30.6	0.0	37.6
R5	1,764'	-31.0	0.0	37.2
R6	1,282'	-28.2	0.0	40.0

[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/berms in the Project study area.

TABLE 10-5: ARCHITECTURAL COATING EQUIPMENT NOISE LEVELS

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

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	2,573'	-34.2	0.0	33.3
R2	2,012'	-32.1	0.0	35.4
R3	2,006'	-32.1	0.0	35.4
R4	1,702'	-30.6	0.0	36.9
R5	1,764'	-31.0	0.0	36.5
R6	1,282'	-28.2	0.0	39.3

[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/berms in the Project study area.

TABLE 10-6: PAVING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Concrete Mixer Truck Movements	71.2
Concrete Paver Activities	65.6
Concrete Mixer Pour & Paving Activities	65.9
Concrete Mixer Backup Alarms & Air Brakes	71.6
Concrete Mixer Pour Activities	67.7
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	71.6

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	2,573'	-34.2	0.0	37.4
R2	2,012'	-32.1	0.0	39.5
R3	2,006'	-32.1	0.0	39.5
R4	1,702'	-30.6	0.0	41.0
R5	1,764'	-31.0	0.0	40.6
R6	1,282'	-28.2	0.0	43.4

[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/berms in the Project study area.

10.4 CONSTRUCTION NOISE LEVEL COMPLIANCE

The construction noise analysis shows that the highest construction noise levels will occur when construction activities take place at the closest point from primary Project construction activity to each of the nearby receiver locations. As shown on Table 10-7, the unmitigated construction noise levels are expected to range from 33.2 to 51.4 dBA L_{eq} at the nearby receiver locations.

TABLE 10-7: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY (DBA L_{EQ})

Receiver Location[1]	Construction Noise Level (dBA L_{eq})					
	Site Preparation	Grading	Building Construction	Architectural Coating	Paving	Highest Activity Noise Levels[2]
R1	45.3	39.2	33.9	33.2	37.4	45.3
R2	47.5	41.4	36.1	35.4	39.5	47.5
R3	47.5	41.4	36.1	35.4	39.5	47.5
R4	48.9	42.8	37.5	36.8	41.0	48.9
R5	48.6	42.5	37.2	36.5	40.6	48.6
R6	51.4	45.3	40.0	39.3	43.4	51.4

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

To evaluate whether the Project will generate potentially significant short-term noise levels at off-site sensitive receiver locations a construction-related the NIOSH noise level threshold of 85 dBA L_{eq} is used as acceptable thresholds for construction noise at the nearby sensitive receiver locations. Table 10-8 shows the highest construction noise levels at the potentially impacted receiver locations are expected at 51.4 dBA L_{eq} or less and will satisfy the NIOSH 85 dBA L_{eq} significance threshold during temporary Project construction activities. The noise impact due to unmitigated Project construction noise levels is, therefore, considered a *less than significant* impact at all nearby sensitive receiver locations.

TABLE 10-8: CONSTRUCTION EQUIPMENT NOISE LEVEL COMPLIANCE (DBA L_{EQ})

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})		
	Highest Construction Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	45.3	85	No
R2	47.5	85	No
R3	47.5	85	No
R4	48.9	85	No
R5	48.6	85	No
R6	51.4	85	No

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Estimated construction noise levels during peak operating conditions, as shown on Table 10-7.
[3] Construction noise thresholds as shown on Table 4-2.
[4] Do the estimated Project construction noise levels satisfy the construction noise level threshold?

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. 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 6-7 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 10-9 presents the expected Project related vibration levels at the nearby receiver locations.

At distances ranging from 1,223 to 2,630 feet from Project construction activities, construction vibration velocity levels are estimated at 0.0002 in/sec RMS and will remain below the County of Riverside threshold of 0.01 in/sec RMS at all receiver locations, as shown on Table 10-9. Therefore, the Project-related vibration impacts are considered *less than significant* during the construction activities at the Project site.

Further, the Project-related construction vibration levels do not represent levels capable of causing building damage to nearby residential homes. The FTA identifies construction vibration levels capable of building damage ranging from 0.12 to 0.5 in/sec PPV. (3) The peak Project-construction vibration levels shown on Table 10-9, of 0.0002 in/sec PPV, are below the FTA vibration levels for building damage at the residential homes near the Project site. Moreover, the impacts at the site of the closest sensitive receivers are unlikely to be sustained during the entire construction period, but will occur rather only during the times that heavy construction equipment is operating adjacent to the Project site perimeter.

TABLE 10-9: PROJECT CONSTRUCTION VIBRATION LEVELS

Receiver[1]	Distance to Const. Activity (Feet)	Receiver PPV Levels (in/sec)[2]					Velocity Levels (in/sec) RMS[3]	Threshold (in/sec) RMS[4]	Threshold Exceeded?[5]
		Small Bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer	Peak Vibration			
R1	2,573'	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.01	No
R2	2,012'	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.01	No
R3	2,006'	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.01	No
R4	1,702'	0.0000	0.0001	0.0001	0.0002	0.0002	0.0001	0.01	No
R5	1,764'	0.0000	0.0001	0.0001	0.0002	0.0002	0.0001	0.01	No
R6	1,282'	0.0000	0.0001	0.0002	0.0002	0.0002	0.0002	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 6-7.
[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] Source: County of Riverside General Plan Noise Element, Policy N 16.3.
[5] Does the vibration level exceed the maximum acceptable vibration threshold?

10.6 BLASTING IMPACTS

Blasting may be required for hard rock areas within the Project site during construction. The blasting contractor is required to obtain blasting permit(s) from the State, and to notify Riverside County Sheriff's Department within 24 hours of planned blasting events.

Based on information provided by AMPCO Contracting, Inc., the maximum charge weight of blasts within the hard rock areas would depend on distance to nearby receivers, and range from 25 pounds at 200 feet, or 100 pounds at 400 feet, or 210 pounds at 600 feet. At the time of this analysis, the exact blasting locations were unknown, therefore, the Project construction activity distances from each receiver location previously shown on Exhibit 10-A are used to evaluate potential blasting impacts.

To calculate the worst-case airblast and vibration levels, this analysis uses the closest receiver distance of 1,282 feet at receiver location R6. The methodology used herein is provided in the International Society of Explosives Engineer's (ISEE's) *Blasters' Handbook*. (12) As previously discussed in Section 3.7, blasting activities are required to satisfy the maximum airblast and vibration levels identified by the USBM and OSMRE. For this analysis the lowest airblast limit of 129 dB is used a conservative threshold for airblast analysis. In addition, the vibration level limit of 1.0 in/sec PPV is used based on the distance from the potential blasting sites to nearby sensitive uses.

Since the actual specifications of each blast will vary in maximum charge weight, location, and other parameters required to calculate the actual airblast and vibration levels experienced at nearby sensitive receiver locations, this noise study describes potential impacts based on the worst-case maximum charge weight of 210 pounds at the worst-case blasting location of 1,282 feet from the potential blasting area limits.

At 1,282 feet from the worst-case blasting location closest to receiver location R6, airblasts are estimated at 119.4 dB, and vibration levels of 0.19 in/sec PPV. Therefore, the worst-case airblast and vibration levels at the closest sensitive receiver location will satisfy the airblast and vibration level thresholds of 129 dB and 1.0 in/sec PPV, respectively. The airblast and vibration calculations per ISEE guidance are provided in Appendix 10.1 based on information provided by the blasting contractor.

Further, the worst-case airblast and vibration levels do not include any additional attenuation provided by the existing topography (e.g., berms) and/or barriers between the Project and the nearby receiver locations, and therefore, may overstate airblast and vibration levels generated by Project blasting activities. At greater distances to the remaining sensitive receiver locations the airblast and vibration levels would be further reduced due to the additional attenuation provided by the added distance and intervening topography and structures in the Project study area.

Therefore, since the worst-case airblast and vibration levels at the closest receiver location would remain below the airblast and vibration level thresholds, Project-related blasting impacts are considered *less than significant.* In addition, the blasting contractor is required to design all blasts such that they remain below the thresholds identified by the USBM and OSMRE at the time of Project blasting activities and must satisfy the permitting requirements of the State and Riverside County Sheriff's Department. Therefore, impacts related to Project blasting activities are considered *less than significant*.

11 REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G.* 2018.
2. **Urban Crossroads, Inc.** *Oleander Business Park Traffic Impact Analysis.* May 2019.
3. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment.* September 2018.
4. **California Department of Transportation.** *Transportation and Construction Vibration Guidance Manual.* September 2019.
5. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
6. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March 1974. EPA/ONAC 550/9/74-004.
7. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* December 2011.
8. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
9. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.
10. **Occupational Safety and Health Administration.** *Standard 29 CRF, Part 1910.*
11. **California Department of Transportation.** *Transportation and Construction Vibration Guidance Manual.* September 2013.
12. **International Society of Explosives Engineer's.** *Blasters' Handbook, 18th Edition.* 2014.
13. **Office of Planning and Research.** *State of California General Plan Guidelines.* October 2017.
14. **State of California.** *2016 California Green Building Standards Code.* January 2017.
15. **County of Riverside.** *General Plan Noise Element.* December 2015.
16. —. *Municipal Code, Chapter 9.52 Noise Regulation.*
17. **National Institute for Occupational Safety and Health.** *Criteria for Recommended Standard: Occupational Noise Exposure.* June 1998.
18. **Riverside County Airport Land Use Commission.** *March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan.* November 2014.
19. **Office of Surface Mining Reclamation and Enforcement.** *Blasting Performance Standards, Code of Federal Regulations Chapter 30.*
20. **State of California.** *California Environmental Quality Act, Appendix G & Amendments and Additions to the State CEQA Guidelines.* 2019.
21. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
22. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.

23. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*

24. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.

25. **California Department of Transportation Environmental Program, Office of Environmental Engineering.** *Use of California Vehicle Noise Reference Energy Mean Emission Levels (Calveno REMELs) in FHWA Highway Traffic Noise Prediction.* September 1995. TAN 95-03.

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

27. **County of Riverside, Office of Industrial Hygiene.** *Requirements for Determining and Mitigating Traffic Noise Impacts to Residential Structures.* April 2015.

28. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* June, 1995.

29. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment.* September 2018.

30. **Urban Crossroads, Inc.** *Oleander Business Park Air Quality Impact Analysis.* June 2019.

12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Oleander Business Park 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.

Bill Lawson, P.E., INCE
Principal
URBAN CROSSROADS, INC.
260 E. Baker Street, Suite 200
Costa Mesa, CA 92626
(949) 336-5979
blawson@urbanxroads.com

EDUCATION

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

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

PROFESSIONAL REGISTRATIONS

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

PROFESSIONAL AFFILIATIONS

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

PROFESSIONAL CERTIFICATIONS

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

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APPENDIX 3.1:

COUNTY OF RIVERSIDE MUNICIPAL CODE

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9.52.010 - Intent.

At certain levels, sound becomes noise and may jeopardize the health, safety or general welfare of Riverside County residents and degrade their quality of life. Pursuant to its police power, the board of supervisors declares that noise shall be regulated in the manner described in this chapter. This chapter is intended to establish county-wide standards regulating noise. This chapter is not intended to establish thresholds of significance for the purpose of any analysis required by the California Environmental Quality Act and no such thresholds are established.

(Ord. 847 § 1, 2006)

9.52.020 - Exemptions.

Sound emanating from the following sources is exempt from the provisions of this chapter:

A. Facilities owned or operated by or for a governmental agency;
B. Capital improvement projects of a governmental agency;
C. The maintenance or repair of public properties;
D. Public safety personnel in the course of executing their official duties, including, but not limited to, sworn peace officers, emergency personnel and public utility personnel. This exemption includes, without limitation, sound emanating from all equipment used by such personnel, whether stationary or mobile;
E. Public or private schools and school-sponsored activities;
F. Agricultural operations on land designated "Agriculture" in the Riverside County general plan, or land zoned A-l (light agriculture), A-P (light agriculture with poultry), A-2 (heavy agriculture), A-D (agriculture-dairy) or C/V (citrus/vineyard), provided such operations are carried out in a manner consistent with accepted industry standards. This exemption includes, without limitation, sound emanating from all equipment used during such operations, whether stationary or mobile;
G. Wind energy conversion systems (WECS), provided such systems comply with the WECS noise provisions of Riverside County Ordinance No. 348;
H. Private construction projects located one-quarter of a mile or more from an inhabited dwelling;
I. Private construction projects located within one-quarter of a mile from an inhabited dwelling, provided that:
   1. Construction does not occur between the hours of six p.m. and six a.m. during the months of June through September, and
   2. Construction does not occur between the hours of six p.m. and seven a.m. during the months of October through May;
J. Property maintenance, including, but not limited to, the operation of lawnmowers, leaf blowers, etc., provided such maintenance occurs between the hours of seven a.m. and eight p.m.;
K. Motor vehicles, other than off-highway vehicles. This exemption does not include sound emanating from motor vehicle sound systems;
L. Heating and air conditioning equipment;
M. Safety, warning and alarm devices, including, but not limited to, house and car alarms, and other warning devices that are designed to protect the public health, safety, and welfare;
N. The discharge of firearms consistent with all state laws.

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APPENDIX 5.1:

STUDY AREA PHOTOS

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L1 East
33, 51' 57.740000", 117, 16' 57.360000"

L1 North
33, 51' 57.740000", 117, 16' 57.390000"

L1 South
33, 51' 57.740000", 117, 16' 57.470000"

L1 West
33, 51' 57.740000", 117, 16' 57.420000"

L2 East
33, 51' 44.410000", 117, 16' 44.700000"

L2 North
33, 51' 44.390000", 117, 16' 44.730000"

L2 South
33, 51' 44.390000", 117, 16' 44.700000"

L2 West
33, 51' 44.380000", 117, 16' 44.750000"

L3 East
33, 51' 31.680000", 117, 16' 48.080000"

L3 North
33, 51' 31.690000", 117, 16' 48.110000"

L3 South
33, 51' 31.680000", 117, 16' 48.130000"

L3 West
33, 51' 31.690000", 117, 16' 48.130000"

L4 East
33, 51' 19.770000", 117, 16' 37.590000"

L4 North
33, 51' 19.780000", 117, 16' 37.590000"

L4 South
33, 51' 19.760000", 117, 16' 37.590000"

L4 West
33, 51' 19.770000", 117, 16' 37.700000"

L5 East
33, 51' 19.910000", 117, 16' 23.660000"

L5 North
33, 51' 19.910000", 117, 16' 23.690000"

L5 South
33, 51' 19.980000", 117, 16' 23.690000"

L5 West
33, 51' 19.880000", 117, 16' 23.690000"

L6 East
33, 51' 23.890000", 117, 16' 12.340000"

L6 North
33, 51' 23.700000", 117, 16' 12.290000"

L6 South
33, 51' 23.930000", 117, 16' 12.340000"

L6 West
33, 51' 23.680000", 117, 16' 12.320000"

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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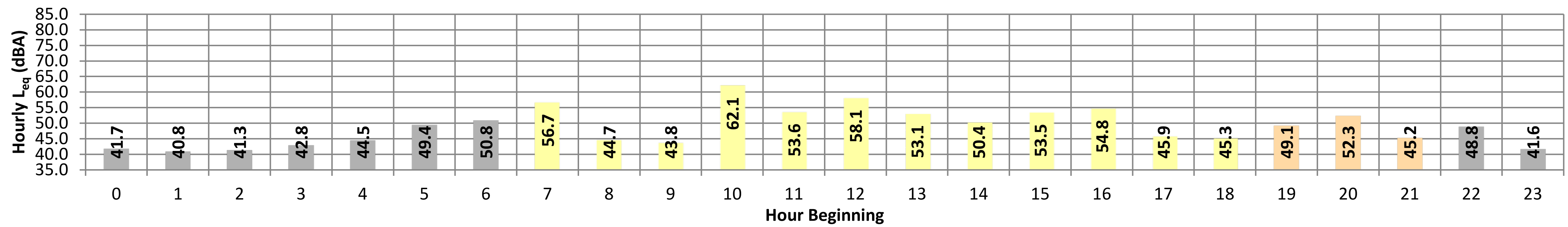
24-Hour Noise Level Measurement Summary

Date: Wednesday, May 29, 2019
Project: Oleander Business Park
Location: L1 - Located on Nandina Avenue, west of the Project site, near existing residential homes.
Meter: Piccolo I
JN: 10720
Analyst: R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	41.7	50.7	39.2	45.0	44.0	44.0	43.0	42.0	41.0	39.0	39.0	39.0	41.7	10.0	51.7
	1	40.8	54.7	38.8	46.0	43.0	42.0	41.0	41.0	39.0	39.0	39.0	39.0	40.8	10.0	50.8
	2	41.3	48.0	38.8	45.0	45.0	44.0	44.0	41.0	41.0	39.0	39.0	39.0	41.3	10.0	51.3
	3	42.8	48.6	39.4	45.0	44.0	44.0	44.0	43.0	42.0	41.0	41.0	40.0	42.8	10.0	52.8
	4	44.5	54.2	41.1	48.0	47.0	46.0	46.0	44.0	44.0	43.0	42.0	42.0	44.5	10.0	54.5
	5	49.4	74.2	39.4	60.0	56.0	50.0	49.0	47.0	45.0	42.0	41.0	40.0	49.4	10.0	59.4
	6	50.8	72.6	40.4	63.0	59.0	53.0	50.0	47.0	45.0	41.0	41.0	41.0	50.8	10.0	60.8
Day	7	56.7	83.1	39.1	67.0	61.0	51.0	48.0	43.0	41.0	39.0	39.0	39.0	56.7	0.0	56.7
	8	44.7	70.9	36.4	53.0	50.0	48.0	46.0	42.0	39.0	39.0	37.0	36.0	44.7	0.0	44.7
	9	43.8	66.7	36.4	52.0	49.0	46.0	44.0	40.0	39.0	38.0	36.0	36.0	43.8	0.0	43.8
	10	62.1	82.8	36.4	76.0	74.0	66.0	62.0	49.0	43.0	38.0	36.0	36.0	62.1	0.0	62.1
	11	53.6	77.7	36.4	64.0	57.0	50.0	46.0	41.0	39.0	36.0	36.0	36.0	53.6	0.0	53.6
	12	58.1	80.2	36.4	73.0	67.0	56.0	51.0	43.0	39.0	36.0	36.0	36.0	58.1	0.0	58.1
	13	53.1	79.2	36.4	59.0	53.0	49.0	47.0	43.0	41.0	37.0	36.0	36.0	53.1	0.0	53.1
	14	50.4	72.7	36.4	63.0	57.0	51.0	49.0	45.0	42.0	39.0	37.0	36.0	50.4	0.0	50.4
	15	53.5	82.0	36.4	65.0	60.0	52.0	48.0	43.0	40.0	36.0	36.0	36.0	53.5	0.0	53.5
	16	54.8	82.4	36.4	63.0	56.0	49.0	48.0	43.0	41.0	36.0	36.0	36.0	54.8	0.0	54.8
	17	45.9	69.6	36.4	54.0	51.0	48.0	47.0	44.0	41.0	38.0	36.0	36.0	45.9	0.0	45.9
	18	45.3	70.0	36.4	55.0	51.0	47.0	45.0	42.0	39.0	36.0	36.0	36.0	45.3	0.0	45.3
Evening	19	49.1	68.4	36.4	61.0	59.0	54.0	52.0	45.0	41.0	39.0	39.0	36.0	49.1	5.0	54.1
	20	52.3	78.8	39.2	61.0	55.0	51.0	50.0	44.0	42.0	39.0	39.0	39.0	52.3	5.0	57.3
	21	45.2	72.7	39.0	49.0	47.0	45.0	45.0	43.0	42.0	39.0	39.0	39.0	45.2	5.0	50.2
Night	22	48.8	80.1	39.1	51.0	49.0	46.0	45.0	43.0	41.0	39.0	39.0	39.0	48.8	10.0	58.8
	23	41.6	63.4	36.4	46.0	43.0	42.0	42.0	41.0	39.0	36.0	36.0	36.0	41.6	10.0	51.6

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	43.8	66.7	36.4	52.0	49.0	46.0	44.0	40.0	39.0	36.0	36.0	36.0
	Max	62.1	83.1	39.1	76.0	74.0	66.0	62.0	49.0	43.0	39.0	39.0	39.0
Energy Average		55.2	Average:		62.0	57.2	51.1	48.4	43.2	40.3	37.3	36.4	36.3
Evening	Min	45.2	68.4	36.4	49.0	47.0	45.0	45.0	43.0	41.0	39.0	39.0	36.0
	Max	52.3	78.8	39.2	61.0	59.0	54.0	52.0	45.0	42.0	39.0	39.0	39.0
Energy Average		49.8	Average:		57.0	53.7	50.0	49.0	44.0	41.7	39.0	39.0	38.0
Night	Min	40.8	48.0	36.4	45.0	43.0	42.0	41.0	41.0	39.0	36.0	36.0	36.0
	Max	50.8	80.1	41.1	63.0	59.0	53.0	50.0	47.0	45.0	43.0	42.0	42.0
Energy Average		46.3	Average:		49.9	47.8	45.7	44.9	43.2	41.9	39.9	39.7	39.4

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
52.8	54.5	46.3

24-Hour CNEL (dBA)
55.6

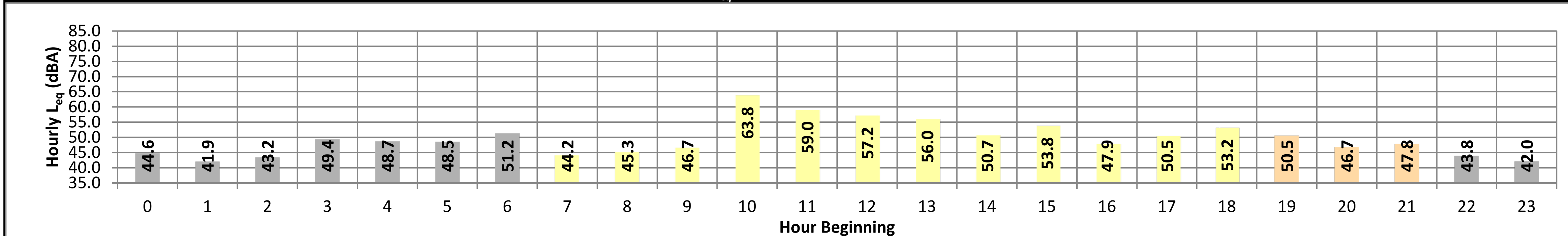
URBAN CROSSROADS

U:\UcJobs_10600-11000_10700\10720\Fieldwork\10720_L1_Summary

24-Hour Noise Level Measurement Summary

Date: Wednesday, May 29, 2019
Project: Oleander Business Park
Location: L2 - Located on Kuder Avenue, west of the Project site, near existing rural-residential homes.
Meter: Piccolo I
JN: 10720
Analyst: R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	44.6	52.4	40.4	48.0	47.0	46.0	46.0	45.0	44.0	42.0	42.0	41.0	44.6	10.0	54.6
	1	41.9	50.3	38.6	46.0	45.0	44.0	43.0	42.0	41.0	40.0	40.0	39.0	41.9	10.0	51.9
	2	43.2	59.1	40.1	47.0	46.0	45.0	44.0	43.0	42.0	41.0	40.0	40.0	43.2	10.0	53.2
	3	49.4	74.4	42.7	61.0	56.0	50.0	48.0	45.0	44.0	43.0	43.0	43.0	49.4	10.0	59.4
	4	48.7	69.5	42.0	61.0	56.0	49.0	47.0	45.0	44.0	43.0	43.0	42.0	48.7	10.0	58.7
	5	48.5	68.1	41.5	55.0	53.0	51.0	50.0	49.0	47.0	43.0	43.0	42.0	48.5	10.0	58.5
	6	51.2	68.2	43.3	61.0	59.0	55.0	53.0	50.0	48.0	45.0	44.0	44.0	51.2	10.0	61.2
Day	7	44.2	56.4	39.4	51.0	50.0	47.0	46.0	44.0	43.0	40.0	40.0	40.0	44.2	0.0	44.2
	8	45.3	67.4	38.5	55.0	52.0	49.0	47.0	43.0	41.0	40.0	39.0	38.0	45.3	0.0	45.3
	9	46.7	67.8	38.5	58.0	55.0	50.0	47.0	43.0	40.0	38.0	38.0	38.0	46.7	0.0	46.7
	10	63.8	84.4	38.6	78.0	74.0	68.0	64.0	52.0	45.0	40.0	40.0	39.0	63.8	0.0	63.8
	11	59.0	85.9	38.5	72.0	67.0	57.0	54.0	49.0	44.0	40.0	39.0	38.0	59.0	0.0	59.0
	12	57.2	78.6	38.6	72.0	66.0	59.0	56.0	49.0	46.0	41.0	40.0	40.0	57.2	0.0	57.2
	13	56.0	81.1	39.8	60.0	56.0	50.0	49.0	46.0	44.0	41.0	40.0	40.0	56.0	0.0	56.0
	14	50.7	74.5	39.4	61.0	57.0	53.0	51.0	48.0	45.0	42.0	41.0	40.0	50.7	0.0	50.7
	15	53.8	77.7	38.5	67.0	63.0	53.0	49.0	46.0	43.0	40.0	40.0	38.0	53.8	0.0	53.8
	16	47.9	67.1	39.8	57.0	53.0	51.0	50.0	47.0	44.0	41.0	41.0	40.0	47.9	0.0	47.9
	17	50.5	75.1	38.6	58.0	54.0	50.0	49.0	45.0	43.0	41.0	40.0	40.0	50.5	0.0	50.5
	18	53.2	72.8	38.6	67.0	64.0	56.0	53.0	47.0	44.0	41.0	40.0	39.0	53.2	0.0	53.2
Evening	19	50.5	68.8	39.3	62.0	60.0	56.0	53.0	47.0	44.0	41.0	41.0	40.0	50.5	5.0	55.5
	20	46.7	57.7	40.3	54.0	53.0	51.0	50.0	46.0	44.0	42.0	41.0	41.0	46.7	5.0	51.7
	21	47.8	70.0	41.2	57.0	51.0	49.0	47.0	45.0	44.0	42.0	42.0	41.0	47.8	5.0	52.8
Night	22	43.8	58.3	40.3	48.0	46.0	46.0	45.0	44.0	43.0	41.0	41.0	40.0	43.8	10.0	53.8
	23	42.0	56.2	35.6	48.0	46.0	44.0	43.0	42.0	41.0	38.0	38.0	38.0	42.0	10.0	52.0

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	44.2	56.4	38.5	51.0	50.0	47.0	46.0	43.0	40.0	38.0	38.0	38.0
	Max	63.8	85.9	39.8	78.0	74.0	68.0	64.0	52.0	46.0	42.0	41.0	40.0
Energy Average		56.2	Average:		63.0	59.3	53.6	51.3	46.6	43.5	40.4	39.8	39.2
Evening	Min	46.7	57.7	39.3	54.0	51.0	49.0	47.0	45.0	44.0	41.0	41.0	40.0
	Max	50.5	70.0	41.2	62.0	60.0	56.0	53.0	47.0	44.0	42.0	42.0	41.0
Energy Average		48.6	Average:		57.7	54.7	52.0	50.0	46.0	44.0	41.7	41.3	40.7
Night	Min	41.9	50.3	35.6	46.0	45.0	44.0	43.0	42.0	41.0	38.0	38.0	38.0
	Max	51.2	74.4	43.3	61.0	59.0	55.0	53.0	50.0	48.0	45.0	44.0	44.0
Energy Average		47.2	Average:		52.8	50.4	47.8	46.6	45.0	43.8	41.8	41.6	41.0

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
53.7	55.4	47.2

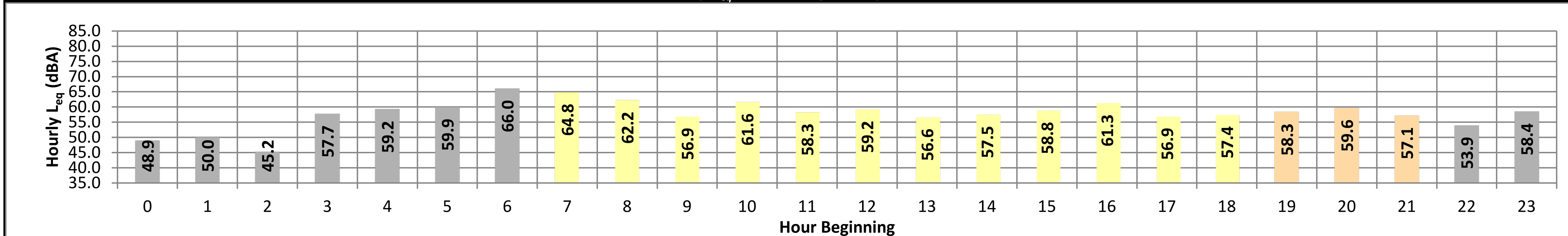
24-Hour CNEL (dBA)
56.3

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Wednesday, May 29, 2019
Project: Oleander Business Park
Location: L3 - Located on Oleander Avenue, southwest of the Project site, near existing rural-residential homes.
Meter: Piccolo I
JN: 10720
Analyst: R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	*Hour*	*L_{eq}*	*L_{max}*	*L_{min}*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*	*L_{eq}*	*Adj.*	*Adj. L_{eq}*
Night	0	48.9	77.0	40.2	56.0	50.0	44.0	43.0	42.0	41.0	40.0	40.0	40.0	48.9	10.0	58.9
	1	50.0	77.8	39.1	55.0	52.0	49.0	48.0	44.0	41.0	40.0	39.0	39.0	50.0	10.0	60.0
	2	45.2	73.6	39.3	49.0	47.0	45.0	44.0	42.0	41.0	40.0	40.0	40.0	45.2	10.0	55.2
	3	57.7	87.7	41.5	69.0	63.0	51.0	48.0	45.0	44.0	43.0	42.0	42.0	57.7	10.0	67.7
	4	59.2	89.3	42.3	69.0	63.0	56.0	55.0	52.0	49.0	45.0	44.0	43.0	59.2	10.0	69.2
	5	59.9	84.6	43.8	74.0	70.0	61.0	58.0	53.0	50.0	47.0	46.0	45.0	59.9	10.0	69.9
	6	66.0	88.7	44.0	77.0	75.0	73.0	71.0	56.0	50.0	46.0	46.0	45.0	66.0	10.0	76.0
Day	7	64.8	85.2	40.2	76.0	75.0	72.0	70.0	57.0	48.0	44.0	43.0	41.0	64.8	0.0	64.8
	8	62.2	85.2	39.3	74.0	72.0	68.0	64.0	51.0	45.0	41.0	41.0	40.0	62.2	0.0	62.2
	9	56.9	76.9	37.5	71.0	68.0	60.0	55.0	46.0	42.0	39.0	39.0	38.0	56.9	0.0	56.9
	10	61.6	83.3	37.6	74.0	72.0	67.0	64.0	51.0	45.0	40.0	40.0	39.0	61.6	0.0	61.6
	11	58.3	80.9	37.6	72.0	69.0	63.0	59.0	49.0	44.0	40.0	39.0	39.0	58.3	0.0	58.3
	12	59.2	76.6	39.4	72.0	69.0	65.0	62.0	56.0	48.0	43.0	42.0	41.0	59.2	0.0	59.2
	13	56.6	80.0	39.3	70.0	67.0	61.0	56.0	47.0	44.0	41.0	40.0	40.0	56.6	0.0	56.6
	14	57.5	80.4	39.5	70.0	68.0	63.0	59.0	50.0	46.0	43.0	42.0	40.0	57.5	0.0	57.5
	15	58.8	83.9	39.3	71.0	69.0	64.0	61.0	50.0	45.0	42.0	41.0	40.0	58.8	0.0	58.8
	16	61.3	86.5	40.1	73.0	70.0	67.0	64.0	51.0	46.0	42.0	42.0	41.0	61.3	0.0	61.3
	17	56.9	76.2	41.5	70.0	68.0	63.0	58.0	50.0	47.0	44.0	43.0	42.0	56.9	0.0	56.9
	18	57.4	77.2	40.2	71.0	69.0	62.0	57.0	49.0	47.0	43.0	43.0	42.0	57.4	0.0	57.4
Evening	19	58.3	84.1	40.4	71.0	69.0	63.0	59.0	51.0	46.0	42.0	42.0	41.0	58.3	5.0	63.3
	20	59.6	87.3	40.3	72.0	69.0	62.0	59.0	48.0	44.0	41.0	41.0	40.0	59.6	5.0	64.6
	21	57.1	84.1	39.3	70.0	66.0	57.0	52.0	45.0	42.0	40.0	40.0	39.0	57.1	5.0	62.1
Night	22	53.9	77.2	39.1	68.0	63.0	52.0	49.0	43.0	41.0	40.0	39.0	39.0	53.9	10.0	63.9
	23	58.4	91.2	37.6	63.0	56.0	47.0	45.0	41.0	40.0	39.0	38.0	37.0	58.4	10.0	68.4

Timeframe	*Hour*	*L_{eq}*	*L_{max}*	*L_{min}*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	56.6	76.2	37.5	70.0	67.0	60.0	55.0	46.0	42.0	39.0	39.0	38.0
	Max	64.8	86.5	41.5	76.0	75.0	72.0	70.0	57.0	48.0	44.0	43.0	42.0
Energy Average		60.1	Average:		72.0	69.7	64.6	60.8	50.6	45.6	41.8	41.3	40.3
Evening	Min	57.1	84.1	39.3	70.0	66.0	57.0	52.0	45.0	42.0	40.0	40.0	39.0
	Max	59.6	87.3	40.4	72.0	69.0	63.0	59.0	51.0	46.0	42.0	42.0	41.0
Energy Average		58.5	Average:		71.0	68.0	60.7	56.7	48.0	44.0	41.0	41.0	40.0
Night	Min	45.2	73.6	37.6	49.0	47.0	44.0	43.0	41.0	40.0	39.0	38.0	37.0
	Max	66.0	91.2	44.0	77.0	75.0	73.0	71.0	56.0	50.0	47.0	46.0	45.0
Energy Average		59.2	Average:		64.4	59.9	53.1	51.2	46.4	44.1	42.2	41.6	41.1

L_{eq} (dBA)		
24-Hour	*Daytime*	*Nighttime*
59.6	**59.8**	**59.2**

24-Hour CNEL (dBA)
65.9

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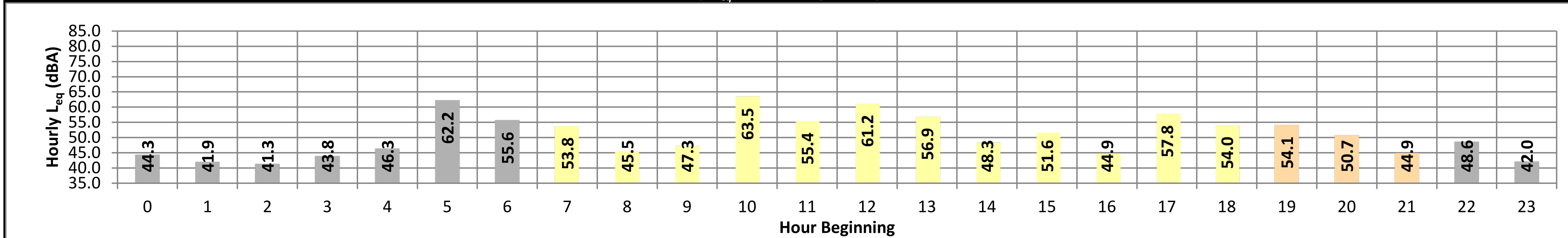
URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Wednesday, May 29, 2019 *Location:* L4 - Located on Nance Street, southwest of the Project site, near existing rural-residential homes. *Meter:* Piccolo I *JN:* 10720
Project: Oleander Business Park *Analyst:* R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	44.3	65.3	40.7	48.0	47.0	45.0	45.0	44.0	43.0	42.0	42.0	41.0	44.3	10.0	54.3
	1	41.9	60.2	38.9	44.0	43.0	43.0	43.0	42.0	41.0	39.0	39.0	39.0	41.9	10.0	51.9
	2	41.3	44.8	39.0	43.0	43.0	42.0	42.0	41.0	40.0	40.0	40.0	39.0	41.3	10.0	51.3
	3	43.8	54.1	40.6	47.0	46.0	45.0	45.0	44.0	43.0	42.0	42.0	40.0	43.8	10.0	53.8
	4	46.3	56.9	42.6	52.0	51.0	50.0	49.0	47.0	45.0	43.0	43.0	43.0	46.3	10.0	56.3
	5	62.2	88.1	44.1	75.0	65.0	56.0	53.0	49.0	47.0	46.0	45.0	44.0	62.2	10.0	72.2
	6	55.6	79.5	42.8	68.0	63.0	55.0	53.0	51.0	49.0	47.0	46.0	45.0	55.6	10.0	65.6
Day	7	53.8	79.3	40.0	62.0	56.0	52.0	50.0	47.0	45.0	42.0	41.0	40.0	53.8	0.0	53.8
	8	45.5	59.8	38.9	54.0	53.0	51.0	49.0	45.0	42.0	39.0	39.0	39.0	45.5	0.0	45.5
	9	47.3	68.5	37.7	58.0	55.0	51.0	49.0	44.0	42.0	39.0	39.0	38.0	47.3	0.0	47.3
	10	63.5	84.1	38.6	77.0	73.0	68.0	64.0	51.0	45.0	40.0	39.0	39.0	63.5	0.0	63.5
	11	55.4	77.1	36.0	67.0	65.0	62.0	58.0	46.0	41.0	38.0	37.0	36.0	55.4	0.0	55.4
	12	61.2	83.4	36.8	71.0	68.0	67.0	66.0	59.0	50.0	40.0	39.0	38.0	61.2	0.0	61.2
	13	56.9	82.8	38.4	67.0	61.0	51.0	48.0	44.0	42.0	39.0	39.0	39.0	56.9	0.0	56.9
	14	48.3	70.7	38.8	57.0	55.0	51.0	50.0	46.0	43.0	40.0	39.0	39.0	48.3	0.0	48.3
	15	51.6	78.5	37.0	61.0	57.0	51.0	48.0	44.0	42.0	39.0	39.0	38.0	51.6	0.0	51.6
	16	44.9	59.8	37.8	54.0	52.0	49.0	48.0	44.0	42.0	39.0	39.0	38.0	44.9	0.0	44.9
	17	57.8	86.9	38.9	67.0	65.0	60.0	57.0	49.0	45.0	41.0	41.0	40.0	57.8	0.0	57.8
	18	54.0	79.3	38.0	67.0	64.0	56.0	51.0	46.0	43.0	40.0	39.0	39.0	54.0	0.0	54.0
Evening	19	54.1	76.9	39.0	67.0	62.0	56.0	53.0	47.0	44.0	41.0	40.0	39.0	54.1	5.0	59.1
	20	50.7	68.7	40.7	63.0	61.0	57.0	52.0	46.0	43.0	42.0	41.0	40.0	50.7	5.0	55.7
	21	44.9	56.1	40.6	51.0	50.0	48.0	47.0	45.0	43.0	42.0	41.0	40.0	44.9	5.0	49.9
Night	22	48.6	77.5	39.0	59.0	54.0	47.0	46.0	44.0	43.0	41.0	40.0	40.0	48.6	10.0	58.6
	23	42.0	52.7	38.8	47.0	46.0	44.0	43.0	42.0	41.0	39.0	39.0	39.0	42.0	10.0	52.0

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	44.9	59.8	36.0	54.0	52.0	49.0	48.0	44.0	41.0	38.0	37.0	36.0
	Max	63.5	86.9	40.0	77.0	73.0	68.0	66.0	59.0	50.0	42.0	41.0	40.0
Energy Average		56.9	Average:		63.5	60.3	55.8	53.2	47.1	43.5	39.7	39.2	38.6
Evening	Min	44.9	56.1	39.0	51.0	50.0	48.0	47.0	45.0	43.0	41.0	40.0	39.0
	Max	54.1	76.9	40.7	67.0	62.0	57.0	53.0	47.0	44.0	42.0	41.0	40.0
Energy Average		51.3	Average:		60.3	57.7	53.7	50.7	46.0	43.3	41.7	40.7	39.7
Night	Min	41.3	44.8	38.8	43.0	43.0	42.0	42.0	41.0	40.0	39.0	39.0	39.0
	Max	62.2	88.1	44.1	75.0	65.0	56.0	53.0	51.0	49.0	47.0	46.0	45.0
Energy Average		53.9	Average:		53.7	50.9	47.4	46.6	44.9	43.6	42.1	41.8	41.1

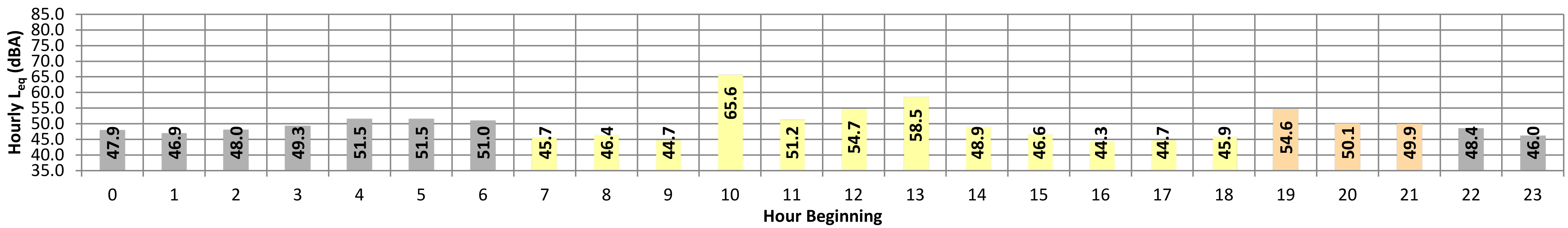
L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
55.5	56.2	53.9
24-Hour CNEL (dBA)		
60.9		

U:\UcJobs_10600-11000_10700\10720\Fieldwork\10720_L4_Summary

24-Hour Noise Level Measurement Summary

Date: Wednesday, May 29, 2019 | *Location:* L5 - Located west of Decker Road, south of the Project site, near an existing Water Tank Reservoir. | *Meter:* Piccolo I | *JN:* 10720
Project: Oleander Business Park | *Analyst:* R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	47.9	54.0	44.0	51.0	51.0	50.0	50.0	48.0	47.0	45.0	45.0	44.0	47.9	10.0	57.9
	1	46.9	53.7	43.3	49.0	49.0	48.0	48.0	47.0	46.0	45.0	44.0	44.0	46.9	10.0	56.9
	2	48.0	55.4	43.9	51.0	51.0	50.0	49.0	48.0	47.0	45.0	45.0	44.0	48.0	10.0	58.0
	3	49.3	55.5	44.9	53.0	53.0	52.0	52.0	50.0	48.0	46.0	46.0	45.0	49.3	10.0	59.3
	4	51.5	63.9	47.1	56.0	54.0	53.0	53.0	52.0	51.0	48.0	48.0	47.0	51.5	10.0	61.5
	5	51.5	60.7	47.2	57.0	55.0	53.0	53.0	52.0	50.0	49.0	48.0	47.0	51.5	10.0	61.5
	6	51.0	64.9	42.9	56.0	55.0	54.0	53.0	52.0	49.0	44.0	44.0	43.0	51.0	10.0	61.0
Day	7	45.7	58.4	41.8	52.0	51.0	49.0	48.0	45.0	44.0	43.0	42.0	42.0	45.7	0.0	45.7
	8	46.4	69.3	40.9	55.0	52.0	49.0	48.0	44.0	43.0	41.0	41.0	41.0	46.4	0.0	46.4
	9	44.7	63.3	40.7	51.0	49.0	48.0	47.0	44.0	43.0	42.0	41.0	41.0	44.7	0.0	44.7
	10	65.6	88.7	40.1	79.0	75.0	68.0	64.0	51.0	46.0	42.0	41.0	40.0	65.6	0.0	65.6
	11	51.2	73.7	39.6	61.0	58.0	54.0	52.0	45.0	42.0	40.0	39.0	39.0	51.2	0.0	51.2
	12	54.7	74.5	39.7	68.0	64.0	57.0	56.0	51.0	45.0	41.0	40.0	40.0	54.7	0.0	54.7
	13	58.5	85.7	39.6	60.0	56.0	51.0	49.0	44.0	42.0	40.0	39.0	39.0	58.5	0.0	58.5
	14	48.9	76.1	38.8	55.0	53.0	49.0	47.0	43.0	42.0	40.0	39.0	39.0	48.9	0.0	48.9
	15	46.6	71.9	37.9	57.0	54.0	49.0	47.0	42.0	41.0	39.0	39.0	39.0	46.6	0.0	46.6
	16	44.3	57.9	38.6	53.0	51.0	49.0	47.0	44.0	41.0	39.0	39.0	39.0	44.3	0.0	44.3
	17	44.7	60.6	39.1	53.0	51.0	49.0	48.0	44.0	42.0	40.0	39.0	39.0	44.7	0.0	44.7
	18	45.9	66.4	37.9	54.0	52.0	49.0	48.0	44.0	42.0	39.0	39.0	38.0	45.9	0.0	45.9
Evening	19	54.6	80.1	41.8	62.0	60.0	57.0	55.0	48.0	45.0	43.0	42.0	42.0	54.6	5.0	59.6
	20	50.1	62.3	43.9	58.0	55.0	54.0	53.0	50.0	49.0	45.0	45.0	44.0	50.1	5.0	55.1
	21	49.9	61.6	45.2	54.0	53.0	52.0	52.0	50.0	49.0	46.0	46.0	45.0	49.9	5.0	54.9
Night	22	48.4	57.1	44.1	51.0	51.0	50.0	50.0	49.0	48.0	46.0	45.0	45.0	48.4	10.0	58.4
	23	46.0	53.4	40.9	49.0	49.0	48.0	47.0	46.0	45.0	44.0	43.0	41.0	46.0	10.0	56.0

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	44.3	57.9	37.9	51.0	49.0	48.0	47.0	42.0	41.0	39.0	39.0	38.0
	Max	65.6	88.7	41.8	79.0	75.0	68.0	64.0	51.0	46.0	43.0	42.0	42.0
Energy Average		56.3	Average:		58.2	55.5	51.8	50.1	45.1	42.8	40.5	39.8	39.7
Evening	Min	49.9	61.6	41.8	54.0	53.0	52.0	52.0	48.0	45.0	43.0	42.0	42.0
	Max	54.6	80.1	45.2	62.0	60.0	57.0	55.0	50.0	49.0	46.0	46.0	45.0
Energy Average		52.1	Average:		58.0	56.0	54.3	53.3	49.3	47.7	44.7	44.3	43.7
Night	Min	46.0	53.4	40.9	49.0	49.0	48.0	47.0	46.0	45.0	44.0	43.0	41.0
	Max	51.5	64.9	47.2	57.0	55.0	54.0	53.0	52.0	51.0	49.0	48.0	47.0
Energy Average		49.4	Average:		52.6	52.0	50.9	50.6	49.3	47.9	45.8	45.3	44.4

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
54.2	55.7	49.4

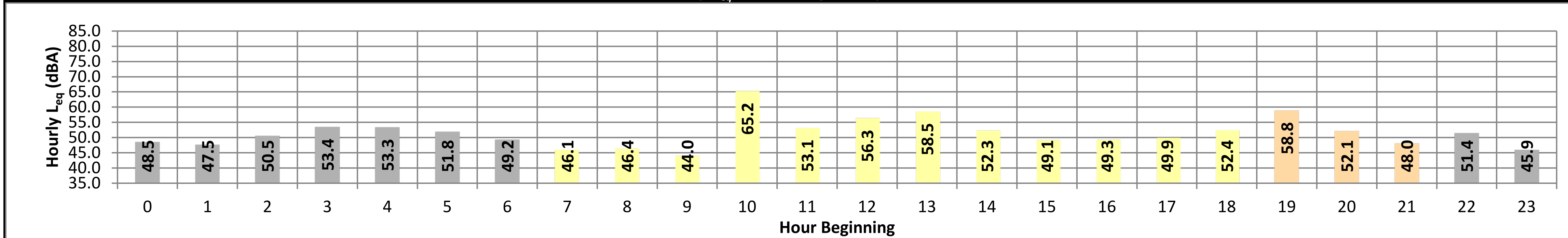
24-Hour CNEL (dBA)

57.8

24-Hour Noise Level Measurement Summary

Date: Wednesday, May 29, 2019
Project: Oleander Business Park
Location: L6 - Located on Decker Road, south of the Project site, near existing rural-residential homes.
Meter: Piccolo I
JN: 10720
Analyst: R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	48.5	62.0	43.5	55.0	53.0	51.0	51.0	49.0	47.0	45.0	44.0	44.0	48.5	10.0	58.5
	1	47.5	58.1	43.2	50.0	50.0	49.0	49.0	48.0	47.0	45.0	45.0	44.0	47.5	10.0	57.5
	2	50.5	67.1	46.5	54.0	53.0	52.0	52.0	51.0	50.0	48.0	48.0	47.0	50.5	10.0	60.5
	3	53.4	70.5	47.0	57.0	57.0	56.0	56.0	54.0	52.0	49.0	48.0	48.0	53.4	10.0	63.4
	4	53.3	61.0	48.2	56.0	56.0	55.0	55.0	54.0	52.0	51.0	50.0	49.0	53.3	10.0	63.3
	5	51.8	61.2	48.2	56.0	55.0	54.0	53.0	52.0	51.0	50.0	49.0	49.0	51.8	10.0	61.8
	6	49.2	69.2	41.5	57.0	55.0	52.0	51.0	49.0	46.0	42.0	42.0	41.0	49.2	10.0	59.2
Day	7	46.1	68.9	40.5	54.0	52.0	48.0	46.0	44.0	43.0	41.0	41.0	40.0	46.1	0.0	46.1
	8	46.4	63.1	40.5	55.0	54.0	51.0	50.0	45.0	43.0	41.0	41.0	40.0	46.4	0.0	46.4
	9	44.0	60.6	40.5	51.0	49.0	47.0	46.0	43.0	42.0	41.0	40.0	40.0	44.0	0.0	44.0
	10	65.2	83.9	38.9	80.0	76.0	69.0	65.0	52.0	47.0	41.0	40.0	39.0	65.2	0.0	65.2
	11	53.1	75.9	38.9	63.0	61.0	58.0	55.0	48.0	43.0	40.0	39.0	38.0	53.1	0.0	53.1
	12	56.3	74.5	38.9	69.0	66.0	61.0	59.0	53.0	46.0	40.0	40.0	39.0	56.3	0.0	56.3
	13	58.5	82.4	38.9	69.0	64.0	57.0	53.0	44.0	42.0	40.0	39.0	38.0	58.5	0.0	58.5
	14	52.3	73.2	38.8	61.0	60.0	59.0	58.0	47.0	42.0	40.0	39.0	38.0	52.3	0.0	52.3
	15	49.1	70.5	38.8	62.0	58.0	52.0	48.0	42.0	40.0	39.0	38.0	38.0	49.1	0.0	49.1
	16	49.3	69.4	38.9	56.0	54.0	51.0	50.0	49.0	48.0	44.0	42.0	39.0	49.3	0.0	49.3
	17	49.9	66.0	38.9	58.0	55.0	53.0	52.0	50.0	49.0	41.0	40.0	39.0	49.9	0.0	49.9
	18	52.4	71.3	38.9	62.0	59.0	56.0	55.0	51.0	49.0	42.0	41.0	40.0	52.4	0.0	52.4
Evening	19	58.8	85.1	41.0	68.0	64.0	59.0	58.0	54.0	48.0	43.0	42.0	42.0	58.8	5.0	63.8
	20	52.1	70.0	42.9	63.0	60.0	56.0	54.0	50.0	48.0	44.0	44.0	43.0	52.1	5.0	57.1
	21	48.0	65.6	44.0	53.0	52.0	50.0	49.0	48.0	47.0	45.0	45.0	44.0	48.0	5.0	53.0
Night	22	51.4	74.7	43.6	61.0	56.0	52.0	51.0	48.0	47.0	45.0	45.0	44.0	51.4	10.0	61.4
	23	45.9	58.9	40.5	52.0	49.0	48.0	48.0	46.0	45.0	42.0	42.0	41.0	45.9	10.0	55.9

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	44.0	60.6	38.8	51.0	49.0	47.0	46.0	42.0	40.0	39.0	38.0	38.0
	Max	65.2	83.9	40.5	80.0	76.0	69.0	65.0	53.0	49.0	44.0	42.0	40.0
Energy Average		56.5	Average:		61.7	59.0	55.2	53.1	47.3	44.5	40.8	40.0	39.0
Evening	Min	48.0	65.6	41.0	53.0	52.0	50.0	49.0	48.0	47.0	43.0	42.0	42.0
	Max	58.8	85.1	44.0	68.0	64.0	59.0	58.0	54.0	48.0	45.0	45.0	44.0
Energy Average		55.2	Average:		61.3	58.7	55.0	53.7	50.7	47.7	44.0	43.7	43.0
Night	Min	45.9	58.1	40.5	50.0	49.0	48.0	48.0	46.0	45.0	42.0	42.0	41.0
	Max	53.4	74.7	48.2	61.0	57.0	56.0	56.0	54.0	52.0	51.0	50.0	49.0
Energy Average		50.8	Average:		55.3	53.8	52.1	51.8	50.1	48.6	46.3	45.9	45.2

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
54.9	56.3	50.8

24-Hour CNEL (dBA)
59.1

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URBAN CROSSROADS

APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE CONTOURS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Harvill Av.
Road Segment: n/o Harley Knox Bl.

Project Name: Oleander
Job Number: 10720

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	549 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	55 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	59.0 feet
Centerline Dist. to Observer:	59.0 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:	68.0%	8.9%	23.2%	85.75%
Medium Trucks:	74.9%	4.9%	20.2%	5.50%
Heavy Trucks:	69.2%	8.1%	22.7%	8.75%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	54.129
Medium Trucks:	53.966
Heavy Trucks:	53.982

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-14.60	-0.62	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	77.72	-26.53	-0.60	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	82.99	-24.51	-0.60	-1.20	*-5.35*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	50.1	47.6	44.8	44.2	51.2	51.4
Medium Trucks:	49.4	47.3	41.5	42.9	50.1	50.2
Heavy Trucks:	56.7	54.3	51.0	50.7	57.7	58.0
Vehicle Noise:	58.2	55.8	52.3	52.1	59.2	59.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	11	24	52	112
CNEL:	12	25	54	116

Wednesday, June 12, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Harvill Av.
Road Segment: s/o Harley Knox Bl.

Project Name: Oleander
Job Number: 10720

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,207 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,021 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	59.0 feet
Centerline Dist. to Observer:	59.0 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:	68.0%	8.9%	23.2%	85.75%
Medium Trucks:	74.9%	4.9%	20.2%	5.50%
Heavy Trucks:	69.2%	8.1%	22.7%	8.75%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	54.129
Medium Trucks:	53.966
Heavy Trucks:	53.982

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-1.90	-0.62	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	77.72	-13.84	-0.60	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	82.99	-11.82	-0.60	-1.20	*-5.35*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	62.8	60.3	57.5	56.9	63.9	64.1
Medium Trucks:	62.1	60.0	54.2	55.6	62.8	62.9
Heavy Trucks:	69.4	67.0	63.7	63.4	70.4	70.7
Vehicle Noise:	70.9	68.5	65.0	64.8	71.9	72.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	78	169	364	784
CNEL:	81	175	377	813

Wednesday, June 12, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing Without Project	*Project Name:*	Oleander
Road Name:	Nandina Av.	*Job Number:*	10720
Road Segment:	e/o Decker Rd.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	10 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	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:	68.0%	8.9%	23.2%	85.75%
Medium Trucks:	74.9%	4.9%	20.2%	5.50%
Heavy Trucks:	69.2%	8.1%	22.7%	8.75%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.859
Medium Trucks:	38.630
Heavy Trucks:	38.653

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-21.99	1.54	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	77.72	-33.92	1.58	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-31.91	1.57	-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:	44.9	42.4	39.6	39.0	45.9	46.2
Medium Trucks:	44.2	42.1	36.3	37.7	44.9	45.0
Heavy Trucks:	51.5	49.1	45.8	45.5	52.5	52.7
Vehicle Noise:	52.9	50.6	47.1	46.9	53.9	54.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	3	7	15	33
CNEL:	3	7	16	34

Wednesday, June 12, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing Without Project	*Project Name:*	Oleander
Road Name:	Harley Knox Bl.	*Job Number:*	10720
Road Segment:	e/o Decker Rd.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	10 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 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:	68.0%	8.9%	23.2%	85.75%
Medium Trucks:	74.9%	4.9%	20.2%	5.50%
Heavy Trucks:	69.2%	8.1%	22.7%	8.75%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-22.51	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	79.45	-34.44	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-32.42	-1.84	-1.20	*-5.25*	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:	42.9	40.4	37.6	37.0	44.0	44.3
Medium Trucks:	42.0	39.9	34.1	35.5	42.7	42.8
Heavy Trucks:	48.8	46.4	43.1	42.8	49.8	50.1
Vehicle Noise:	50.5	48.1	44.6	44.4	51.5	51.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	4	9	20	44
CNEL:	5	10	21	46

Wednesday, June 12, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Harley Knox Bl.
Road Segment: e/o Harvill Av.

Project Name: Oleander
Job Number: 10720

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,880 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,088 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 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:	68.0%	8.9%	23.2%	85.75%
Medium Trucks:	74.9%	4.9%	20.2%	5.50%
Heavy Trucks:	69.2%	8.1%	22.7%	8.75%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.14	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	79.45	-14.07	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-12.05	-1.84	-1.20	*-5.25*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.3	60.8	58.0	57.4	64.4	64.6
Medium Trucks:	62.3	60.3	54.4	55.9	63.0	63.2
Heavy Trucks:	69.2	66.8	63.5	63.2	70.2	70.4
Vehicle Noise:	70.8	68.5	64.9	64.8	71.8	72.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	100	216	466	1,005
CNEL:	104	224	483	1,041

Wednesday, June 12, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing Without Project	*Project Name:*	Oleander
Road Name:	Harley Knox Bl.	*Job Number:*	10720
Road Segment:	e/o I-215 NB Ramps		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,923 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,492 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 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:	68.0%	8.9%	23.2%	85.75%
Medium Trucks:	74.9%	4.9%	20.2%	5.50%
Heavy Trucks:	69.2%	8.1%	22.7%	8.75%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	1.46	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	79.45	-10.47	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-8.45	-1.84	-1.20	*-5.25*	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	64.4	61.6	61.0	68.0	68.2
Medium Trucks:	65.9	63.9	58.0	59.5	66.6	66.8
Heavy Trucks:	72.8	70.4	67.1	66.8	73.8	74.0
Vehicle Noise:	74.4	72.1	68.5	68.4	75.4	75.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	175	376	810	1,746
CNEL:	181	390	840	1,810

Wednesday, June 12, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Oleander Av.
Road Segment: e/o Decker Rd.

Project Name: Oleander
Job Number: 10720

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	10 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	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:	68.0%	8.9%	23.2%	85.75%
Medium Trucks:	74.9%	4.9%	20.2%	5.50%
Heavy Trucks:	69.2%	8.1%	22.7%	8.75%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.859
Medium Trucks:	38.630
Heavy Trucks:	38.653

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-21.99	1.54	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	77.72	-33.92	1.58	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-31.91	1.57	-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:	44.9	42.4	39.6	39.0	45.9	46.2
Medium Trucks:	44.2	42.1	36.3	37.7	44.9	45.0
Heavy Trucks:	51.5	49.1	45.8	45.5	52.5	52.7
Vehicle Noise:	52.9	50.6	47.1	46.9	53.9	54.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	3	7	15	33
CNEL:	3	7	16	34

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing With Project	*Project Name:*	Oleander
Road Name:	Harvill Av.	*Job Number:*	10720
Road Segment:	n/o Harley Knox Bl.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	685 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	68 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	59.0 feet
Centerline Dist. to Observer:	59.0 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:	68.0%	8.9%	23.2%	83.18%
Medium Trucks:	74.9%	4.9%	20.2%	5.28%
Heavy Trucks:	69.2%	8.1%	22.7%	11.54%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	54.129
Medium Trucks:	53.966
Heavy Trucks:	53.982

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-13.77	-0.62	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	77.72	-25.74	-0.60	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	82.99	-22.35	-0.60	-1.20	*-5.35*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	50.9	48.5	45.6	45.0	52.0	52.3
Medium Trucks:	50.2	48.1	42.3	43.7	50.9	51.0
Heavy Trucks:	58.8	56.5	53.1	52.9	59.9	60.1
Vehicle Noise:	60.0	57.6	54.1	54.0	61.0	61.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	15	32	69	148
CNEL:	15	33	71	153

Wednesday, June 12, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Harvill Av.
Road Segment: s/o Harley Knox Bl.

Project Name: Oleander
Job Number: 10720

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,226 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,023 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	59.0 feet
Centerline Dist. to Observer:	59.0 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:	68.0%	8.9%	23.2%	85.59%
Medium Trucks:	74.9%	4.9%	20.2%	5.52%
Heavy Trucks:	69.2%	8.1%	22.7%	8.89%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	54.129
Medium Trucks:	53.966
Heavy Trucks:	53.982

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-1.90	-0.62	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	77.72	-13.81	-0.60	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	82.99	-11.74	-0.60	-1.20	*-5.35*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.8	60.3	57.5	56.9	63.9	64.1
Medium Trucks:	62.1	60.1	54.2	55.6	62.8	63.0
Heavy Trucks:	69.5	67.1	63.7	63.5	70.5	70.7
Vehicle Noise:	70.9	68.6	65.0	64.9	71.9	72.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	79	171	367	791
CNEL:	82	177	381	821

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Nandina Av.
Road Segment: e/o Decker Rd.
Project Name: Oleander
Job Number: 10720

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	236 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	24 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	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:	68.0%	8.9%	23.2%	78.29%
Medium Trucks:	74.9%	4.9%	20.2%	4.87%
Heavy Trucks:	69.2%	8.1%	22.7%	16.84%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.859
Medium Trucks:	38.630
Heavy Trucks:	38.653

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-18.66	1.54	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	77.72	-30.72	1.58	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-25.33	1.57	-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:	48.2	45.7	42.9	42.3	49.3	49.5
Medium Trucks:	47.4	45.3	39.5	40.9	48.1	48.2
Heavy Trucks:	58.0	55.6	52.3	52.1	59.1	59.3
Vehicle Noise:	58.8	56.4	53.0	52.8	59.8	60.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	8	18	38	82
CNEL:	8	18	39	85

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Harley Knox Bl.
Road Segment: e/o Decker Rd.
Project Name: Oleander
Job Number: 10720

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,193 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	119 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 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:	68.0%	8.9%	23.2%	73.58%
Medium Trucks:	74.9%	4.9%	20.2%	4.74%
Heavy Trucks:	69.2%	8.1%	22.7%	21.69%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-12.40	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	79.45	-24.32	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-17.71	-1.84	-1.20	*-5.25*	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:	53.0	50.5	47.7	47.1	54.1	54.4
Medium Trucks:	52.1	50.0	44.2	45.6	52.8	53.0
Heavy Trucks:	63.5	61.1	57.8	57.5	64.5	64.8
Vehicle Noise:	64.2	61.8	58.4	58.2	65.2	65.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	36	78	168	362
CNEL:	38	81	174	376

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing With Project	*Project Name:*	Oleander
Road Name:	Harley Knox Bl.	*Job Number:*	10720
Road Segment:	e/o Harvill Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,128 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,213 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 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:	68.0%	8.9%	23.2%	84.28%
Medium Trucks:	74.9%	4.9%	20.2%	5.43%
Heavy Trucks:	69.2%	8.1%	22.7%	10.29%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.74	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	79.45	-13.65	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-10.88	-1.84	-1.20	*-5.25*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	63.7	61.2	58.4	57.8	64.8	65.0
Medium Trucks:	62.8	60.7	54.9	56.3	63.5	63.6
Heavy Trucks:	70.3	67.9	64.6	64.4	71.4	71.6
Vehicle Noise:	71.8	69.4	65.9	65.7	72.8	73.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	116	250	540	1,162
CNEL:	121	260	559	1,205

Wednesday, June 12, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing With Project	*Project Name:*	Oleander
Road Name:	Harley Knox Bl.	*Job Number:*	10720
Road Segment:	e/o I-215 NB Ramps		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,090 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,509 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 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:	68.0%	8.9%	23.2%	85.77%
Medium Trucks:	74.9%	4.9%	20.2%	5.47%
Heavy Trucks:	69.2%	8.1%	22.7%	8.75%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.49	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	79.45	-10.46	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-8.42	-1.84	-1.20	*-5.25*	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	64.4	61.6	61.0	68.0	68.3
Medium Trucks:	65.9	63.9	58.0	59.5	66.6	66.8
Heavy Trucks:	72.8	70.4	67.1	66.8	73.8	74.1
Vehicle Noise:	74.4	72.1	68.6	68.4	75.4	75.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	175	378	814	1,753
CNEL:	182	392	844	1,818

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Oleander Av.
Road Segment: e/o Decker Rd.

Project Name: Oleander
Job Number: 10720

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	236 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	24 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	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:	68.0%	8.9%	23.2%	78.29%
Medium Trucks:	74.9%	4.9%	20.2%	4.87%
Heavy Trucks:	69.2%	8.1%	22.7%	16.84%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.859
Medium Trucks:	38.630
Heavy Trucks:	38.653

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-18.66	1.54	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	77.72	-30.72	1.58	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-25.33	1.57	-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:	48.2	45.7	42.9	42.3	49.3	49.5
Medium Trucks:	47.4	45.3	39.5	40.9	48.1	48.2
Heavy Trucks:	58.0	55.6	52.3	52.1	59.1	59.3
Vehicle Noise:	58.8	56.4	53.0	52.8	59.8	60.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	8	18	38	82
CNEL:	8	18	39	85

Wednesday, June 12, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project
Road Name: Harvill Av.
Road Segment: n/o Harley Knox Bl.
Project Name: Oleander
Job Number: 10720

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	925 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	93 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	59.0 feet
Centerline Dist. to Observer:	59.0 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:	68.0%	8.9%	23.2%	85.75%
Medium Trucks:	74.9%	4.9%	20.2%	5.50%
Heavy Trucks:	69.2%	8.1%	22.7%	8.75%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	54.129
Medium Trucks:	53.966
Heavy Trucks:	53.982

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-12.33	-0.62	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	77.72	-24.26	-0.60	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	82.99	-22.25	-0.60	-1.20	*-5.35*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	52.4	49.9	47.1	46.5	53.5	53.7
Medium Trucks:	51.7	49.6	43.7	45.2	52.4	52.5
Heavy Trucks:	58.9	56.6	53.2	53.0	60.0	60.2
Vehicle Noise:	60.4	58.1	54.6	54.4	61.4	61.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	16	34	73	158
CNEL:	16	35	76	164

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project
Road Name: Harvill Av.
Road Segment: s/o Harley Knox Bl.

Project Name: Oleander
Job Number: 10720

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,074 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,307 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	59.0 feet
Centerline Dist. to Observer:	59.0 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:	68.0%	8.9%	23.2%	85.75%
Medium Trucks:	74.9%	4.9%	20.2%	5.50%
Heavy Trucks:	69.2%	8.1%	22.7%	8.75%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	54.129
Medium Trucks:	53.966
Heavy Trucks:	53.982

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-0.83	-0.62	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	77.72	-12.76	-0.60	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	82.99	-10.74	-0.60	-1.20	*-5.35*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.9	61.4	58.6	58.0	65.0	65.2
Medium Trucks:	63.2	61.1	55.3	56.7	63.9	64.0
Heavy Trucks:	70.4	68.1	64.7	64.5	71.5	71.7
Vehicle Noise:	71.9	69.6	66.1	65.9	72.9	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	93	199	429	925
CNEL:	96	207	445	959

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY Without Project	*Project Name:*	Oleander
Road Name:	Nandina Av.	*Job Number:*	10720
Road Segment:	e/o Decker Rd.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	159 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	16 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	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:	68.0%	8.9%	23.2%	85.75%
Medium Trucks:	74.9%	4.9%	20.2%	5.50%
Heavy Trucks:	69.2%	8.1%	22.7%	8.75%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.859
Medium Trucks:	38.630
Heavy Trucks:	38.653

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-19.98	1.54	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	77.72	-31.91	1.58	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-29.89	1.57	-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:	46.9	44.4	41.6	41.0	48.0	48.2
Medium Trucks:	46.2	44.1	38.3	39.7	46.9	47.0
Heavy Trucks:	53.5	51.1	47.8	47.5	54.5	54.8
Vehicle Noise:	55.0	52.6	49.1	48.9	56.0	56.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	5	10	21	45
CNEL:	5	10	22	47

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY Without Project	*Project Name:*	Oleander
Road Name:	Harley Knox Bl.	*Job Number:*	10720
Road Segment:	e/o Decker Rd.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,691 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	169 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 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:	68.0%	8.9%	23.2%	85.75%
Medium Trucks:	74.9%	4.9%	20.2%	5.50%
Heavy Trucks:	69.2%	8.1%	22.7%	8.75%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-10.22	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	79.45	-22.15	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-20.14	-1.84	-1.20	*-5.25*	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:	55.2	52.7	49.9	49.3	56.3	56.5
Medium Trucks:	54.3	52.2	46.4	47.8	55.0	55.1
Heavy Trucks:	61.1	58.7	55.4	55.1	62.1	62.4
Vehicle Noise:	62.7	60.4	56.9	56.7	63.7	64.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	29	63	135	290
CNEL:	30	65	140	301

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project
Road Name: Harley Knox Bl.
Road Segment: e/o Harvill Av.

Project Name: Oleander
Job Number: 10720

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,678 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,668 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 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:	68.0%	8.9%	23.2%	85.75%
Medium Trucks:	74.9%	4.9%	20.2%	5.50%
Heavy Trucks:	69.2%	8.1%	22.7%	8.75%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.28	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	79.45	-12.21	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-10.20	-1.84	-1.20	*-5.25*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.1	62.7	59.8	59.2	66.2	66.5
Medium Trucks:	64.2	62.1	56.3	57.7	64.9	65.1
Heavy Trucks:	71.0	68.6	65.3	65.0	72.0	72.3
Vehicle Noise:	72.7	70.3	66.8	66.6	73.7	73.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	134	288	620	1,336
CNEL:	138	298	643	1,385

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY Without Project	*Project Name:*	Oleander
Road Name:	Harley Knox Bl.	*Job Number:*	10720
Road Segment:	e/o I-215 NB Ramps		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,441 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,744 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 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:	68.0%	8.9%	23.2%	85.75%
Medium Trucks:	74.9%	4.9%	20.2%	5.50%
Heavy Trucks:	69.2%	8.1%	22.7%	8.75%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.23	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	79.45	-8.70	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-6.68	-1.84	-1.20	*-5.25*	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:	68.6	66.2	63.3	62.7	69.7	70.0
Medium Trucks:	67.7	65.7	59.8	61.2	68.4	68.6
Heavy Trucks:	74.5	72.1	68.8	68.6	75.6	75.8
Vehicle Noise:	76.2	73.8	70.3	70.2	77.2	77.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	229	493	1,063	2,290
CNEL:	237	511	1,102	2,374

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project
Road Name: Oleander Av.
Road Segment: e/o Decker Rd.

Project Name: Oleander
Job Number: 10720

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,651 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	165 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	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:	68.0%	8.9%	23.2%	85.75%
Medium Trucks:	74.9%	4.9%	20.2%	5.50%
Heavy Trucks:	69.2%	8.1%	22.7%	8.75%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.859
Medium Trucks:	38.630
Heavy Trucks:	38.653

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-9.82	1.54	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	77.72	-21.75	1.58	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-19.73	1.57	-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:	57.0	54.6	51.7	51.1	58.1	58.4
Medium Trucks:	56.3	54.3	48.4	49.9	57.0	57.2
Heavy Trucks:	63.6	61.2	57.9	57.7	64.7	64.9
Vehicle Noise:	65.1	62.8	59.2	59.1	66.1	66.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	21	46	100	215
CNEL:	22	48	103	223

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY With Project	*Project Name:*	Oleander
Road Name:	Harvill Av.	*Job Number:*	10720
Road Segment:	n/o Harley Knox Bl.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,061 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	106 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	59.0 feet
Centerline Dist. to Observer:	59.0 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:	68.0%	8.9%	23.2%	84.09%
Medium Trucks:	74.9%	4.9%	20.2%	5.36%
Heavy Trucks:	69.2%	8.1%	22.7%	10.55%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	54.129
Medium Trucks:	53.966
Heavy Trucks:	53.982

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-11.82	-0.62	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	77.72	-23.78	-0.60	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	82.99	-20.84	-0.60	-1.20	*-5.35*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	52.9	50.4	47.6	47.0	54.0	54.2
Medium Trucks:	52.1	50.1	44.2	45.7	52.8	53.0
Heavy Trucks:	60.4	58.0	54.7	54.4	61.4	61.6
Vehicle Noise:	61.6	59.2	55.7	55.6	62.6	62.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	19	41	88	189
CNEL:	20	42	91	196

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Harvill Av.
Road Segment: s/o Harley Knox Bl.

Project Name: Oleander
Job Number: 10720

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,092 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,309 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	59.0 feet
Centerline Dist. to Observer:	59.0 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:	68.0%	8.9%	23.2%	85.63%
Medium Trucks:	74.9%	4.9%	20.2%	5.51%
Heavy Trucks:	69.2%	8.1%	22.7%	8.86%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	54.129
Medium Trucks:	53.966
Heavy Trucks:	53.982

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-0.83	-0.62	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	77.72	-12.74	-0.60	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	82.99	-10.68	-0.60	-1.20	*-5.35*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.9	61.4	58.6	58.0	65.0	65.2
Medium Trucks:	63.2	61.1	55.3	56.7	63.9	64.0
Heavy Trucks:	70.5	68.1	64.8	64.5	71.5	71.8
Vehicle Noise:	72.0	69.6	66.1	65.9	73.0	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	93	201	432	932
CNEL:	97	208	448	966

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY With Project	*Project Name:*	Oleander
Road Name:	Nandina Av.	*Job Number:*	10720
Road Segment:	e/o Decker Rd.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	295 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	29 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	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:	68.0%	8.9%	23.2%	79.78%
Medium Trucks:	74.9%	4.9%	20.2%	5.00%
Heavy Trucks:	69.2%	8.1%	22.7%	15.22%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.859
Medium Trucks:	38.630
Heavy Trucks:	38.653

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-17.61	1.54	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	77.72	-29.64	1.58	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-24.80	1.57	-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:	49.2	46.8	44.0	43.3	50.3	50.6
Medium Trucks:	48.5	46.4	40.6	42.0	49.2	49.3
Heavy Trucks:	58.6	56.2	52.9	52.6	59.6	59.8
Vehicle Noise:	59.4	57.0	53.6	53.4	60.4	60.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	9	19	42	90
CNEL:	9	20	43	93

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Harley Knox Bl.
Road Segment: e/o Decker Rd.

Project Name: Oleander
Job Number: 10720

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,784 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	278 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 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:	68.0%	8.9%	23.2%	80.54%
Medium Trucks:	74.9%	4.9%	20.2%	5.17%
Heavy Trucks:	69.2%	8.1%	22.7%	14.29%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-8.33	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	79.45	-20.26	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-15.84	-1.84	-1.20	*-5.25*	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:	57.1	54.6	51.8	51.2	58.2	58.4
Medium Trucks:	56.2	54.1	48.3	49.7	56.9	57.0
Heavy Trucks:	65.4	63.0	59.7	59.4	66.4	66.6
Vehicle Noise:	66.4	64.0	60.6	60.4	67.4	67.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	51	110	237	511
CNEL:	53	114	246	530

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Harley Knox Bl.
Road Segment: e/o Harvill Av.

Project Name: Oleander
Job Number: 10720

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,925 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,793 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 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:	68.0%	8.9%	23.2%	84.75%
Medium Trucks:	74.9%	4.9%	20.2%	5.45%
Heavy Trucks:	69.2%	8.1%	22.7%	9.79%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.02	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	79.45	-11.94	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-9.39	-1.84	-1.20	*-5.25*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.4	62.9	60.1	59.5	66.5	66.7
Medium Trucks:	64.5	62.4	56.6	58.0	65.2	65.3
Heavy Trucks:	71.8	69.4	66.1	65.8	72.9	73.1
Vehicle Noise:	73.3	71.0	67.5	67.3	74.3	74.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	147	318	684	1,474
CNEL:	153	329	709	1,528

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Harley Knox Bl.
Road Segment: e/o I-215 NB Ramps

Project Name: Oleander
Job Number: 10720

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,607 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,761 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 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:	68.0%	8.9%	23.2%	85.77%
Medium Trucks:	74.9%	4.9%	20.2%	5.48%
Heavy Trucks:	69.2%	8.1%	22.7%	8.75%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.25	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	79.45	-8.70	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-6.66	-1.84	-1.20	*-5.25*	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:	68.7	66.2	63.4	62.8	69.7	70.0
Medium Trucks:	67.7	65.7	59.8	61.2	68.4	68.6
Heavy Trucks:	74.5	72.2	68.8	68.6	75.6	75.8
Vehicle Noise:	76.2	73.8	70.3	70.2	77.2	77.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	230	495	1,066	2,297
CNEL:	238	513	1,105	2,381

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY With Project	*Project Name:*	Oleander
Road Name:	Oleander Av.	*Job Number:*	10720
Road Segment:	e/o Decker Rd.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,787 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	179 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	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:	68.0%	8.9%	23.2%	84.77%
Medium Trucks:	74.9%	4.9%	20.2%	5.41%
Heavy Trucks:	69.2%	8.1%	22.7%	9.82%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.859
Medium Trucks:	38.630
Heavy Trucks:	38.653

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-9.52	1.54	-1.20	*-4.58*	0.000	0.000
Medium Trucks:	77.72	-21.47	1.58	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-18.88	1.57	-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:	57.3	54.9	52.0	51.4	58.4	58.7
Medium Trucks:	56.6	54.6	48.7	50.1	57.3	57.5
Heavy Trucks:	64.5	62.1	58.8	58.5	65.5	65.8
Vehicle Noise:	65.8	63.4	60.0	59.8	66.8	67.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	24	51	111	239
CNEL:	25	53	115	248

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APPENDIX 9.1:

OPERATIONAL STATIONARY-SOURCE NOISE CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL
6/12/2019

Observer Location: **R1**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Oleander
Job Number: 10720
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,611.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,611.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	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	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,611.0	-38.8	-38.8	-38.8	-38.8	-38.8	-38.8
Shielding (Barrier Attenuation)	2,611.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		28.4	-38.8	-38.8	-38.8	-38.8	-38.8
60 Minute Hourly Adjustment		**28.4**	**-38.8**	**-38.8**	**-38.8**	**-38.8**	**-38.8**

STATIONARY SOURCE NOISE PREDICTION MODEL
6/12/2019

Observer Location: **R1**
Source: Entry Gate & Truck Movements
Condition: Operational

Project Name: Oleander
Job Number: 10720
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,645.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,645.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	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)	20.0	64.0	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,645.0	-42.4	-42.4	-42.4	-42.4	-42.4	-42.4
Shielding (Barrier Attenuation)	2,645.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		21.6	-42.4	-42.4	-42.4	-42.4	-42.4
60 Minute Hourly Adjustment		**21.6**	**-42.4**	**-42.4**	**-42.4**	**-42.4**	**-42.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/12/2019

Observer Location: **R1**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Oleander
Job Number: 10720
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	3,087.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	3,087.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	3,087.0	-55.8	-55.8	-55.8	-55.8	-55.8	-55.8
Shielding (Barrier Attenuation)	3,087.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		21.4	-55.8	-55.8	-55.8	-55.8	-55.8
60 Minute Hourly Adjustment		**21.4**	**-55.8**	**-55.8**	**-55.8**	**-55.8**	**-55.8**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/12/2019

Observer Location: **R1**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: Oleander
Job Number: 10720
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,732.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,732.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
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)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,732.0	-36.5	-36.5	-36.5	-36.5	-36.5	-36.5
Shielding (Barrier Attenuation)	2,732.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		15.7	-36.5	-36.5	-36.5	-36.5	-36.5
60 Minute Hourly Adjustment		**15.7**	**-36.5**	**-36.5**	**-36.5**	**-36.5**	**-36.5**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/12/2019

Observer Location: **R2**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Oleander
Job Number: 10720
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer 2,082.0 feet
Noise Distance to Barrier: 2,082.0 feet
Barrier Distance to Observer: 0.0 feet

Observer Elevation: 0.0 feet
Noise Source Elevation: 0.0 feet
Barrier Elevation: 0.0 feet

Barrier Height: **0.0 feet**
Noise Source Height: 8.0 feet
Observer Height: 5.0 feet

Barrier Type (0-Wall, 1-Berm): 0
Drop Off Coefficient: 20.0

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	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,082.0	-36.8	-36.8	-36.8	-36.8	-36.8	-36.8
Shielding (Barrier Attenuation)	2,082.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		30.4	-36.8	-36.8	-36.8	-36.8	-36.8
60 Minute Hourly Adjustment		**30.4**	**-36.8**	**-36.8**	**-36.8**	**-36.8**	**-36.8**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/12/2019

Observer Location: **R2**
Source: Entry Gate & Truck Movements
Condition: Operational

Project Name: Oleander
Job Number: 10720
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer 2,088.0 feet
Noise Distance to Barrier: 2,088.0 feet
Barrier Distance to Observer: 0.0 feet

Observer Elevation: 0.0 feet
Noise Source Elevation: 0.0 feet
Barrier Elevation: 0.0 feet

Barrier Height: **0.0 feet**
Noise Source Height: 8.0 feet
Observer Height: 5.0 feet

Barrier Type (0-Wall, 1-Berm): 0
Drop Off Coefficient: 20.0

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)	20.0	64.0	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,088.0	-40.4	-40.4	-40.4	-40.4	-40.4	-40.4
Shielding (Barrier Attenuation)	2,088.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		23.6	-40.4	-40.4	-40.4	-40.4	-40.4
60 Minute Hourly Adjustment		**23.6**	**-40.4**	**-40.4**	**-40.4**	**-40.4**	**-40.4**

STATIONARY SOURCE NOISE PREDICTION MODEL			6/12/2019
Observer Location:	**R2**	*Project Name:*	Oleander
Source:	Roof-Top Air Conditioning Unit	*Job Number:*	10720
Condition:	Operational	*Analyst:*	A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,529.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,529.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,529.0	-54.1	-54.1	-54.1	-54.1	-54.1	-54.1
Shielding (Barrier Attenuation)	2,529.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		23.1	-54.1	-54.1	-54.1	-54.1	-54.1
60 Minute Hourly Adjustment		**23.1**	**-54.1**	**-54.1**	**-54.1**	**-54.1**	**-54.1**

STATIONARY SOURCE NOISE PREDICTION MODEL			6/12/2019
Observer Location:	**R2**	*Project Name:*	Oleander
Source:	Parking Lot Vehicle Movements	*Job Number:*	10720
Condition:	Operational	*Analyst:*	A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,161.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,161.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
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)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,161.0	-35.0	-35.0	-35.0	-35.0	-35.0	-35.0
Shielding (Barrier Attenuation)	2,161.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		17.2	-35.0	-35.0	-35.0	-35.0	-35.0
60 Minute Hourly Adjustment		**17.2**	**-35.0**	**-35.0**	**-35.0**	**-35.0**	**-35.0**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/12/2019

***Observer Location:* R3** | *Project Name:* Oleander
Source: Unloading/Docking Activity | *Job Number:* 10720
Condition: Operational | *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,039.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,039.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	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	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,039.0	-36.6	-36.6	-36.6	-36.6	-36.6	-36.6
Shielding (Barrier Attenuation)	2,039.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		30.6	-36.6	-36.6	-36.6	-36.6	-36.6
60 Minute Hourly Adjustment		**30.6**	**-36.6**	**-36.6**	**-36.6**	**-36.6**	**-36.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/12/2019

***Observer Location:* R3** | *Project Name:* Oleander
Source: Entry Gate & Truck Movements | *Job Number:* 10720
Condition: Operational | *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,053.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,053.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	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)	20.0	64.0	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,053.0	-40.2	-40.2	-40.2	-40.2	-40.2	-40.2
Shielding (Barrier Attenuation)	2,053.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		23.8	-40.2	-40.2	-40.2	-40.2	-40.2
60 Minute Hourly Adjustment		**23.8**	**-40.2**	**-40.2**	**-40.2**	**-40.2**	**-40.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/12/2019

Observer Location: **R3** *Project Name:* Oleander
Source: Roof-Top Air Conditioning Unit *Job Number:* 10720
Condition: Operational *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer 2,517.0 feet
Noise Distance to Barrier: 2,517.0 feet
Barrier Distance to Observer: 0.0 feet

Observer Elevation: 0.0 feet
Noise Source Elevation: 30.0 feet
Barrier Elevation: 0.0 feet

Barrier Height: **0.0 feet**
Noise Source Height: 5.0 feet
Observer Height: 5.0 feet

Barrier Type (0-Wall, 1-Berm): 0
Drop Off Coefficient: 20.0
20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,517.0	-54.0	-54.0	-54.0	-54.0	-54.0	-54.0
Shielding (Barrier Attenuation)	2,517.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		23.2	-54.0	-54.0	-54.0	-54.0	-54.0
60 Minute Hourly Adjustment		**23.2**	**-54.0**	**-54.0**	**-54.0**	**-54.0**	**-54.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/12/2019

Observer Location: **R3** *Project Name:* Oleander
Source: Parking Lot Vehicle Movements *Job Number:* 10720
Condition: Operational *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer 2,148.0 feet
Noise Distance to Barrier: 2,148.0 feet
Barrier Distance to Observer: 0.0 feet

Observer Elevation: 0.0 feet
Noise Source Elevation: 0.0 feet
Barrier Elevation: 0.0 feet

Barrier Height: **0.0 feet**
Noise Source Height: 5.0 feet
Observer Height: 5.0 feet

Barrier Type (0-Wall, 1-Berm): 0
Drop Off Coefficient: 15.0
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	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,148.0	-35.0	-35.0	-35.0	-35.0	-35.0	-35.0
Shielding (Barrier Attenuation)	2,148.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		17.2	-35.0	-35.0	-35.0	-35.0	-35.0
60 Minute Hourly Adjustment		**17.2**	**-35.0**	**-35.0**	**-35.0**	**-35.0**	**-35.0**

STATIONARY SOURCE NOISE PREDICTION MODEL	6/12/2019

***Observer Location:* R4** | *Project Name:* Oleander
Source: Unloading/Docking Activity | *Job Number:* 10720
Condition: Operational | *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,786.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,786.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	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	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,786.0	-35.5	-35.5	-35.5	-35.5	-35.5	-35.5
Shielding (Barrier Attenuation)	1,786.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		31.7	-35.5	-35.5	-35.5	-35.5	-35.5
60 Minute Hourly Adjustment		**31.7**	**-35.5**	**-35.5**	**-35.5**	**-35.5**	**-35.5**

STATIONARY SOURCE NOISE PREDICTION MODEL	6/12/2019

***Observer Location:* R4** | *Project Name:* Oleander
Source: Entry Gate & Truck Movements | *Job Number:* 10720
Condition: Operational | *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,765.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,765.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	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)	20.0	64.0	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,765.0	-38.9	-38.9	-38.9	-38.9	-38.9	-38.9
Shielding (Barrier Attenuation)	1,765.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		25.1	-38.9	-38.9	-38.9	-38.9	-38.9
60 Minute Hourly Adjustment		**25.1**	**-38.9**	**-38.9**	**-38.9**	**-38.9**	**-38.9**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/12/2019

***Observer Location:* R4** | *Project Name:* Oleander
Source: Roof-Top Air Conditioning Unit | *Job Number:* 10720
Condition: Operational | *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,234.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,234.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,234.0	-53.0	-53.0	-53.0	-53.0	-53.0	-53.0
Shielding (Barrier Attenuation)	2,234.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		24.2	-53.0	-53.0	-53.0	-53.0	-53.0
60 Minute Hourly Adjustment		**24.2**	**-53.0**	**-53.0**	**-53.0**	**-53.0**	**-53.0**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/12/2019

***Observer Location:* R4** | *Project Name:* Oleander
Source: Parking Lot Vehicle Movements | *Job Number:* 10720
Condition: Operational | *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,836.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,836.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
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)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,836.0	-34.0	-34.0	-34.0	-34.0	-34.0	-34.0
Shielding (Barrier Attenuation)	1,836.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		18.2	-34.0	-34.0	-34.0	-34.0	-34.0
60 Minute Hourly Adjustment		**18.2**	**-34.0**	**-34.0**	**-34.0**	**-34.0**	**-34.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/12/2019

Observer Location: **R5** *Project Name:* Oleander
Source: Unloading/Docking Activity *Job Number:* 10720
Condition: Operational *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,958.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,958.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	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	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,958.0	-36.3	-36.3	-36.3	-36.3	-36.3	-36.3
Shielding (Barrier Attenuation)	1,958.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		30.9	-36.3	-36.3	-36.3	-36.3	-36.3
60 Minute Hourly Adjustment		**30.9**	**-36.3**	**-36.3**	**-36.3**	**-36.3**	**-36.3**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/12/2019

Observer Location: **R5** *Project Name:* Oleander
Source: Entry Gate & Truck Movements *Job Number:* 10720
Condition: Operational *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,830.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,830.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	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)	20.0	64.0	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,830.0	-39.2	-39.2	-39.2	-39.2	-39.2	-39.2
Shielding (Barrier Attenuation)	1,830.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		24.8	-39.2	-39.2	-39.2	-39.2	-39.2
60 Minute Hourly Adjustment		**24.8**	**-39.2**	**-39.2**	**-39.2**	**-39.2**	**-39.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/12/2019

Observer Location:	**R5**	*Project Name:*	Oleander
Source:	Roof-Top Air Conditioning Unit	*Job Number:*	10720
Condition:	Operational	*Analyst:*	A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,252.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,252.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,252.0	-53.1	-53.1	-53.1	-53.1	-53.1	-53.1
Shielding (Barrier Attenuation)	2,252.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		24.1	-53.1	-53.1	-53.1	-53.1	-53.1
60 Minute Hourly Adjustment		**24.1**	**-53.1**	**-53.1**	**-53.1**	**-53.1**	**-53.1**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/12/2019

Observer Location:	**R5**	*Project Name:*	Oleander
Source:	Parking Lot Vehicle Movements	*Job Number:*	10720
Condition:	Operational	*Analyst:*	A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,900.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,900.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
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)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,900.0	-34.2	-34.2	-34.2	-34.2	-34.2	-34.2
Shielding (Barrier Attenuation)	1,900.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		18.0	-34.2	-34.2	-34.2	-34.2	-34.2
60 Minute Hourly Adjustment		**18.0**	**-34.2**	**-34.2**	**-34.2**	**-34.2**	**-34.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/12/2019

Observer Location:	**R6**	*Project Name:*	Oleander
Source:	Unloading/Docking Activity	*Job Number:*	10720
Condition:	Operational	*Analyst:*	A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,669.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,669.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	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	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,669.0	-34.9	-34.9	-34.9	-34.9	-34.9	-34.9
Shielding (Barrier Attenuation)	1,669.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		32.3	-34.9	-34.9	-34.9	-34.9	-34.9
60 Minute Hourly Adjustment		**32.3**	**-34.9**	**-34.9**	**-34.9**	**-34.9**	**-34.9**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/12/2019

Observer Location:	**R6**	*Project Name:*	Oleander
Source:	Entry Gate & Truck Movements	*Job Number:*	10720
Condition:	Operational	*Analyst:*	A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,515.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,515.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	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)	20.0	64.0	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,515.0	-37.6	-37.6	-37.6	-37.6	-37.6	-37.6
Shielding (Barrier Attenuation)	1,515.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		26.4	-37.6	-37.6	-37.6	-37.6	-37.6
60 Minute Hourly Adjustment		**26.4**	**-37.6**	**-37.6**	**-37.6**	**-37.6**	**-37.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/12/2019

Observer Location:	**R6**	*Project Name:*	Oleander
Source:	Roof-Top Air Conditioning Unit	*Job Number:*	10720
Condition:	Operational	*Analyst:*	A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,478.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,478.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

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

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,478.0	-49.4	-49.4	-49.4	-49.4	-49.4	-49.4
Shielding (Barrier Attenuation)	1,478.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		27.8	-49.4	-49.4	-49.4	-49.4	-49.4
60 Minute Hourly Adjustment		**27.8**	**-49.4**	**-49.4**	**-49.4**	**-49.4**	**-49.4**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/12/2019

Observer Location:	**R6**	*Project Name:*	Oleander
Source:	Parking Lot Vehicle Movements	*Job Number:*	10720
Condition:	Operational	*Analyst:*	A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,399.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,399.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
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)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,399.0	-32.2	-32.2	-32.2	-32.2	-32.2	-32.2
Shielding (Barrier Attenuation)	1,399.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		20.0	-32.2	-32.2	-32.2	-32.2	-32.2
60 Minute Hourly Adjustment		**20.0**	**-32.2**	**-32.2**	**-32.2**	**-32.2**	**-32.2**

APPENDIX 10.1:

BLASTING CALCULATIONS & CONTRACTOR INFORMATION

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BLAST AT CLOSEST RECEIVER LOCATION

Scaled Distance

Source: ISEE's Blaster's Handbook, 2018 Edition.

Square Root Scaled Distance

$SD_2 = R / W^{1/2}$

R =	1282	feet	Distance to closest receiver location
W =	210	lbs	Maximum charge weight provided by the Project Applicant.

SD_2 = 88.47 ft/lbs$^{1/2}$

Peak Particle Velocity

$PPV = A * (SD_2)^{-B}$

A =	242	**Construction - Upper Bound**
SD_2 =	88.47	
B =	1.6	**Construction - Upper Bound**

PPV = 0.19 in/sec

Vibration Amplitude Equations For Various Blasting Industries

Industry	Metric Equations mm/sec.	U.S. Equations in./sec.	Confidence level	Source
General	$PPV = 1{,}140(SD_2)^{-1.6}$	$PPV = 160(SD_2)^{-1.6}$	Best Fit	DuPont
Construction	$PPV = 173(SD_2)^{-1.6}$	$PPV = 24.2(SD_2)^{-1.6}$	Lower Bound	Oriard
Construction	$PPV = 1{,}730(SD_2)^{-1.6}$	$PPV = 242(SD_2)^{-1.6}$	Upper Bound	Oriard (2005)
Construction	$PPV = 4{,}320(SD_2)^{-1.6}$	$PPV = 605(SD_2)^{-1.6}$	Upper Bound - High Confinement	Oriard (2005)
Construction	$PPV = 53(SD_2)^{-1.09}$	$PPV = 5(SD_2)^{-1.09}$	Best Fit	USBM RI 8507
Quarries	$PPV = 1{,}090(SD_2)^{-1.82}$	$PPV = 182(SD_2)^{-1.82}$	Best Fit	USBM Bulletin 656
Coal Mines	$PPV = 905(SD_2)^{-1.52}$	$PPV = 119(SD_2)^{-1.52}$	Best Fit	USBM RI 8507
Coal Mines	$PPV = 3{,}330(SD_2)^{-1.52}$	$PPV = 438(SD_2)^{-1.52}$	Upper bound	USBM RI 8507
Coal - Low Frequency sites	$PPV = 1{,}252(SD_2)^{-1.31}$	$PPV = 138(SD_2)^{-1.31}$	Best Fit	USBM RI 9226

Air Overpressure/Airblast

Cubed Root Scaled Distance

$SD_3 = R / W^{1/3}$

R =	1282	feet
W =	210	lbs

SD_3 = 215.68 ft/lbs$^{1/3}$

Air Overpressure Prediction

$P = A * SD_3^{-B}$

A = 1 — **Construction (average)**

SD_3 = 215.68

B = 1.1 — **Construction (average)**

P = 0.0027 psi

Air Overpressure Prediction Equations				
Blasting	**Metric Equations mb**	**U.S. Equations psi**	**Statistical Type**	**Source**
Open air (no confinement)	$P = 3589 \times SD_3^{-1.38}$	$P = 187 \times SD_3^{-1.38}$	Best Fit	Perkins
Coal mines (parting)	$P = 2596 \times SD_3^{-1.62}$	$P = 169 \times SD_3^{-1.62}$	Best Fit	USBM RI 8485
Coal mines (highwall)	$P = 5.37 \times SD_3^{-0.79}$	$P = 0.162 \times SD_3^{-0.79}$	Best Fit	USBM RI 8485
Quarry face	$P = 37.1 \times SD_3^{-0.97}$	$P = 1.32 \times SD_3^{-0.97}$	Best Fit	USBM RI 8485
Metal Mine	$P = 14.3 \times SD_3^{-0.71}$	$P = 0.401 \times SD_3^{-0.71}$	Best Fit	USBM RI 8485
Construction (average)	$P = 24.8 \times SD_3^{-1.1}$	$P = 1 \times SD_3^{-1.1}$	Best Fit	Oriard (2005)
Construction (highly confined)	$P = 2.48 \times SD_3^{-1.1}$	$P = 0.1 \times SD_3^{-1.1}$	Best Fit	Oriard (2005)
Buried (total confinement)	$P = 1.73 \times SD_3^{-0.96}$	$P = 0.061 \times SD_3^{-0.96}$	Best Fit	USBM RI 8485

Decibels (Linear)

$P_s = 20 * \log(P / P_0)$

P = 0.0027 psi

P_0 = 2.9E-09 pascals — Reference value: $2.9 * 10^{-9}$ lbs/inch^2

P_s = 119.41 dB

From: Jonathan Drake <jdrake@ampcocontracting.com>
Subject: RE: Oleander Grading/Blasting
Date: July 3, 2019 at 1:28:44 PM PDT
To: "Bernard, Jared" <Jared.Bernard@mbakerintl.com>, Joe Ha <joeha@ampcocontracting.com>
Cc: Charly Ray <cray@appliedplanning.com>, "Mota, Cesar" <Cesar.Mota@mbakerintl.com>, Michael Parizo <MParizo@ampconorth.com>

Jared,

Here is the information we received regarding the blasting.

Blasting frequency: 2-3 days a week.
Blasts per day: 1 blast per day
Estimated Horizontal Blast Area (ft2): 150ft x 150ft to 200ft x 200ft.
Max charge weight: max charge of blast depend on appox to building.@200ft 25lbs max per delay. @400ft 100lbs per delay.@600ft 210lbs per delay based on scale dist of 40.
Anticipated locations: Depends on area est. by AMPCO they will know where there is rock. And then give us area they want drilled.

Regards,

Jonathan Drake
Project Engineer | AMPCO Contracting, Inc.

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