APPENDIX I1

NOISE IMPACT ANALYSIS

Gateway South Building 4

NOISE IMPACT ANALYSIS

CITY OF SAN BERNARDINO

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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
CHE	Cargo Handling Equipment
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EA	Existing plus Ambient
EAC	Existing plus Ambient plus Cumulative
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz
I-215	Interstate 215
I-10	Interstate 10
INCE	Institute of Noise Control Engineering
Leq	Equivalent continuous (average) sound level
Lmax	Maximum level measured over the time interval
Lmin	Minimum level measured over the time interval
mph	Miles per hour
OPR	Office of Planning and Research
PPV	Peak particle velocity
Project	Gateway South Building 4
RCNM	Roadway Construction Noise Model
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
SBIA	San Bernardino International Airport
sf	Square feet
VdB	Vibration Decibels

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EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures for the proposed Gateway South Building 4 development ("Project"). The Project site is located south of Dumas Street and west of Waterman Avenue in the City of San Bernardino. The Project is proposed to consist of a total of 1,063,853 square feet (sf) of high-cube warehouse/distribution center use (as a conservative measure, the analysis herein evaluates 1,064,880 sf of high-cube warehouse/distribution center use). This study has been prepared to satisfy the City of San Bernardino noise standards and to ensure that adequate noise abatement measures are incorporated into the Project's development.

OFF-SITE TRAFFIC NOISE ANALYSIS

Traffic generated by the operation of the proposed Project will influence the traffic noise levels in surrounding off-site areas. To quantify the off-site traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on 11 roadway segments surrounding the Project site were calculated based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in the *Gateway South Building 4 Traffic Impact Analysis* prepared by Urban Crossroads, Inc. (1) To assess the off-site noise level impacts associated with the proposed Project, noise contour boundaries were developed for Existing, Existing plus Ambient (EA) 2018, EA plus Cumulative (EAC) 2018, and Horizon Year 2040 traffic conditions. The analysis shows that the Project-related traffic noise level increases under all traffic scenarios will be *potentially significant* on one roadway segment: Washington Avenue south of Orange Show Road, which will exceed the significance thresholds for both noise-sensitive and non-noise-sensitive land uses identified in Section 4. This roadway segment will include both an interim roadway improvement area under Existing and Year 2018 conditions, and two permanent access alternatives for site access under Horizon Year 2040 conditions. However, the off-site Project-related traffic noise level increase on Washington Avenue south of Orange Show Road is considered a *significant* impact under all three site access route alternatives.

The land use adjacent to Washington Avenue south of Orange Show road is designated as Industrial Light use by the City of San Bernardino General Plan Land Use Element, and the existing residential homes immediately south of Project access on Washington Avenue represent non-conforming use. However, the Project-related traffic noise level increase due to the addition of Project truck trips on this roadway segment represents a *significant* noise level impact for both noise-sensitive and non-noise-sensitive uses, and therefore, noise mitigation measures are considered in this analysis to reduce the noise levels generated by Project truck trips.

The mitigation measures considered in this analysis include the use of rubberized asphalt hot mix pavement for the portion of Project access road on Washington Avenue south of Orange Show Road, and off-site noise barriers adjacent to the existing non-conforming residential lots south of Project access on Washington Avenue. However, neither form of potential noise mitigation would eliminate or *substantially* (12 dBA Leq or more per Caltrans *Traffic Noise Analysis Protocol* (2)) reduce the off-site traffic noise level increases associated with Project truck trips on

Washington Avenue south of Orange Show Road. Therefore, the Project-related traffic noise level increases are considered *significant* impacts, and no off-site traffic noise mitigation is identified, since the off-site traffic noise mitigation measures considered in this analysis would not substantially reduce or eliminate the impacts.

This off-site traffic noise analysis evaluated 11 study area roadway segments based on the without and with Project traffic noise levels. As indicated above, only one segment of the 11, Washington Avenue south of Orange Show Road, will experience a *significant* off-site traffic noise level impact under with Project conditions. Further, the noise-sensitive residential homes on the impacted roadway segment represent existing non-conforming uses which are designated as Industrial Light land use, and are expected, under long range General Plan buildout conditions, to be redeveloped as industrial, non-noise sensitive land use.

OPERATIONAL NOISE ANALYSIS

Using reference noise levels to represent the expected noise sources from the Gateway South Building 4 site, this analysis estimates the Project-related stationary-source noise levels at nearby sensitive receiver locations. The normal activities associated with the proposed Gateway South Building 4 are anticipated to include idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods. The operational noise analysis shows that the Project-related stationary-source noise levels due to the idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods will satisfy the City of San Bernardino noise level standards at the sensitive receiver locations near the Project site.

Further, this analysis demonstrates that the Project will not contribute an operational noise level impact to the existing ambient noise environment at any of the sensitive receiver locations. Therefore, the operational noise level impacts associated with the proposed 24-hour seven days per week Project activities, such as the idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods, will be *less than significant*.

OPERATIONAL NOISE ABATEMENT MEASURES

To further reduce potential operational noise levels received at nearby noise-sensitive receiver locations, it is recommended that the Lead Agency require the following as Project Conditions of Approval:

- All on-site operating equipment under the control of the building user that is used in outdoor areas shall be equipped with properly functioning and well-maintained mufflers.
- Maintain quality pavement conditions on the property that are free of vertical deflection (i.e. speed bumps) to minimize truck noise.
- The truck access gates and loading docks within the truck court on the Project site shall be posted with signs which state:
    - Truck drivers shall turn off engines when not in use;
    - Diesel trucks servicing the Project shall not idle for more than five (5) minutes; and
    - Post telephone numbers of the building facilities manager to report idling violations.

CONSTRUCTION NOISE AND VIBRATION ANALYSIS

Construction noise represents a short-term impact on the ambient noise levels. Based on the five phases of Project construction, the temporary construction-related noise impacts are expected to create temporary and intermittent high-level noise at receivers surrounding the Project site when certain activities occur near the property line. While the City of San Bernardino establishes limits to the hours during which construction activity may take place, it does not identify specific noise level limits for construction noise levels. Therefore, this analysis uses an 85 dBA Leq threshold identified by the National Institute for Occupational Safety and Health (NIOSH) to quantify and determine potential construction noise level impacts. The analysis shows that the Project-related short-term construction noise levels will approach 75.4 dBA Leq and will satisfy the 85 dBA Leq threshold identified by the National Institute for Occupational Safety and Health (NIOSH). (3)

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 construction vibration levels in RMS are expected to approach 0.011 in/sec (RMS) at the nearby receiver locations. Based on the City of San Bernardino vibration standards of 0.7 in/sec (RMS), the proposed Project construction activities will be *less than significant.*

CONSTRUCTION NOISE AND VIBRATION ABATEMENT MEASURES

Construction noise is temporary, intermittent and of short duration, and will not present any long-term impacts. The following practices would reduce any temporary and intermittent noise level increases produced by the construction equipment at the nearby noise-sensitive residential land uses, consistent with City of San Bernardino General Plan Policies 14.3.2.1 and 14.3.2. (4) Prior to approval of grading plans and/or issuance of building permits, plans shall include the following notes. The Project construction supervisor shall ensure compliance with the notes and the City shall conduct periodic inspection at its discretion.

- Noise-generating Project construction activities shall only occur between the hours of 7:00 a.m. and 8:00 p.m. on any day, as specified in the City of San Bernardino Noise Ordinance. (5)
- The construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards.
- No stationary construction equipment shall be placed within 500 feet of residential homes and other noise-sensitive receivers. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise-sensitive receivers nearest the Project site.
- The construction contractor shall locate equipment staging in the western portion of the property, near the proposed western building façade, which is the area that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site.
- The construction contractor shall schedule haul truck deliveries to occur during the same hours specified for construction equipment (between the hours of 7:00 a.m. and 8:00 p.m. on any day)

and design haul truck delivery routes to minimize the use of roads that pass by noise-sensitive land uses.

SIGNIFICANCE FINDINGS

The results of this Gateway South Building 4 Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report. Table ES-1 shows the findings of significance for each potential noise and/or vibration impact 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	*Potentially Significant*	*Significant*[1]
Operational Noise	9	*Less Than Significant*	*n/a*
Operational Vibration		*Less Than Significant*	*n/a*
Construction Noise	10	*Less Than Significant*	*n/a*
Construction Vibration		*Less Than Significant*	*n/a*

[1] Significant impact occurs at adjacent land use to one roadway segment, Washington Avenue south of Orange Show Road. The existing residential land use is non-conforming use based on the General Plan designation for industrial use at this location. Mitigation measures are considered in this noise study to reduce the impacts at adjacent uses, but the impact remains significant since they cannot substantially reduce or eliminate the noise impact.
"n/a" = No mitigation is required.

1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed Gateway South Building 4 ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, describes the local regulatory setting, provides the study methods and procedures for traffic noise analysis, and evaluates the future exterior noise environment. In addition, this study includes an analysis of the potential Project-related long-term operational and short-term construction noise impacts.

1.1 SITE LOCATION

The proposed Gateway South Building 4 site is located south of Dumas Street and west of Waterman Avenue in the City of San Bernardino, as shown on Exhibit 1-A. The Project site is bordered by the San Bernardino County Flood Control Channel to the west, and a future industrial warehouse building to the north, various office and industrial land uses to the east, and the Santa Ana River to the south. The Interstate 215 (I-215) and I-10 Freeways are located roughly one-half mile to the west and south, respectively.

1.2 PROJECT DESCRIPTION

The Project is proposed to consist of a total of 1,063,853 square feet (sf) of high-cube warehouse/distribution center use (as a conservative measure, the analysis herein evaluates 1,064,880 sf of high-cube warehouse/distribution center use), as shown on Exhibit 1-B. The Project site is currently occupied by the San Bernardino Public Golf Course. Existing structures on-site totaling approximately 17,575 square feet (sf) will be demolished prior to building construction. For the purposes of this traffic study, the Project anticipated to be developed in a single phase with an anticipated opening year of 2018.

At the time this noise analysis was prepared the future tenants of the proposed Project were unknown. To present the potential worst-case noise conditions, this analysis assumes the Project would be operational 24 hours per day, seven days per week. The Project business operations would primarily be conducted within the enclosed buildings, except for traffic movement, parking, as well as loading and unloading of trucks at designated loading bays. The on-site Project-related noise sources are expected to include: idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods. This noise analysis is intended to describe noise level impacts associated with the expected typical warehouse and distribution storage activities at the Project site. As part of the Project's design, all on-site outdoor cargo handling equipment (CHE) (including yard trucks, hostlers, yard goats, pallet jacks, forklifts, and other on-site equipment) will be powered by non-diesel fueled engines and all on-site indoor forklifts shall be powered by electricity, compressed natural gas, or propane.

According to the *Gateway South Building 4 Traffic Impact Analysis* prepared by Urban Crossroads, Inc., the Project is expected to generate a net total of approximately 1,789 trip-ends per day (actual vehicles) with 117 AM peak hour trips and 127 PM peak hour trips. (1) The net Project trip generation includes 682 truck trip-ends per day from the proposed buildings within the Project site. This noise study relies on the net Project trips to accurately account for the effect of individual truck trips on the study area roadway network.

Access to the northern portion of the Project site from Washington Avenue south of Orange Show Road will include both an interim roadway improvement area under Existing and Year 2018 conditions, and two permanent access alternatives for site access under Horizon Year 2040 conditions, as shown on Exhibit 1-C.

EXHIBIT 1-A: LOCATION MAP

EXHIBIT 1-B: SITE PLAN

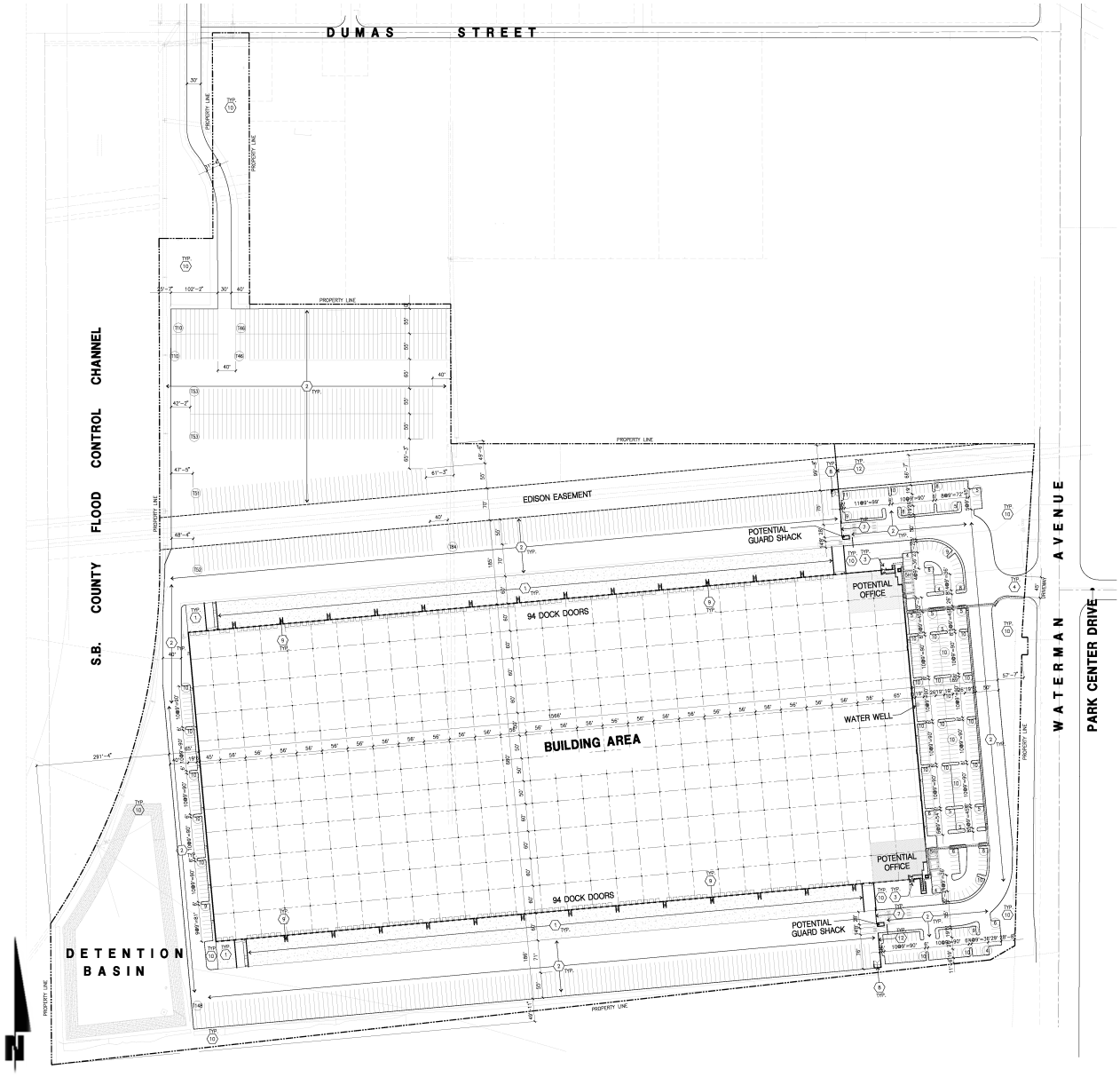
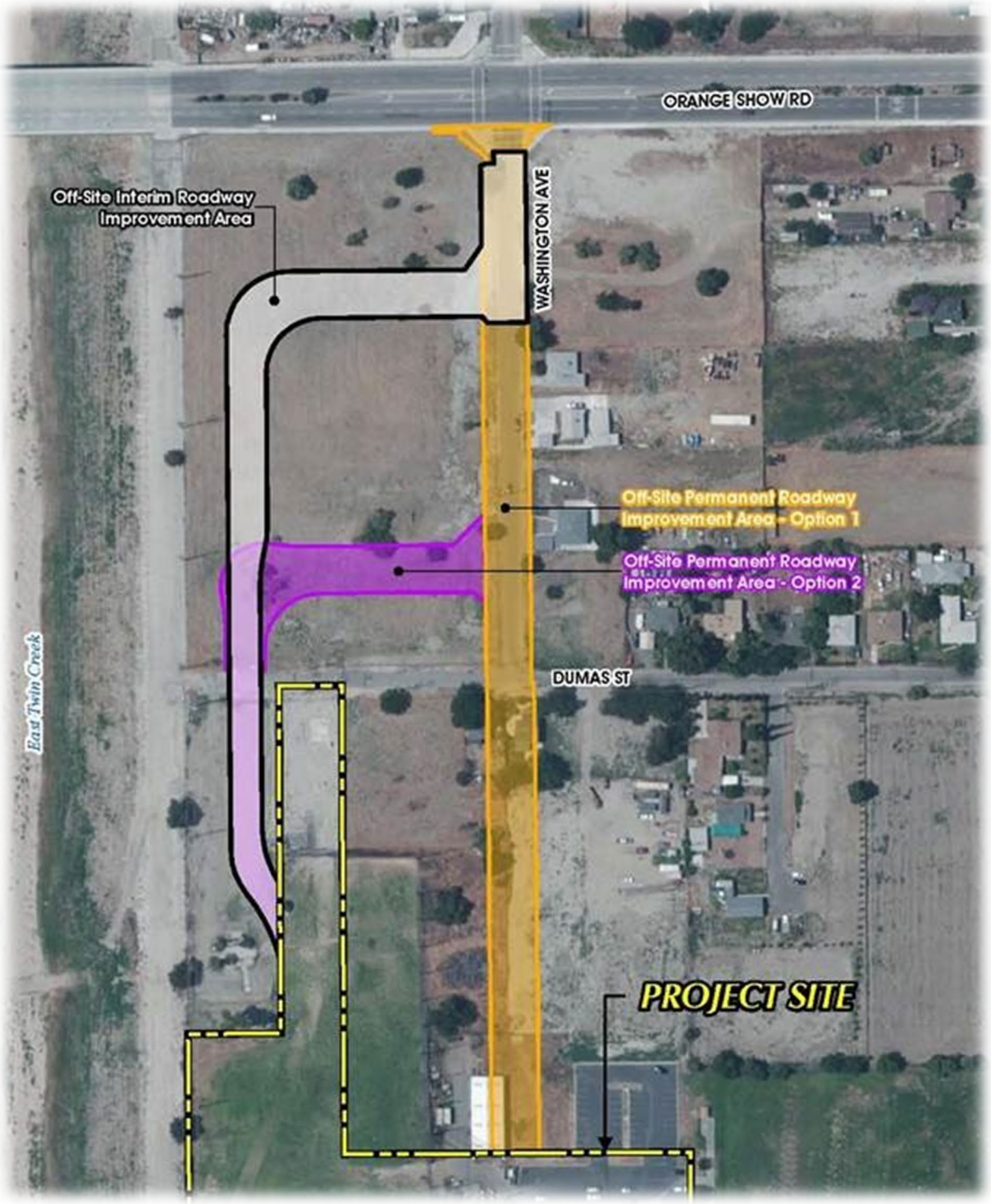


EXHIBIT 1-C: SITE ACCESS ALTERNATIVES



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2 FUNDAMENTALS

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

EXHIBIT 2-A: TYPICAL NOISE LEVELS

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

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

2.1 RANGE OF NOISE

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

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

2.2 NOISE DESCRIPTORS

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

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

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.

2.3.2 GROUND ABSORPTION

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

2.3.3 ATMOSPHERIC EFFECTS

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

2.3.4 SHIELDING

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

2.4 NOISE CONTROL

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

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receptor.

Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (8)

2.6 LAND USE COMPATIBILITY WITH NOISE

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

2.7 COMMUNITY RESPONSE TO NOISE

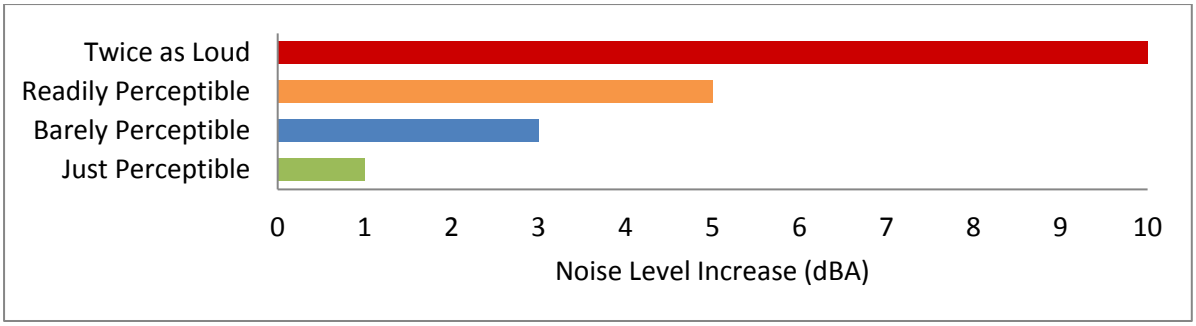
Community responses to noise may range from registering a complaint by telephone or letter, to initiating court action, depending upon each individual's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

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

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Another twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (10) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (10)

Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. An increase or decrease of 1 dBA cannot be perceived except in carefully controlled laboratory experiments, a change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (8)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



2.8 EXPOSURE TO HIGH NOISE LEVELS

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

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

2.9 VIBRATION

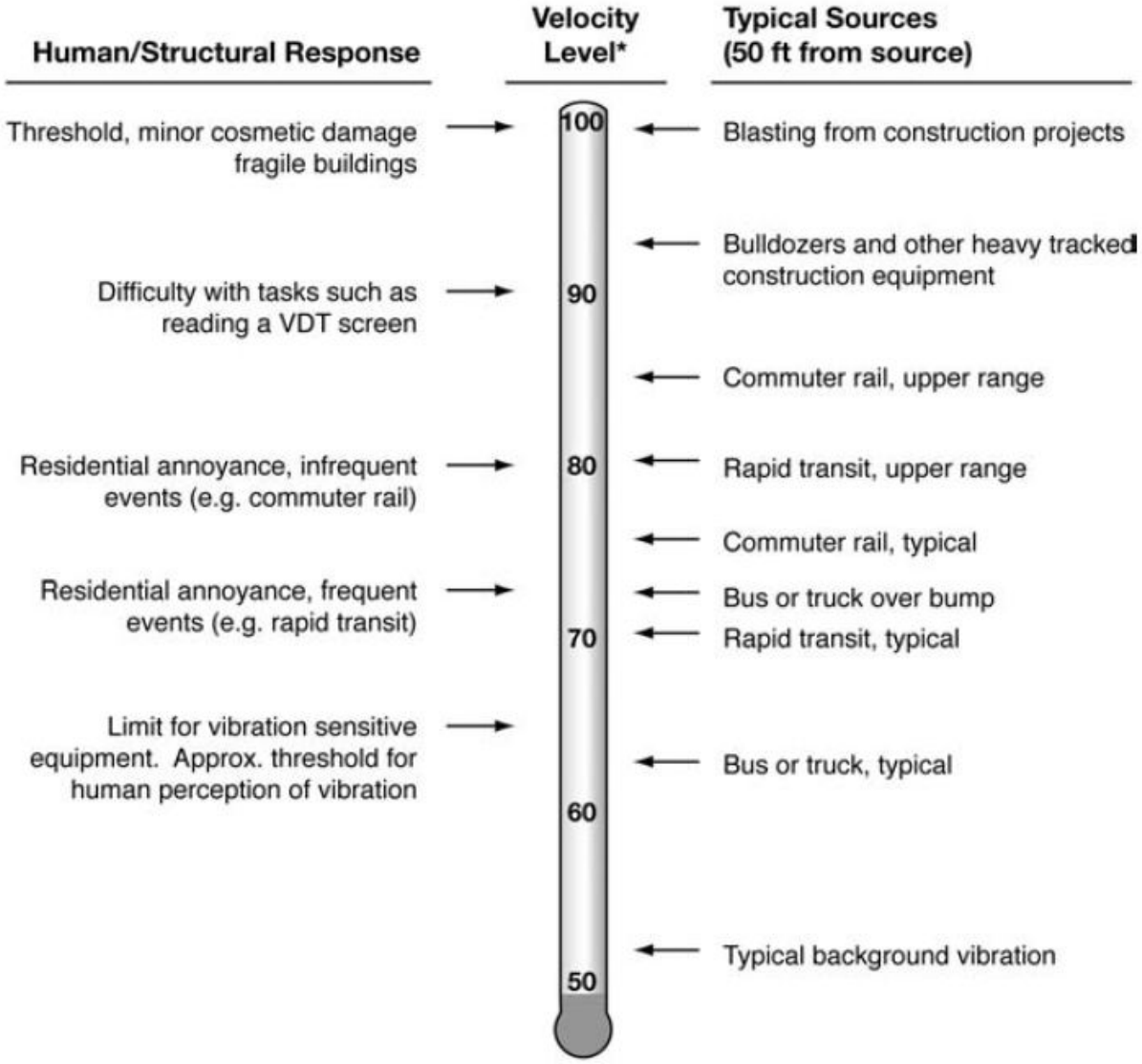
According to the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment* (13), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include 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.

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

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



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

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

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3 REGULATORY SETTING

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains fairly 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 according to guidelines adopted by the Governor's Office of Planning and Research (OPR). (14) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*.

3.2 STATE OF CALIFORNIA GREEN BUILDING STANDARDS CODE

The 2014 State of California's Green Building Standards Code contains mandatory measures for non-residential building construction in Section 5.507 on Environmental Comfort. (15) 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 Leq for any hour of operation, a wall and roof-ceiling combined STC rating of 45, and exterior windows with a minimum STC rating of 40 are required (Section 5.507.4.1).

3.3 CITY OF SAN BERNARDINO GENERAL PLAN NOISE ELEMENT

The City of San Bernardino General Plan Noise Element identifies several policies to minimize the impacts of excessive noise levels throughout the community. (4) The Noise Element provides policy guidance which addresses the generation, mitigation, avoidance, and the control of excessive noise. To protect City of San Bernardino residents from excessive noise levels, the Noise Element contains the following three goals:

14.1 Ensure that residents are protected from excessive noise through careful land planning.

14.2 Encourage the reduction of noise from transportation-related noise sources such as motor vehicles, aircraft operations, and railroad movements.

14.3 Protect residents from the negative effects of "spill over" or nuisance noise.

The noise policies specified in the City of San Bernardino Noise Element provide the guidelines necessary to satisfy these goals. To ensure that residents are not exposed to excessive noise levels (Goal 14.1), Policies 14.1.1 to 14.1.4 indicate that sensitive land uses such as housing, health care facilities, schools, libraries, and religious facilities should not experience exterior noise levels greater than 65 dBA LDN for exterior areas and 45 dBA LDN for interior areas. As discussed in Section 2.2 the more conservative CNEL descriptor is used in this analysis, and therefore, the exterior noise level criteria of 65 dBA CNEL and interior noise level criteria of 45 dBA CNEL shall apply to sensitive land uses. Policies 14.2.1 to 14.2.19 outline the transportation-related guidelines and mitigation strategies the City uses to satisfy Goal 14.2. To protect residents from sources of operational and construction noise (Goal 14.3), the Noise Element includes Policies 14.3.1 to 14.3.8 to adopt a Noise Ordinance and ensure noise issues between land uses are reduced. (4)

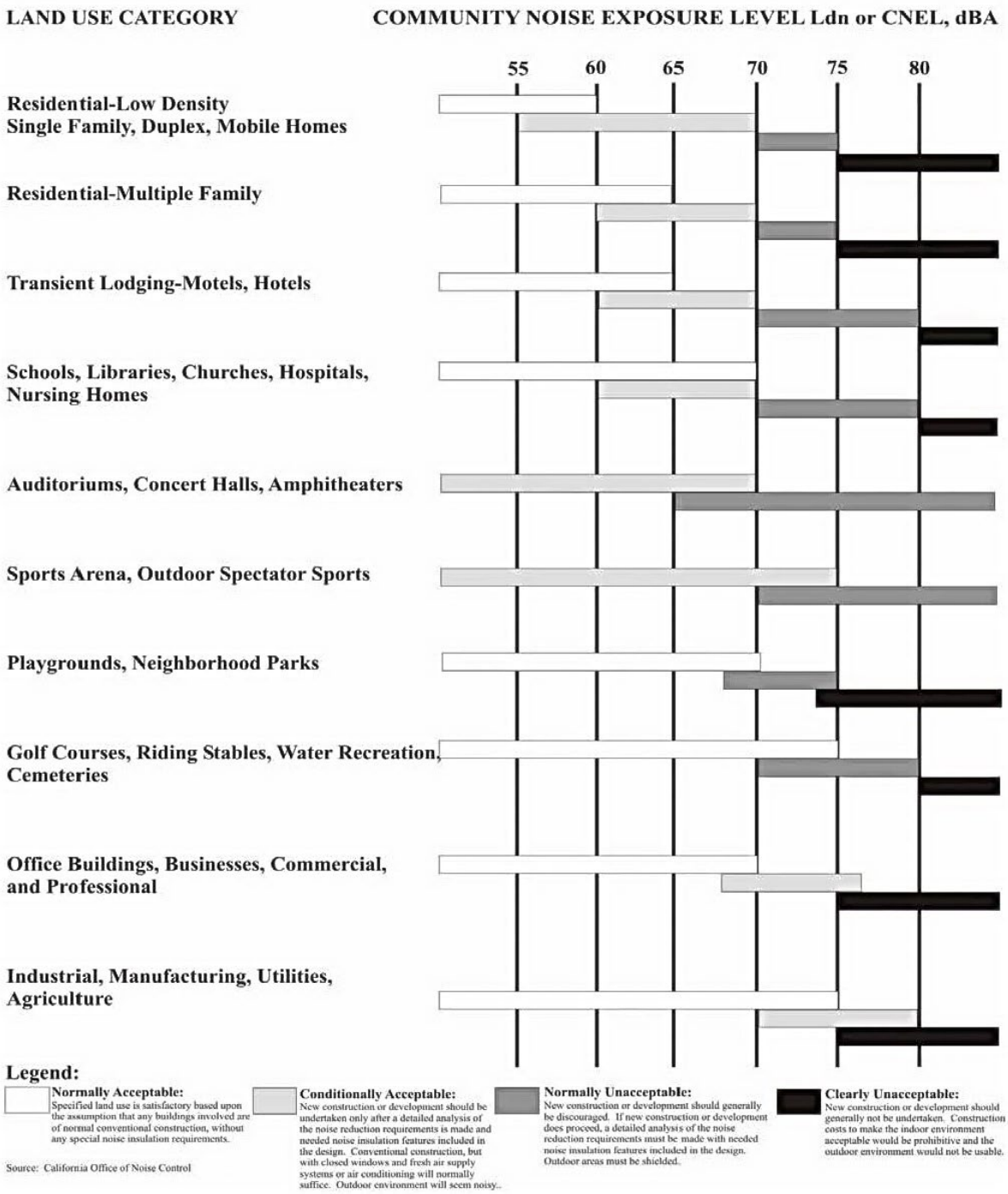
3.3.1 LAND USE COMPATIBILITY

The noise criteria identified in the City of San Bernardino Noise Element (Figure N-1) are guidelines to evaluate the land use compatibility of transportation-related noise. The compatibility criteria, shown on Exhibit 3-A, provides the City with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels. The *Land Use Compatibility for Community Noise Exposure* guidelines indicate that industrial and manufacturing land uses, such as the Project, are considered *normally acceptable* with noise levels below 70 dBA CNEL and *conditionally acceptable* with noise levels of less than 75 dBA CNEL.

3.3.2 TRANSPORTATION NOISE STANDARDS

To encourage the reduction of noise from transportation-related noise sources such as motor vehicles, aircraft operations and railroad movements (Goal 14.2), Table N-3 of the City of San Bernardino General Plan Noise Element, shown on Exhibit 3-B, identifies a maximum allowable exterior noise level of 65 dBA CNEL and an interior noise level limit of 45 dBA CNEL for new residential developments. While the City specifically identifies an exterior noise level limit for noise-sensitive residential land uses such as hotels, hospitals, schools, and parks, the City of San Bernardino does not maintain exterior noise standards for non-noise sensitive land uses such as office, retail, manufacturing, utilities, agriculture, and industrial.

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



Source: City of San Bernardino General Plan Noise Element, Figure N-1.

EXHIBIT 3-B: INTERIOR AND EXTERIOR NOISE STANDARDS

Land Use		*CNEL (dBA)*	
Categories	***Uses***	***Interior [1]***	***Exterior [2]***
Residential	Single and multi-family, duplex	45[3]	65
	Mobile homes	----	65[4]
Commercial	Hotel, motel, transient housing	45	---
	Commercial retail, bank, restaurant	55	---
	Office building, research and development, professional offices	50	---
	Amphitheater, concert hall, auditorium, movie theater	45	---
	Gymnasium (Multipurpose)	50	---
	Sports Club	55	---
	Manufacturing, warehousing, wholesale, utilities	65	---
	Movie Theaters	45	---
Institutional/ Public	Hospital, school classrooms/playgrounds	45	65
	Church, library	45	---
Open Space	Parks	---	65

[1] Indoor environment excluding: bathrooms, kitchens, toilets, closets, and corridors

[2] Outdoor environment limited to:

- Private yard of single-family dwellings
- Multi-family private patios or balconies accessed from within the dwelling (Balconies 6 feet deep or less are exempt)
- Mobile home parks
- Park picnic areas
- School playgrounds
- Hospital patios

[3] Noise level requirement with closed windows, mechanical ventilation or other means of natural ventilation shall be provided as per Chapter 12, Section 1205 of the Uniform Building Code.

[4] Exterior noise levels should be such that interior noise levels will not exceed 45 dBA CNEL.

Source: City of San Bernardino General Plan Noise Element, Table N-3.

3.4 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Gateway South Building 4 Project, operational source noise is typically evaluated against standards established under a City's Municipal Code. While the City of San Bernardino maintains several policies in the Municipal Code Noise Control Ordinance to control the negative effects of nuisance noise, it does not identify specific exterior noise level limits. However, the policies in the Municipal Code Development Code, Chapter 19.20, *Property Development Standards* contain the exterior and interior noise level standards for residential land uses. Therefore, the stationary noise sources such as idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods originating from a designated fixed location or private property such as the Gateway South Building 4 site, are evaluated against the policies adopted in the City's Development Code. (5)

The Project operational noise impacts are governed by the City of San Bernardino Municipal Code, Section 8.54, included in Appendix 3.2. Section 8.54.060 states when: *such noises are an accompaniment and effect of a lawful business, commercial or industrial enterprise carried on in an area zoned for that purpose*…these activities shall be exempt (Section 8.54.060(B)). (16) However, due to the Project's close proximity to residential land uses, located north of the Project site boundary, Development Code, Section 19.20.030.15(A), limits the operational stationary-source noise from the Gateway South Building 4 Project to an exterior noise level of 65 dBA Leq for residential land use. (5) The City of San Bernardino Development Code noise standards are shown on Table 3-1 and included in Appendix 3.1.

TABLE 3-1: OPERATIONAL NOISE STANDARDS

Jurisdiction	Land Use	Exterior Noise Level Standard (dBA Leq)[1]
City of San Bernardino[1]	Residential	65

[1] Source: City of San Bernardino Development Code, Section 19.20.030.15(A) (Appendix 3.1).

3.5 CONSTRUCTION NOISE STANDARDS

To analyze noise impacts originating from the construction of the Gateway South Building 4 site, noise from construction activities are typically evaluated against standards established under a City's Municipal Code. The Municipal Code noise standards for construction are described below for the City of San Bernardino to determine the potential noise impacts at nearby receiver locations. The construction-related noise standards are shown on Table 3-2.

3.5.1 CITY OF SAN BERNARDINO MUNICIPAL CODE

The City of San Bernardino has set restrictions to control noise impacts associated with the construction of the proposed Project. Section 8.54.070 of the City's Noise Control Ordinance states: *No person shall be engaged or employed, or cause any other person to be engaged or employed, in any work of construction, erection, alteration, repair, addition, movement, demolition, or improvement to any building or structure except within the hours of 7:00 a.m. and 8:00 p.m.* (16) While the City establishes limits to the hours during which construction activity may take place, it does not identify specific noise level limits for construction noise levels.

TABLE 3-2: CONSTRUCTION NOISE STANDARDS

Jurisdiction	Permitted Hours of Construction Activity
City of San Bernardino[1]	7:00 a.m. to 8:00 p.m. on any day.

[1] Source: City of San Bernardino Municipal Code, Section 8.54.070 (Appendix 3.2).

3.5.1 CONSTRUCTION NOISE LEVEL THRESHOLD

To evaluate whether the Project will generate a substantial periodic increase in short-term 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). (3) 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. (3) For the purposes of this analysis, the lowest, more conservative construction noise level threshold of 85 dBA Leq 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 period, they are expressed as Leq noise levels. Therefore, the noise level threshold of 85 dBA Leq 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.

3.5.2 CONSTRUCTION-RELATED HEARING CONSERVATION

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. (11) 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. Further, periodic exposure to high noise levels in short duration, such as Project construction, is typically considered an annoyance and not impactful to human health. It would take several years of exposure to high noise levels to result in hearing impairment. (12)

3.6 VIBRATION STANDARDS

The City of San Bernardino Development Code, Section 19.20.030.28 indicates: *No vibration associated with any use shall be permitted which is discernible beyond the boundary line of the property*; however, no specific vibration standards are identified. To assess vibration impacts from the Project site, this analysis uses the vibration standards found in Section 15.68.020 of the City of San Bernardino Municipal Code for equipment or machinery. The vibration standards indicate that no displacement of greater than 0.33 of one inch is allowed. To determine the vibration (inches per second) standard based on a displacement of 0.33 inches, the following equation from the *Caltrans Transportation and Construction- Induced Vibration Guidance Manual*:

$$V = 2 \pi f (D/2)$$

Where "V" is the velocity; "f" is the frequency (in Hertz); and "D" is the displacement of 0.33 inches. The typical frequency range of vibration from transportation and construction sources falls within 10 to 30 Hertz (Hz) and centers around 15 Hz. (17) Therefore, using the typical frequency range of 10 to 30 Hz, the vibration standards shown on Table 3-3 shall apply for the nearby residential receiver locations due to equipment or machinery associated with the construction of the Project.

Construction activity can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. Construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. Occasionally large bulldozers and loaded trucks can cause perceptible vibration levels at close proximity. The vibration standards on Table 3-3 provide the basis for determining the relative significance of potential Project related vibration impacts at the nearby sensitive receiver locations.

TABLE 3-3: CONSTRUCTION VIBRATION STANDARDS

Jurisdiction	Frequency (Hz)[1]	Displacement (inches)[2]	PPV (in/sec)[3]	RMS Velocity (in/sec)[4]
City of San Bernardino	10	0.033	1.0	0.7
	15	0.033	1.6	1.1
	20	0.033	2.1	1.5
	25	0.033	2.6	1.8
	30	0.033	3.1	2.2
Minimum Velocity Threshold:			1.0	0.7

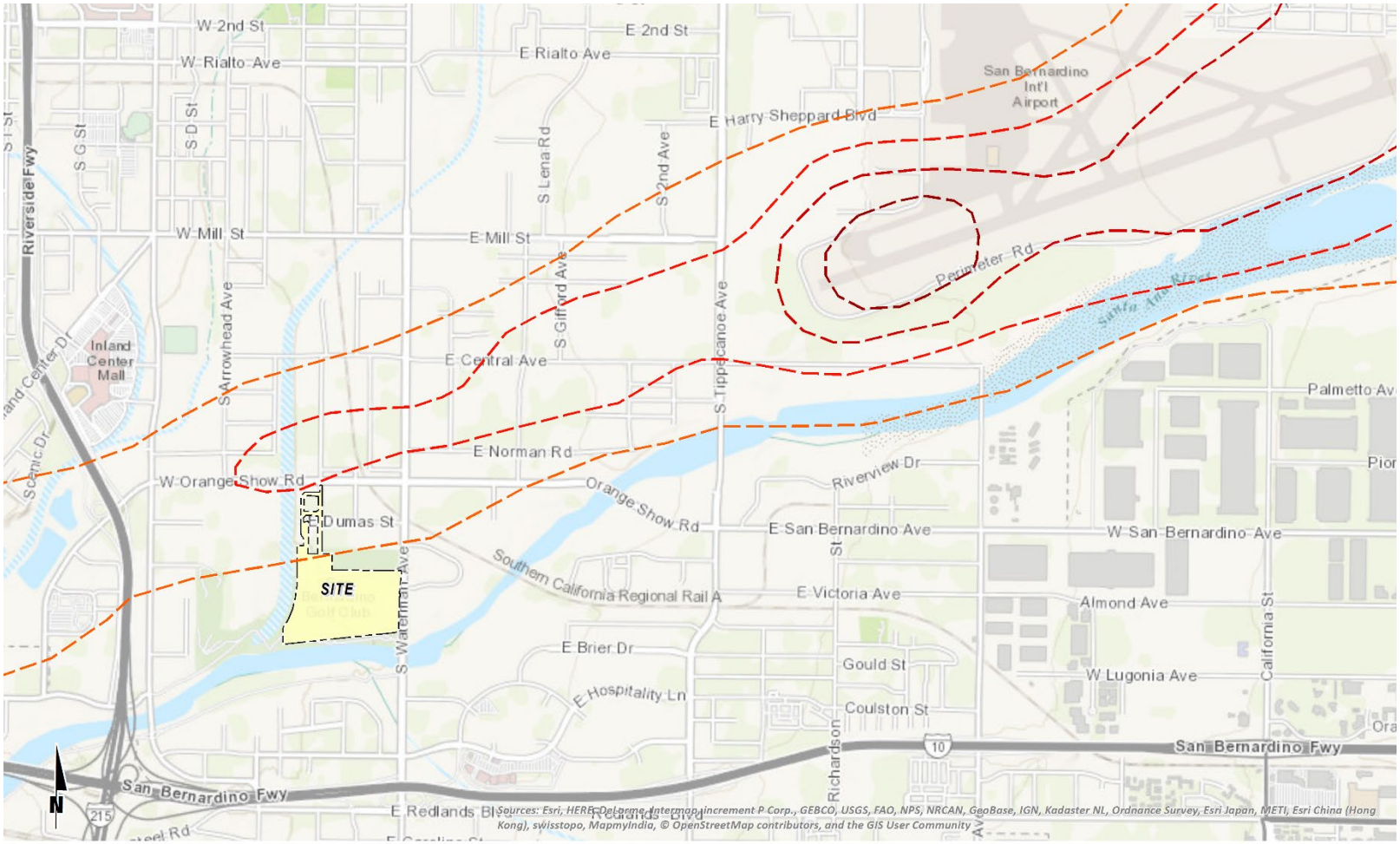
[1] The typical frequency range of vibration from transportation and construction sources based on the Caltrans Transportation and Construction Vibration Guidance Manual, September 2013.
[2] No displacement of greater than 0.033 of one inch is allowed based on Section 15.68.020 of the City of San Bernardino Municipal Code for equipment or machinery.
[3] Calculated Peak Particle Velocity (PPV) based on the basic vibration formula ($V=2\pi f(D/2)$) provided in the Caltrans Transportation and Construction Vibration Guidance Manual, September 2013, where 'f' = frequency and 'D' = displacement.
[4] Calculated Root-Mean-Square (RMS) velocity based on the 0.71 conversion factor for the PPV as provided in Appendix A of the Caltrans Transportation and Construction Vibration Guidance Manual, September 2013.

3.7 SAN BERNARDINO INTERNATIONAL AIRPORT NOISE STANDARDS

The San Bernardino International Airport (SBIA) is located approximately 1.75 miles northeast of the Project site. The City of San Bernardino General Plan Noise Element policies and noise contours for the SBIA are used in this analysis to determine the potential aircraft-related noise impacts on the Project site.

As shown on Exhibit 3-C, the Project site is located within the 65 to 70 dBA CNEL noise level contour boundary of the SBIA. The City of San Bernardino General Plan Noise Element, Table N-3, indicates that any industrial (manufacturing) building of the Project within the 65 to 70 dBA CNEL noise level contour boundary must satisfy an interior noise level standard of 65 dBA CNEL. (4) However, no Project buildings are located in the portion of the Project site within the 65 to 70 dBA CNEL noise level contour boundary, and no exterior noise level standards are identified for industrial land uses in the City of San Bernardino General Plan Noise Element. Further, as previously shown on Exhibit 3-A, the Project industrial land use is considered *normally acceptable* with exterior noise levels between 65 to 70 dBA CNEL. Therefore, no exterior or interior noise mitigation is required to satisfy the City of San Bernardino General Plan Noise Element policies. Further, standard building construction typically provides up to 25 dBA CNEL of attenuation, which will reduce the interior noise levels within the building at the Project site to satisfy the 65 dBA CNEL interior noise level standard of the City of San Bernardino General Plan Noise Element.

EXHIBIT 3-C: SAN BERNARDINO INTERNATIONAL AIRPORT NOISE LEVEL CONTOUR BOUNDARIES



LEGEND:

- Unmitigated 65 dBA CNEL Noise Level Contour Boundary
- Unmitigated 70 dBA CNEL Noise Level Contour Boundary
- Unmitigated 75 dBA CNEL Noise Level Contour Boundary
- Unmitigated 80 dBA CNEL Noise Level Contour Boundary

Source: County of San Bernardino, Norton Air Force Base, 1988.

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4 SIGNIFICANCE CRITERIA

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

A. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

B. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.

C. A substantial permanent increase in ambient noise levels in the Project vicinity above existing levels without the proposed Project; or

D. A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above noise levels existing without the proposed Project.

E. For a project located within 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, expose people residing or working in the Project area to excessive noise levels.

F. For a project within the vicinity of a private airstrip, expose people residing or working in the Project area to excessive noise levels.

While the CEQA Guidelines and the City of San Bernardino 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 under CEQA Guideline A, they do not define the levels at which increases are considered substantial for use under Guidelines B, C, and D. CEQA Guidelines E and F apply to nearby public and private airports, if any, and the Project's land use compatibility. The closest airport which would require additional noise analysis under CEQA guidelines E and F is the San Bernardino International Airport (SBIA). As previously shown on Exhibit 3-C, the Project site is located within the 65 to 70 dBA CNEL noise level contour boundary of the SBIA. However, no Project buildings are in the portion of the Project site within the 65 to 70 dBA CNEL noise level contour boundary, and no exterior noise level standards are identified for industrial land uses in the City of San Bernardino General Plan Noise Element. Therefore, the potential impacts under CEQA guidelines E and F are *less than significant*, and are not further analyzed in this noise study.

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.* (18)

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) (19) 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 (i.e., CNEL).

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. According to 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 City of San Bernardino General Plan Noise Element, Figure 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, such as Industrial land uses. As previously shown on Exhibit 3-A, the *normally acceptable* exterior noise level for non-noise-sensitive land use, such as industrial use, is 70 dBA CNEL. Noise levels greater than 70 dBA CNEL are considered *conditionally acceptable* according to the *Land Use Compatibility for Community Noise Exposure*.

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 are 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 for noise-sensitive land uses but instead rely on the City of San Bernardino General Plan Noise Element, Table N-1, *Land Use Compatibility for Community Noise Exposure normally acceptable* 70 dBA CNEL exterior noise level criteria.

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.

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 and the Project creates a *readily perceptible* 5 dBA or greater Project-related noise level increase; or
    - range from 60 to 65 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project-related noise level increase; or
    - already exceed 65 dBA, and the Project creates a community noise level impact of greater than 1.5 dBA (FICON, 1992).
- When the noise levels at existing and future non-noise-sensitive land uses (e.g. industrial, etc.):
    - are less than the City of San Bernardino General Plan Noise Element, Figure N-1, *normally acceptable* 70 dBA and the Project creates a *readily perceptible* 5 dBA or greater Project-related noise level increase; or
    - are greater than the City of San Bernardino General Plan Noise Element, Table N-1, *normally acceptable* 70 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project-related noise level increase.

OPERATIONAL NOISE

- If Project-related operational (stationary source) noise levels exceed the exterior 65 dBA Leq noise level standards at nearby sensitive residential land uses (City of San Bernardino Development Code, Section 19.20.030.15(A)); or
- If the existing ambient noise levels at the nearby noise-sensitive receivers near the Project site:
    - are less than 60 dBA and the Project creates a *readily perceptible* 5 dBA or greater Project-related noise level increase; or

- range from 60 to 65 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project-related noise level increase; or
- already exceed 65 dBA, and the Project creates a community noise level impact of greater than 1.5 dBA (FICON, 1992).

CONSTRUCTION NOISE AND VIBRATION

- If Project-related construction activities:
  - occur any time other than between the permitted hours of 7:00 a.m. and 8:00 p.m. on any day (City of San Bernardino Municipal Code, Section 8.54.070); and
  - create noise levels which exceed the 85 dBA Leq 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 City of San Bernardino acceptable vibration standard of 0.7 in/sec (RMS) at sensitive receiver locations (City of San Bernardino Municipal Code, Section 15.68.020).

TABLE 4-2: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site	Noise-Sensitive[1]	if ambient is < 60 dBA CNEL	≥ 5 dBA CNEL Project increase	
		if ambient is 60 - 65 dBA CNEL	≥ 3 dBA CNEL Project increase	
		if ambient is > 65 dBA CNEL	≥ 1.5 dBA CNEL Project increase	
	Non-Noise-Sensitive[2]	if ambient is < 70 dBA CNEL	≥ 5 dBA CNEL Project increase	
		if ambient is > 70 dBA CNEL	≥ 3 dBA CNEL Project increase	
Operational[3]	Noise-Sensitive	Exterior Residential Land Use	65 dBA Leq	
Construction[4]	Permitted hours between 7:00 a.m. to 8:00 p.m. on any day.			
	Noise-Sensitive	Noise Level Threshold[5]	85 dBA Leq	n/a
		Vibration Level Threshold[6]	0.7 in/sec	n/a

[1] Source: FICON, 1992.
[2] Source: City of San Bernardino General Plan Noise Element, Figure N-1.
[3] Source: City of San Bernardino Development Code, Section 19.20.030.15(A) (Appendix 3.1).
[4] Source: City of San Bernardino Municipal Code, Section 8.54.070 (Appendix 3.2).
[5] Source: NIOSH, Criteria for Recommended Standard: Occupational Noise Exposure.
[6] Source: Section 15.68.020 of the City of San Bernardino Municipal Code (Appendix 3.1).
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, eight 24-hour noise level measurements were taken at sensitive receiver locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Wednesday, July 6th, 2016. 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. (20)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent any part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (6) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (13)

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. (13) 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 (Leq). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. 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 north of the Project site on Orange Show Road adjacent to existing residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 79.4 dBA CNEL. The hourly noise levels measured at location L1 ranged from 71.6 to 78.4 dBA Leq during the daytime hours and from 68.4 to 74.6 dBA Leq during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 76.1 dBA Leq with an average nighttime noise level of 71.7 dBA Leq.
- Location L2 represents the noise levels north of the Project site on Washington Avenue south of Orange Show Road near existing residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 62.7 dBA CNEL. The hourly noise levels measured at location L2 ranged from 55.4 to 64.5 dBA Leq during the daytime hours and from 50.6 to 58.4 dBA Leq during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 59.4 dBA Leq with an average nighttime noise level of 54.9 dBA Leq.
- Location L3 represents the noise levels north of the Project site on Dumas Street, west of Waterman Avenue, near an existing church and residential homes. The 24-hour CNEL indicates that the overall exterior noise level is 66.0 dBA CNEL. At location L3 the background ambient noise levels ranged from 58.7 to 65.3 dBA Leq during the daytime hours to levels of 54.0 to 62.0 dBA Leq during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 60.9 dBA Leq with an average nighttime noise level of 58.9 dBA Leq.
- Located north of the Project site, location L4 represents the noise levels in the existing parking lot of the San Bernardino Public Golf Course. The noise level measurements collected show an overall 24-hour exterior noise level of 58.3 dBA CNEL. The hourly noise levels measured at location L4 ranged from 45.9 to 54.5 dBA Leq during the daytime hours and from 47.8 to 52.9 dBA Leq during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 52.3 dBA Leq with an average nighttime noise level of 51.4 dBA Leq.
- Location L5 represents the noise levels east of the Project site on Park Center Circle adjacent to existing office buildings. The noise level measurements collected show an overall 24-hour exterior noise level of 68.6 dBA CNEL. The hourly noise levels measured at location L5 ranged from 55.2 to 70.5 dBA Leq during the daytime hours and from 49.5 to 67.1 dBA Leq during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 62.5 dBA Leq with an average nighttime noise level of 61.2 dBA Leq.
- Location L6 represents the noise levels near the southern Project site boundary and the Santa Ana River. The noise level measurements collected show an overall 24-hour exterior noise level of 58.9 dBA CNEL. The hourly noise levels measured at location L6 ranged from 50.8 to 54.3 dBA Leq

during the daytime hours and from 48.1 to 53.8 dBA Leq during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 53.1 dBA Leq with an average nighttime noise level of 51.8 dBA Leq.

- Location L7 represents the noise levels south of the Project site in an existing parking lot for a Quality Inn hotel on Waterman Avenue. The 24-hour CNEL indicates that the overall exterior noise level is 57.4 dBA CNEL. At location L7 the background ambient noise levels ranged from 48.5 to 55.2 dBA Leq during the daytime hours to levels of 45.8 to 51.6 dBA Leq during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 52.3 dBA Leq with an average nighttime noise level of 50.2 dBA Leq.
- Located south of the Project site, location L8 represents the noise levels adjacent to office buildings on Commercenter West and the Santa Ana River Trail. The noise level measurements collected show an overall 24-hour exterior noise level of 58.2 dBA CNEL. The hourly noise levels measured at location L8 ranged from 48.9 to 55.6 dBA Leq during the daytime hours and from 46.7 to 52.5 dBA Leq during the nighttime hours. The energy (logarithmic) average daytime noise level was calculated at 53.0 dBA Leq with an average nighttime noise level of 51.0 dBA Leq.

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

The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with the arterial roadway network. This includes the auto and heavy truck activities on Orange Show Road and Waterman Avenue near the noise level measurement locations. Additional background noise sources in the Project study area include aircraft overflight noise from the San Bernardino International Airport. The 24-hour existing noise level measurements are shown on Table 5-1.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

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

Location[1]	Distance To Project Boundary (Feet)	Description	Energy Average Hourly Noise Level (dBA Leq)[2]		CNEL
			Daytime	Nighttime	
L1	1,620'	Located north of the Project site on Orange Show Road adjacent to existing residential homes.	76.1	71.7	79.4
L2	0'	Located north of the Project site on Washington Avenue south of Orange Show Road near existing residential homes.	59.4	54.9	62.7
L3	920'	Located north of the Project site on Dumas Street, west of Waterman Avenue, near an existing church and residential homes.	60.9	58.9	66.0
L4	76'	Located north of the Project site in the existing parking lot of the San Bernardino Public Golf Course.	52.3	51.4	58.3
L5	362'	Located east of the Project site on Park Center Circle adjacent to existing office buildings.	62.5	61.2	68.6
L6	75'	Located near the southern Project site boundary and the Santa Ana River.	53.1	51.8	58.9
L7	825'	Located south of the Project site in an existing parking lot for a Quality Inn hotel on Waterman Avenue.	52.3	50.2	57.4
L8	818'	Located south of the Project site adjacent to office buildings on Commercenter West and the Santa Ana River Trail.	53.0	51.0	58.2

[1] See Exhibit 5-A for the noise level measurement locations.
[2] Energy (logarithmic) average hourly 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.

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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. (21) 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. (22) 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. (23)

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 11 study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications according to the City of San Bernardino *General Plan Circulation Element*, and the posted vehicle speeds. The ADT volumes used in this study are presented on Tables 6-2 and 6-3 and were obtained from the *Gateway South Building 4 Traffic Impact Analysis* prepared by Urban Crossroads, Inc., for the following traffic scenarios: Existing, Existing plus Ambient (EA) 2018, EA plus Cumulative (EAC) 2018, and Horizon Year 2040 ADT volumes. (1) Table 6-4 provides the time of day (daytime, evening, and nighttime) vehicle splits.

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Adjacent Planned (Existing) Land Use[1]	Distance from Centerline to Nearest Adjacent Land Use (Feet)[2]	Posted Speed Limit (mph)
1	Washington Av.	s/o Orange Show Rd.	Industrial Light (Residential)	30'	25
2	Waterman Av.	s/o Orange Show Rd.	Industrial Heavy (Office/Public)	50'	50
3	Waterman Av.	s/o Dumas St.	Industrial Heavy (Office/Public)	50'	50
4	Waterman Av.	s/o Park Center Dr.	Industrial Heavy (Public)	50'	50
5	Waterman Av.	n/o Hospitality Ln.	Commercial Regional (Public)	50'	50
6	Waterman Av.	s/o Hospitality Ln.	Commercial Regional (Commercial)	50'	50
7	Auto Center Rd.	e/o I-215 Fwy.	Commercial General (Commercial)	50'	40
8	Orange Show Rd.	e/o E St.	Industrial Light (Commercial/Ind.)	50'	50
9	Orange Show Rd.	e/o Arrowhead Av.	Industrial Light (Industrial)	50'	50
10	Orange Show Rd.	e/o Washington Av.	Industrial Light (Residential)	50'	50
11	Orange Show Rd.	e/o Waterman Av.	Industrial Light (Residential/Ind.)	50'	50

[1] Sources: City of San Bernardino General Plan Land Use Element, Figure LU-2 and Google Earth imagery.
[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 Elements.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES (1 OF 2)

ID	Roadway	Segment	Average Daily Traffic Volumes[1]			
			Existing (2017)		Existing + Ambient (EA) 2018	
			Without Project	With Project	Without Project	With Project
1	Washington Av.	s/o Orange Show Rd.	500	773	500	773
2	Waterman Av.	s/o Orange Show Rd.	25,800	26,610	26,500	27,310
3	Waterman Av.	s/o Dumas St.	23,500	24,310	24,200	25,010
4	Waterman Av.	s/o Park Center Dr.	29,800	30,508	30,700	31,408
5	Waterman Av.	n/o Hospitality Ln.	25,000	25,708	25,800	26,508
6	Waterman Av.	s/o Hospitality Ln.	40,600	41,128	41,800	42,328
7	Auto Center Rd.	e/o I-215 Fwy.	38,400	39,205	39,600	40,405
8	Orange Show Rd.	e/o E St.	31,200	32,061	32,100	32,961
9	Orange Show Rd.	e/o Arrowhead Av.	24,400	25,283	25,200	26,083
10	Orange Show Rd.	e/o Washington Av.	24,100	24,711	24,800	25,411
11	Orange Show Rd.	e/o Waterman Av.	21,200	21,366	21,800	21,966

[1] Source: Gateway South Building 4 Traffic Impact Analysis, Urban Crossroads, Inc., April 2017.

TABLE 6-3: AVERAGE DAILY TRAFFIC VOLUMES (2 OF 2)

ID	Roadway	Segment	Average Daily Traffic Volumes[1]			
			EA + Cumulative (EAC) 2018		Horizon Year 2040	
			Without Project	With Project	Without Project	With Project
1	Washington Av.	s/o Orange Show Rd.	800	1,073	1,700	1,973
2	Waterman Av.	s/o Orange Show Rd.	30,800	31,610	31,800	32,610
3	Waterman Av.	s/o Dumas St.	28,500	29,310	33,800	34,610
4	Waterman Av.	s/o Park Center Dr.	34,900	35,608	41,600	42,308
5	Waterman Av.	n/o Hospitality Ln.	29,900	30,608	35,700	36,408
6	Waterman Av.	s/o Hospitality Ln.	45,600	46,128	54,700	55,228
7	Auto Center Rd.	e/o I-215 Fwy.	45,400	46,205	39,100	39,905
8	Orange Show Rd.	e/o E St.	37,300	38,161	30,200	31,061
9	Orange Show Rd.	e/o Arrowhead Av.	29,100	29,983	21,300	22,183
10	Orange Show Rd.	e/o Washington Av.	28,700	29,311	34,100	34,711
11	Orange Show Rd.	e/o Waterman Av.	26,900	27,066	20,900	21,066

[1] Source: Gateway South Building 4 Traffic Impact Analysis, Urban Crossroads, Inc., April 2017.

TABLE 6-4: TIME OF DAY VEHICLE SPLITS

Vehicle Type	Time of Day Splits[1]			Total of Time of Day Splits
	Daytime	Evening	Nighttime	
Autos	82.90%	7.12%	9.98%	100.00%
Medium Trucks	82.77%	5.57%	11.66%	100.00%
Heavy Trucks	69.34%	8.68%	21.98%	100.00%

Based on existing 24-hour counts by vehicle type taken on 3/7/2017 at Waterman Avenue and Park Center Drive (Gateway South Building 4 Traffic Impact Analysis, Urban Crossroads, Inc., April 2017). 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.

According to the *Gateway South Building 4 Traffic Impact Analysis* prepared by Urban Crossroads, Inc., the Project is expected to generate a net total of approximately 1,789 trip-ends per day (actual vehicles) with 117 AM peak hour trips and 127 PM peak hour trips. (1) The net Project trip generation includes 682 truck trip-ends per day from the proposed buildings within the Project site. This noise study relies on the net Project trips to accurately account for the effect of individual truck trips on the study area roadway network.

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.

The 682 daily Project truck trip-ends were assigned to the 11 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 6-5 shows the traffic flow by vehicle type (vehicle mix) used for all without Project traffic scenarios, and Tables 6-6 to 6-9 show the vehicle mixes used for the with Project traffic scenarios.

TABLE 6-5: WITHOUT PROJECT CONDITIONS VEHICLE MIX

Classification	Total % Traffic Flow[1]			Total
	Autos	Medium Trucks	Heavy Trucks	
All Segments	90.45%	6.42%	3.14%	100.00%

[1] Based on existing 24-hour counts by vehicle type taken on 3/7/2017 at Waterman Avenue and Park Center Drive (Gateway South Building 4 Traffic Impact Analysis, Urban Crossroads, Inc., March 2017). 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 6-6: EXISTING WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Washington Av.	s/o Orange Show Rd.	58.50%	11.91%	29.58%	100.00%
2	Waterman Av.	s/o Orange Show Rd.	90.61%	6.25%	3.14%	100.00%
3	Waterman Av.	s/o Dumas St.	90.62%	6.24%	3.14%	100.00%
4	Waterman Av.	s/o Park Center Dr.	89.44%	6.54%	4.02%	100.00%
5	Waterman Av.	n/o Hospitality Ln.	89.25%	6.56%	4.19%	100.00%
6	Waterman Av.	s/o Hospitality Ln.	89.91%	6.48%	3.61%	100.00%
7	Auto Center Rd.	e/o I-215 Fwy.	89.86%	6.46%	3.68%	100.00%
8	Orange Show Rd.	e/o E St.	89.75%	6.46%	3.80%	100.00%
9	Orange Show Rd.	e/o Arrowhead Av.	89.57%	6.46%	3.97%	100.00%
10	Orange Show Rd.	e/o Washington Av.	90.54%	6.29%	3.17%	100.00%
11	Orange Show Rd.	e/o Waterman Av.	90.52%	6.37%	3.11%	100.00%

[1] Source: Gateway South Building 4 Traffic Impact Analysis, Urban Crossroads, Inc., April 2017.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-7: EA 2018 WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Washington Av.	s/o Orange Show Rd.	58.50%	11.91%	29.58%	100.00%
2	Waterman Av.	s/o Orange Show Rd.	90.60%	6.26%	3.14%	100.00%
3	Waterman Av.	s/o Dumas St.	90.62%	6.24%	3.14%	100.00%
4	Waterman Av.	s/o Park Center Dr.	89.47%	6.54%	4.00%	100.00%
5	Waterman Av.	n/o Hospitality Ln.	89.28%	6.56%	4.16%	100.00%
6	Waterman Av.	s/o Hospitality Ln.	89.92%	6.48%	3.60%	100.00%
7	Auto Center Rd.	e/o I-215 Fwy.	89.88%	6.46%	3.66%	100.00%
8	Orange Show Rd.	e/o E St.	89.76%	6.46%	3.78%	100.00%
9	Orange Show Rd.	e/o Arrowhead Av.	89.59%	6.46%	3.95%	100.00%
10	Orange Show Rd.	e/o Washington Av.	90.54%	6.30%	3.17%	100.00%
11	Orange Show Rd.	e/o Waterman Av.	90.52%	6.37%	3.11%	100.00%

[1] Source: Gateway South Building 4 Traffic Impact Analysis, Urban Crossroads, Inc., April 2017.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-8: EAC 2018 WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Washington Av.	s/o Orange Show Rd.	67.43%	10.38%	22.19%	100.00%
2	Waterman Av.	s/o Orange Show Rd.	90.58%	6.28%	3.14%	100.00%
3	Waterman Av.	s/o Dumas St.	90.59%	6.27%	3.14%	100.00%
4	Waterman Av.	s/o Park Center Dr.	89.58%	6.52%	3.90%	100.00%
5	Waterman Av.	n/o Hospitality Ln.	89.44%	6.54%	4.02%	100.00%
6	Waterman Av.	s/o Hospitality Ln.	89.96%	6.47%	3.56%	100.00%
7	Auto Center Rd.	e/o I-215 Fwy.	89.95%	6.45%	3.60%	100.00%
8	Orange Show Rd.	e/o E St.	89.86%	6.45%	3.69%	100.00%
9	Orange Show Rd.	e/o Arrowhead Av.	89.70%	6.46%	3.84%	100.00%
10	Orange Show Rd.	e/o Washington Av.	90.53%	6.31%	3.16%	100.00%
11	Orange Show Rd.	e/o Waterman Av.	90.51%	6.38%	3.12%	100.00%

[1] Source: Gateway South Building 4 Traffic Impact Analysis, Urban Crossroads, Inc., April 2017.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-9: HORIZON YEAR 2040 WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Washington Av.	s/o Orange Show Rd.	77.93%	8.57%	13.50%	100.00%
2	Waterman Av.	s/o Orange Show Rd.	90.58%	6.28%	3.14%	100.00%
3	Waterman Av.	s/o Dumas St.	90.57%	6.29%	3.14%	100.00%
4	Waterman Av.	s/o Park Center Dr.	89.72%	6.51%	3.78%	100.00%
5	Waterman Av.	n/o Hospitality Ln.	89.60%	6.52%	3.88%	100.00%
6	Waterman Av.	s/o Hospitality Ln.	90.04%	6.47%	3.49%	100.00%
7	Auto Center Rd.	e/o I-215 Fwy.	89.87%	6.46%	3.67%	100.00%
8	Orange Show Rd.	e/o E St.	89.72%	6.46%	3.82%	100.00%
9	Orange Show Rd.	e/o Arrowhead Av.	89.44%	6.47%	4.09%	100.00%
10	Orange Show Rd.	e/o Washington Av.	90.51%	6.33%	3.16%	100.00%
11	Orange Show Rd.	e/o Waterman Av.	90.52%	6.37%	3.11%	100.00%

[1] Source: Gateway South Building 4 Traffic Impact Analysis, Urban Crossroads, Inc., April 2017.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

6.3 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 6-10. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the human response (annoyance) using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 6-10: 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, May 2006.

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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 *Gateway South Building 4 Traffic Impact Analysis*. (1) 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 Without / With Project: This scenario refers to the existing present-day noise conditions, without and with the proposed Project.
- Existing plus Ambient (EA) 2018 Without / With Project: This scenario refers to the background noise conditions at future Year 2018 without and with the proposed Project plus ambient growth.
- EA plus Cumulative 2018 Without / With Project: This scenario refers to the background noise conditions at future Year 2018 without and with the proposed Project plus ambient growth. This scenario corresponds to Year 2018 conditions, and includes all cumulative projects identified in the *Traffic Impact Analysis*.
- Horizon Year 2040 Without / With Project: This scenario refers to the background noise conditions at future Year 2040 without and with the proposed Project. This scenario corresponds to Horizon Year 2040 conditions, and includes all cumulative projects identified in the *Traffic Impact Analysis*.

7.1 TRAFFIC NOISE CONTOURS

To quantify the Project's operational traffic noise impacts on the surrounding areas, the changes in traffic noise levels on 11 roadway segments surrounding the Project were calculated based on the changes in the average daily traffic volumes. Based on the noise impact significance criteria described in Section 4 and shown on Table 4-2, a significant off-site traffic noise level impact occurs:

- When the noise levels at existing and future noise-sensitive land uses (e.g. residential, etc.):
    - are less than 60 dBA and the Project creates a *readily perceptible* 5 dBA or greater Project-related noise level increase; or
    - range from 60 to 65 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project-related noise level increase; or
    - already exceed 65 dBA, and the Project creates a community noise level impact of greater than 1.5 dBA (FICON, 1992).
- When the noise levels at existing and future non-noise-sensitive land uses (e.g. industrial, etc.):
    - are less than the City of San Bernardino General Plan Noise Element, Figure N-1, *normally acceptable* 70 dBA and the Project creates a *readily perceptible* 5 dBA or greater Project-related noise level increase; or
    - are greater than the City of San Bernardino General Plan Noise Element, Table N-1, *normally acceptable* 70 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project-related noise level increase.

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 7-8 present a summary of the exterior traffic noise levels, without barrier attenuation, for the 11 study area roadway segments analyzed from the without Project to the with Project conditions in each of the three timeframes: Existing, Existing plus Ambient (EA) 2018, EA plus Cumulative (EAC) 2018, and Horizon Year 2040 conditions. Appendix 7.1 includes a summary of the traffic noise level contours for each of the eight 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	Washington Av.	s/o Orange Show Rd.	Industrial Light (Residential)	55.7	RW	RW	RW
2	Waterman Av.	s/o Orange Show Rd.	Industrial Heavy (Office/Public)	76.7	139	300	646
3	Waterman Av.	s/o Dumas St.	Industrial Heavy (Office/Public)	76.3	131	282	607
4	Waterman Av.	s/o Park Center Dr.	Industrial Heavy (Public)	77.3	153	330	711
5	Waterman Av.	n/o Hospitality Ln.	Commercial Regional (Public)	76.5	136	294	633
6	Waterman Av.	s/o Hospitality Ln.	Commercial Regional (Commercial)	78.6	188	406	874
7	Auto Center Rd.	e/o I-215 Fwy.	Commercial General (Commercial)	76.4	134	290	624
8	Orange Show Rd.	e/o E St.	Industrial Light (Commercial/Ind.)	77.5	158	340	733
9	Orange Show Rd.	e/o Arrowhead Av.	Industrial Light (Industrial)	76.4	134	289	622
10	Orange Show Rd.	e/o Washington Av.	Industrial Light (Residential)	76.4	133	287	617
11	Orange Show Rd.	e/o Waterman Av.	Industrial Light (Residential/Ind.)	75.8	122	263	567

[1] Sources: City of San Bernardino General Plan Land Use Element, Figure LU-2 and Google Earth imagery.

[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 7-2: 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	Washington Av.	s/o Orange Show Rd.	Industrial Light (Residential)	65.9	RW	34	74
2	Waterman Av.	s/o Orange Show Rd.	Industrial Heavy (Office/Public)	76.8	142	305	657
3	Waterman Av.	s/o Dumas St.	Industrial Heavy (Office/Public)	76.4	133	287	619
4	Waterman Av.	s/o Park Center Dr.	Industrial Heavy (Public)	78.0	170	366	788
5	Waterman Av.	n/o Hospitality Ln.	Commercial Regional (Public)	77.3	154	331	713
6	Waterman Av.	s/o Hospitality Ln.	Commercial Regional (Commercial)	79.0	199	429	925
7	Auto Center Rd.	e/o I-215 Fwy.	Commercial General (Commercial)	76.9	145	312	672
8	Orange Show Rd.	e/o E St.	Industrial Light (Commercial/Ind.)	78.0	172	370	796
9	Orange Show Rd.	e/o Arrowhead Av.	Industrial Light (Industrial)	77.1	149	321	691
10	Orange Show Rd.	e/o Washington Av.	Industrial Light (Residential)	76.5	135	291	628
11	Orange Show Rd.	e/o Waterman Av.	Industrial Light (Residential/Ind.)	75.8	122	263	568

[1] Sources: City of San Bernardino General Plan Land Use Element, Figure LU-2 and Google Earth imagery.
[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: EA 2018 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	Washington Av.	s/o Orange Show Rd.	Industrial Light (Residential)	55.7	RW	RW	RW
2	Waterman Av.	s/o Orange Show Rd.	Industrial Heavy (Office/Public)	76.8	142	305	658
3	Waterman Av.	s/o Dumas St.	Industrial Heavy (Office/Public)	76.4	133	287	619
4	Waterman Av.	s/o Park Center Dr.	Industrial Heavy (Public)	77.4	156	337	725
5	Waterman Av.	n/o Hospitality Ln.	Commercial Regional (Public)	76.7	139	300	646
6	Waterman Av.	s/o Hospitality Ln.	Commercial Regional (Commercial)	78.8	192	414	891
7	Auto Center Rd.	e/o I-215 Fwy.	Commercial General (Commercial)	76.6	137	296	637
8	Orange Show Rd.	e/o E St.	Industrial Light (Commercial/Ind.)	77.6	161	347	747
9	Orange Show Rd.	e/o Arrowhead Av.	Industrial Light (Industrial)	76.6	137	295	636
10	Orange Show Rd.	e/o Washington Av.	Industrial Light (Residential)	76.5	136	292	629
11	Orange Show Rd.	e/o Waterman Av.	Industrial Light (Residential/Ind.)	75.9	124	268	577

[1] Sources: City of San Bernardino General Plan Land Use Element, Figure LU-2 and Google Earth imagery.
[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 7-4: EA 2018 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	Washington Av.	s/o Orange Show Rd.	Industrial Light (Residential)	65.9	RW	34	74
2	Waterman Av.	s/o Orange Show Rd.	Industrial Heavy (Office/Public)	76.9	144	310	669
3	Waterman Av.	s/o Dumas St.	Industrial Heavy (Office/Public)	76.5	136	293	631
4	Waterman Av.	s/o Park Center Dr.	Industrial Heavy (Public)	78.1	173	372	801
5	Waterman Av.	n/o Hospitality Ln.	Commercial Regional (Public)	77.4	156	337	726
6	Waterman Av.	s/o Hospitality Ln.	Commercial Regional (Commercial)	79.1	203	437	941
7	Auto Center Rd.	e/o I-215 Fwy.	Commercial General (Commercial)	77.0	147	318	684
8	Orange Show Rd.	e/o E St.	Industrial Light (Commercial/Ind.)	78.1	174	376	810
9	Orange Show Rd.	e/o Arrowhead Av.	Industrial Light (Industrial)	77.2	152	326	703
10	Orange Show Rd.	e/o Washington Av.	Industrial Light (Residential)	76.6	138	297	640
11	Orange Show Rd.	e/o Waterman Av.	Industrial Light (Residential/Ind.)	75.9	125	268	578

[1] Sources: City of San Bernardino General Plan Land Use Element, Figure LU-2 and Google Earth imagery.
[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 7-5: EAC 2018 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	Washington Av.	s/o Orange Show Rd.	Industrial Light (Residential)	57.7	RW	RW	RW
2	Waterman Av.	s/o Orange Show Rd.	Industrial Heavy (Office/Public)	77.4	157	337	727
3	Waterman Av.	s/o Dumas St.	Industrial Heavy (Office/Public)	77.1	149	320	690
4	Waterman Av.	s/o Park Center Dr.	Industrial Heavy (Public)	78.0	170	367	790
5	Waterman Av.	n/o Hospitality Ln.	Commercial Regional (Public)	77.3	154	331	713
6	Waterman Av.	s/o Hospitality Ln.	Commercial Regional (Commercial)	79.1	203	438	944
7	Auto Center Rd.	e/o I-215 Fwy.	Commercial General (Commercial)	77.2	150	324	698
8	Orange Show Rd.	e/o E St.	Industrial Light (Commercial/Ind.)	78.3	178	383	826
9	Orange Show Rd.	e/o Arrowhead Av.	Industrial Light (Industrial)	77.2	151	325	700
10	Orange Show Rd.	e/o Washington Av.	Industrial Light (Residential)	77.1	149	322	694
11	Orange Show Rd.	e/o Waterman Av.	Industrial Light (Residential/Ind.)	76.9	143	308	664

[1] Sources: City of San Bernardino General Plan Land Use Element, Figure LU-2 and Google Earth imagery.
[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 7-6: EAC 2018 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	Washington Av.	s/o Orange Show Rd.	Industrial Light (Residential)	66.1	RW	36	77
2	Waterman Av.	s/o Orange Show Rd.	Industrial Heavy (Office/Public)	77.5	159	342	738
3	Waterman Av.	s/o Dumas St.	Industrial Heavy (Office/Public)	77.2	151	326	701
4	Waterman Av.	s/o Park Center Dr.	Industrial Heavy (Public)	78.6	186	401	863
5	Waterman Av.	n/o Hospitality Ln.	Commercial Regional (Public)	78.0	170	366	789
6	Waterman Av.	s/o Hospitality Ln.	Commercial Regional (Commercial)	79.5	214	461	993
7	Auto Center Rd.	e/o I-215 Fwy.	Commercial General (Commercial)	77.6	160	345	743
8	Orange Show Rd.	e/o E St.	Industrial Light (Commercial/Ind.)	78.7	191	411	886
9	Orange Show Rd.	e/o Arrowhead Av.	Industrial Light (Industrial)	77.8	165	355	764
10	Orange Show Rd.	e/o Washington Av.	Industrial Light (Residential)	77.2	152	327	704
11	Orange Show Rd.	e/o Waterman Av.	Industrial Light (Residential/Ind.)	76.9	143	309	665

[1] Sources: City of San Bernardino General Plan Land Use Element, Figure LU-2 and Google Earth imagery.
[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 7-7: HORIZON YEAR 2040 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	Washington Av.	s/o Orange Show Rd.	Industrial Light (Residential)	61.0	RW	RW	35
2	Waterman Av.	s/o Orange Show Rd.	Industrial Heavy (Office/Public)	77.6	160	345	743
3	Waterman Av.	s/o Dumas St.	Industrial Heavy (Office/Public)	77.8	167	359	774
4	Waterman Av.	s/o Park Center Dr.	Industrial Heavy (Public)	78.7	191	412	888
5	Waterman Av.	n/o Hospitality Ln.	Commercial Regional (Public)	78.1	173	372	802
6	Waterman Av.	s/o Hospitality Ln.	Commercial Regional (Commercial)	79.9	230	495	1066
7	Auto Center Rd.	e/o I-215 Fwy.	Commercial General (Commercial)	76.5	136	293	631
8	Orange Show Rd.	e/o E St.	Industrial Light (Commercial/Ind.)	77.4	155	333	718
9	Orange Show Rd.	e/o Arrowhead Av.	Industrial Light (Industrial)	75.8	122	264	569
10	Orange Show Rd.	e/o Washington Av.	Industrial Light (Residential)	77.9	168	361	778
11	Orange Show Rd.	e/o Waterman Av.	Industrial Light (Residential/Ind.)	75.8	121	261	561

[1] Sources: City of San Bernardino General Plan Land Use Element, Figure LU-2 and Google Earth imagery.
[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 7-8: HORIZON YEAR 2040 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	Washington Av.	s/o Orange Show Rd.	Industrial Light (Residential)	66.8	RW	39	85
2	Waterman Av.	s/o Orange Show Rd.	Industrial Heavy (Office/Public)	77.7	162	350	753
3	Waterman Av.	s/o Dumas St.	Industrial Heavy (Office/Public)	77.9	169	364	784
4	Waterman Av.	s/o Park Center Dr.	Industrial Heavy (Public)	79.2	206	444	957
5	Waterman Av.	n/o Hospitality Ln.	Commercial Regional (Public)	78.6	188	406	874
6	Waterman Av.	s/o Hospitality Ln.	Commercial Regional (Commercial)	80.2	240	516	1112
7	Auto Center Rd.	e/o I-215 Fwy.	Commercial General (Commercial)	77.0	146	315	679
8	Orange Show Rd.	e/o E St.	Industrial Light (Commercial/Ind.)	77.9	168	363	781
9	Orange Show Rd.	e/o Arrowhead Av.	Industrial Light (Industrial)	76.6	138	297	639
10	Orange Show Rd.	e/o Washington Av.	Industrial Light (Residential)	78.0	170	366	787
11	Orange Show Rd.	e/o Waterman Av.	Industrial Light (Residential/Ind.)	75.8	121	261	562

[1] Sources: City of San Bernardino General Plan Land Use Element, Figure LU-2 and Google Earth imagery.
[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 CONDITION PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-1 presents the Existing without Project conditions CNEL noise levels. The Exiting without Project exterior noise levels are expected to range from 55.7 to 78.6 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions will range from 65.9 to 79.0 dBA CNEL. As shown on Table 7-9 the Project is expected to generate an exterior noise level increase of up to 10.2 dBA CNEL on one roadway segment: Washington Avenue south of Orange Show Road, which will exceed the significance thresholds for both noise-sensitive and non-noise-sensitive land uses identified in Section 4. Therefore, the off-site Project-related traffic noise level increase is considered a *potentially significant* impact under Existing with Project conditions. It is important to note that the land use adjacent to Washington Avenue south of Orange Show road is designated as Industrial Light use by the City of San Bernardino General Plan Land Use Element, and existing residential homes immediately south of Project access on Washington Avenue represent non-conforming use. However, the Project-related traffic noise level increase due to the addition of Project truck trips on this roadway segment represents a *potentially significant* noise level impact for both noise-sensitive and non-noise-sensitive land uses.

TABLE 7-9: EXISTING CONDITION OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Planned Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Noise-Sensitive Land Use?[3]	Threshold Exceeded?[4]
				No Project	With Project	Project Addition		
1	Washington Av.	s/o Orange Show Rd.	Industrial Light (Residential)	55.7	65.9	10.2	Yes	Yes
2	Waterman Av.	s/o Orange Show Rd.	Industrial Heavy (Office/Public)	76.7	76.8	0.1	No	No
3	Waterman Av.	s/o Dumas St.	Industrial Heavy (Office/Public)	76.3	76.4	0.1	No	No
4	Waterman Av.	s/o Park Center Dr.	Industrial Heavy (Public)	77.3	78.0	0.7	No	No
5	Waterman Av.	n/o Hospitality Ln.	Commercial Regional (Public)	76.5	77.3	0.8	No	No
6	Waterman Av.	s/o Hospitality Ln.	Commercial Regional (Commercial)	78.6	79.0	0.4	No	No
7	Auto Center Rd.	e/o I-215 Fwy.	Commercial General (Commercial)	76.4	76.9	0.5	No	No
8	Orange Show Rd.	e/o E St.	Industrial Light (Commercial/Ind.)	77.5	78.0	0.5	No	No
9	Orange Show Rd.	e/o Arrowhead Av.	Industrial Light (Industrial)	76.4	77.1	0.7	No	No
10	Orange Show Rd.	e/o Washington Av.	Industrial Light (Residential)	76.4	76.5	0.1	Yes	No
11	Orange Show Rd.	e/o Waterman Av.	Industrial Light (Residential/Ind.)	75.8	75.8	0.0	Yes	No

[1] Sources: City of San Bernardino General Plan Land Use Element, Figure LU-2 and Google Earth imagery.
[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.
[3] "Yes" = Existing, non-conforming noise-sensitive land uses adjacent to the study area roadway segment.
[4] Significance Criteria (Section 4).

7.3 EXISTING PLUS AMBIENT (EA) 2018 PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-10 presents a comparison of the EA 2018 without and with Project conditions CNEL noise levels. Table 7-3 shows that the exterior noise levels without accounting for any noise attenuation features are expected to range from 55.7 to 78.8 dBA CNEL without the Project. Table 7-4 presents the EA 2018 with Project conditions noise level contours that are expected to range from 65.9 to 79.1 dBA CNEL. As shown on Table 7-10 the Project is expected to generate an exterior noise level increase of up to 10.2 dBA CNEL on one roadway segment: Washington Avenue south of Orange Show Road, which will exceed the significance thresholds for both noise-sensitive and non-noise-sensitive land uses identified in Section 4. Therefore, the off-site Project-related traffic noise level increase is considered a *potentially significant* impact under Existing plus Ambient with Project conditions. As previously discussed in Section 7.2, the land use adjacent to Washington Avenue south of Orange Show road is designated as Industrial Light use by the City of San Bernardino General Plan Land Use Element, and existing residential homes immediately south of Project access on Washington Avenue represent non-conforming use. However, the Project-related traffic noise level increase due to the addition of Project truck trips on this roadway segment represents a *potentially significant* noise level impact for both noise-sensitive and non-noise-sensitive land uses.

TABLE 7-10: EA 2018 OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Planned Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Noise-Sensitive Land Use?[3]	Threshold Exceeded?[4]
				No Project	With Project	Project Addition		
1	Washington Av.	s/o Orange Show Rd.	Industrial Light (Residential)	57.7	66.1	8.4	Yes	Yes
2	Waterman Av.	s/o Orange Show Rd.	Industrial Heavy (Office/Public)	77.4	77.5	0.1	No	No
3	Waterman Av.	s/o Dumas St.	Industrial Heavy (Office/Public)	77.1	77.2	0.1	No	No
4	Waterman Av.	s/o Park Center Dr.	Industrial Heavy (Public)	78.0	78.6	0.6	No	No
5	Waterman Av.	n/o Hospitality Ln.	Commercial Regional (Public)	77.3	78.0	0.7	No	No
6	Waterman Av.	s/o Hospitality Ln.	Commercial Regional (Commercial)	79.1	79.5	0.4	No	No
7	Auto Center Rd.	e/o I-215 Fwy.	Commercial General (Commercial)	77.2	77.6	0.4	No	No
8	Orange Show Rd.	e/o E St.	Industrial Light (Commercial/Ind.)	78.3	78.7	0.4	No	No
9	Orange Show Rd.	e/o Arrowhead Av.	Industrial Light (Industrial)	77.2	77.8	0.6	No	No
10	Orange Show Rd.	e/o Washington Av.	Industrial Light (Residential)	77.1	77.2	0.1	Yes	No
11	Orange Show Rd.	e/o Waterman Av.	Industrial Light (Residential/Ind.)	76.9	76.9	0.0	Yes	No

[1] Sources: City of San Bernardino General Plan Land Use Element, Figure LU-2 and Google Earth imagery.
[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.
[3] "Yes" = Existing, non-conforming noise-sensitive land uses adjacent to the study area roadway segment.
[4] Significance Criteria (Section 4).

7.4 EA PLUS CUMULATIVE (EAC) 2018 PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-11 presents a comparison of the EAC 2018 without and with Project conditions CNEL noise levels. Table 7-5 shows that the exterior noise levels without accounting for any noise attenuation features are expected to range from 57.7 to 79.1 dBA CNEL without the Project. Table 7-6 presents the EAC 2018 with Project conditions noise level contours that are expected to range from 66.1 to 79.5 dBA CNEL. As shown on Table 7-11 the Project is expected to generate an exterior noise level increase of up to 8.4 dBA CNEL on one roadway segment: Washington Avenue south of Orange Show Road, which will exceed the significance thresholds for both noise-sensitive and non-noise-sensitive land uses identified in Section 4. Therefore, the off-site Project-related traffic noise level increase is considered a *potentially significant* impact under Existing plus Ambient plus Cumulative with Project conditions. As previously discussed, the land use adjacent to Washington Avenue south of Orange Show road is designated as Industrial Light use by the City of San Bernardino General Plan Land Use Element, and existing residential homes immediately south of Project access on Washington Avenue represent non-conforming use. However, the Project-related traffic noise level increase due to the addition of Project truck trips on this roadway segment represents a *potentially significant* noise level impact for both noise-sensitive and non-noise-sensitive land uses.

TABLE 7-11: EAC 2018 OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Planned Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Noise-Sensitive Land Use?[3]	Threshold Exceeded?[4]
				No Project	With Project	Project Addition		
1	Washington Av.	s/o Orange Show Rd.	Industrial Light (Residential)	57.7	66.1	8.4	Yes	Yes
2	Waterman Av.	s/o Orange Show Rd.	Industrial Heavy (Office/Public)	77.4	77.5	0.1	No	No
3	Waterman Av.	s/o Dumas St.	Industrial Heavy (Office/Public)	77.1	77.2	0.1	No	No
4	Waterman Av.	s/o Park Center Dr.	Industrial Heavy (Public)	78.0	78.6	0.6	No	No
5	Waterman Av.	n/o Hospitality Ln.	Commercial Regional (Public)	77.3	78.0	0.7	No	No
6	Waterman Av.	s/o Hospitality Ln.	Commercial Regional (Commercial)	79.1	79.5	0.4	No	No
7	Auto Center Rd.	e/o I-215 Fwy.	Commercial General (Commercial)	77.2	77.6	0.4	No	No
8	Orange Show Rd.	e/o E St.	Industrial Light (Commercial/Ind.)	78.3	78.7	0.4	No	No
9	Orange Show Rd.	e/o Arrowhead Av.	Industrial Light (Industrial)	77.2	77.8	0.6	No	No
10	Orange Show Rd.	e/o Washington Av.	Industrial Light (Residential)	77.1	77.2	0.1	Yes	No
11	Orange Show Rd.	e/o Waterman Av.	Industrial Light (Residential/Ind.)	76.9	76.9	0.0	Yes	No

[1] Sources: City of San Bernardino General Plan Land Use Element, Figure LU-2 and Google Earth imagery.
[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.
[3] "Yes" = Existing, non-conforming noise-sensitive land uses adjacent to the study area roadway segment.
[4] Significance Criteria (Section 4).

7.5 HORIZON YEAR 2040 PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-12 presents a comparison of the Horizon Year 2040 without and with Project conditions CNEL noise levels. Table 7-7 shows that the exterior noise levels without accounting for any noise attenuation features are expected to range from 61.0 to 79.9 dBA CNEL without the Project. Table 7-8 presents the Horizon Year 2040 with Project conditions noise level contours that are expected to range from 66.8 to 80.2 dBA CNEL. As shown on Table 7-12 the Project is expected to generate an exterior noise level increase of up to 5.8 dBA CNEL on one roadway segment: Washington Avenue south of Orange Show Road, which will exceed the significance thresholds for both noise-sensitive and non-noise-sensitive land uses identified in Section 4. Therefore, the off-site Project-related traffic noise level increase is considered a *potentially significant* impact under Horizon Year with Project conditions. As previously discussed, the land use adjacent to Washington Avenue south of Orange Show road is designated as Industrial Light use by the City of San Bernardino General Plan Land Use Element, and existing residential homes immediately south of Project access on Washington Avenue represent non-conforming use. However, the Project-related traffic noise level increase due to the addition of Project truck trips on this roadway segment represents a *potentially significant* noise level impact for both noise-sensitive and non-noise-sensitive land uses.

TABLE 7-12: HORIZON YEAR 2040 OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Planned Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Noise-Sensitive Land Use?[3]	Threshold Exceeded?[4]
				No Project	With Project	Project Addition		
1	Washington Av.	s/o Orange Show Rd.	Industrial Light (Residential)	61.0	66.8	5.8	Yes	Yes
2	Waterman Av.	s/o Orange Show Rd.	Industrial Heavy (Office/Public)	77.6	77.7	0.1	No	No
3	Waterman Av.	s/o Dumas St.	Industrial Heavy (Office/Public)	77.8	77.9	0.1	No	No
4	Waterman Av.	s/o Park Center Dr.	Industrial Heavy (Public)	78.7	79.2	0.5	No	No
5	Waterman Av.	n/o Hospitality Ln.	Commercial Regional (Public)	78.1	78.6	0.5	No	No
6	Waterman Av.	s/o Hospitality Ln.	Commercial Regional (Commercial)	79.9	80.2	0.3	No	No
7	Auto Center Rd.	e/o I-215 Fwy.	Commercial General (Commercial)	76.5	77.0	0.5	No	No
8	Orange Show Rd.	e/o E St.	Industrial Light (Commercial/Ind.)	77.4	77.9	0.5	No	No
9	Orange Show Rd.	e/o Arrowhead Av.	Industrial Light (Industrial)	75.8	76.6	0.8	No	No
10	Orange Show Rd.	e/o Washington Av.	Industrial Light (Residential)	77.9	78.0	0.1	Yes	No
11	Orange Show Rd.	e/o Waterman Av.	Industrial Light (Residential/Ind.)	75.8	75.8	0.0	Yes	No

[1] Sources: City of San Bernardino General Plan Land Use Element, Figure LU-2 and Google Earth imagery.
[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.
[3] "Yes" = Existing, non-conforming noise-sensitive land uses adjacent to the study area roadway segment.
[4] Significance Criteria (Section 4).

7.6 OFF-SITE TRAFFIC NOISE MITIGATION

To minimize the *potentially significant* Project traffic noise level increases on Washington Avenue south of Orange Show Road, noise mitigation measures were considered in this analysis. These mitigation measures include rubberized asphalt hot mix pavement for the portion of Project access on Washington Avenue south of Orange Show Road, and off-site noise barriers at the existing non-conforming residential lots south of Project access on Washington Avenue. Further, the mitigation measures described below were considered under both interim and permanent access conditions for Project access off Washington Avenue.

7.6.1 RUBBERIZED ASPHALT

In an effort to reduce traffic noise levels at the noise source, Caltrans research has shown that rubberized asphalt can provide noise attenuation of approximately 4 dBA. (24) Therefore, rubberized asphalt was considered as a mitigation measure with the potential to be included in the Project-access roadway improvements associated with Project construction on Washington Avenue. Changing the pavement type of a roadway can reduce the amount of noise produced at the source for both near-term and long-term conditions. This is based on research conducted by Caltrans (24) and the Canadian Ministry of Transportation and Highways (25) which indicates that a 4 dBA reduction in tire/pavement noise is attainable using rubberized asphalt under typical operating conditions. Traffic noise is generated primarily by the interaction of the tires and pavement, the engine, and exhaust systems. For automobiles noise, as much as 75 to 90-percent

of traffic noise is generated by the interaction of the tires and pavement, especially when traveling at higher and constant speeds. (6)

However, the effectiveness of reducing traffic noise levels is higher on roadways with low percentages of heavy trucks, since heavy truck engine and exhaust noise is not affected by rubberized alternative pavement. (24) This is due to the truck height or the height at which truck engines and exhaust systems sit above the pavement. Per Caltrans guidance, noise barriers are required to break the line-of-sight using a truck stack height of 11.5 feet above the road. (8) (26) With the primary off-site traffic noise source representing heavy trucks with a stack height of 11.5 feet off the ground, the tire/pavement noise reduction benefits associated rubberized asphalt will be limited and are not expected to provide a meaningful noise reduction.

While the rubberized asphalt paving off-site traffic noise mitigation measure could provide a noise reduction of roughly 4 dBA for autos traveling at higher speeds, the benefit of rubberized asphalt for noise produced by higher truck stack noise sources is not expected to *substantially* reduce (12 dBA Leq or more per Caltrans *Traffic Noise Analysis Protocol* (2)) or eliminate the impacts. Therefore, off-site Project-related traffic noise level increases at adjacent land uses under all scenarios would remain *potentially significant* with or without the rubberized asphalt mitigation considered in this analysis.

7.6.2 OFF-SITE NOISE BARRIERS

Existing noise-sensitive residential homes are located on the eastern side of Washington Avenue south of Orange Show Road, and therefore, off-site noise barriers are considered in this analysis as potential mitigation to reduce the impacts at the noise-sensitive land uses closest to the heavy truck traffic accessing the Project site. Off-site noise barriers are estimated to provide a *readily perceptible* 5 dBA reduction which, according to the FHWA, is *simple* to attain when blocking the line-of-sight from the noise source to the receiver. (8) This 5 dBA of noise barrier attenuation is also identified by Caltrans as the minimum required noise attenuation to justify the construction of a noise barrier. (26)

As previously discussed, Caltrans guidance requires an 11.5 foot high truck stack height representing truck engine and exhaust noise to evaluate heavy truck traffic noise levels. Therefore, any exterior noise barriers at residential homes experiencing Project-related traffic noise level increases would need to be high enough and long enough to block the line-of-sight from the noise source (at 11.5 feet high per Caltrans) to the receiver (at 5 feet high per FHWA guidance). (8; 26) This would result in the need for a minimum 8-foot high noise barrier on Washington Avenue. However, Project-related traffic noise level increases were previously shown to approach 10.2 dBA CNEL under Existing with Project conditions, and therefore, the off-site traffic noise barriers are not expected to *substantially* reduce (12 dBA Leq or more per Caltrans *Traffic Noise Analysis Protocol* (2)) or eliminate the impacts.

Further, FHWA guidance indicates that the front yards of the residential homes on Washington Avenue south of Orange Show Road do not represent outdoor living areas of frequent human use (e.g., backyards of single-family homes). (8) Therefore, exterior noise mitigation in the form of noise barriers on Washington Avenue is not required per FHWA guidance. In addition, the estimated minimum 8-foot high noise barrier will not provide a *substantial* reduction (12 dBA Leq or more per Caltrans *Traffic Noise Analysis Protocol* (2)) or eliminate the off-site Project traffic noise impacts.

7.6.3 SIGNIFICANT OFF-SITE TRAFFIC NOISE IMPACTS

Both rubberized asphalt and off-site noise barriers were considered as potential noise mitigation measures to reduce the Project-related off-site traffic noise level increases under all with Project scenarios, previously shown on Tables 7-9 to 7-12. However, neither form of potential mitigation would eliminate or *substantially* (12 dBA Leq or more per Caltrans *Traffic Noise Analysis Protocol* (2)) reduce the off-site traffic noise level increases associated with Project truck trips on either the interim or permanent Project access conditions for Washington Avenue south of Orange Show Road. Therefore, the Project-related traffic noise level increases will remain as *significant* impacts, since the off-site traffic noise mitigation measures considered in this analysis would not substantially reduce or eliminate the impacts.

This off-site traffic noise analysis evaluated 11 study area roadway segments based on the without and with Project traffic noise levels. As indicated above, only one segment of the 11, Washington Avenue south of Orange Show Road, will experience a *significant* off-site traffic noise level impact under with Project conditions. Further, the noise-sensitive residential homes on the impacted roadway segment represent existing non-conforming uses which are designated as Industrial Light land use, and are expected, under long range General Plan buildout conditions, to be redeveloped as industrial, non-noise sensitive land use.

8 RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following seven 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, natural open space, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

Representative sensitive receivers near the Project site include the single-family residential home at location R1, the church uses at locations R2 and R3, and the Santa Ana River at location R5. Location R4 represents the closest business office use, and location R6 represents nearby hotel use south of the Project site. The closest sensitive receiver is represented by location R1 where an existing residential home is located approximately 218 feet east of the Project site boundary. 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 roughly 140 feet southeast of the Project site on Washington Avenue, R1 represents the existing residential homes near proposed Project site access.

R2: Located approximately 218 feet east of the Project site on Dumas Street, R2 represents the existing residential homes closest to the Project site. Under permanent site access Option 1, this receiver location would be replaced with the extension of Washington Avenue south to the Project site.

R3: Location R3 represents existing church located roughly 292 feet north of the Project site on Dumas Street. A long-term noise measurement was taken near this location, L4, to describe the existing ambient noise environment.

R4: Location R4 represents the existing church situated north of the Project site at approximately 585 feet on Dumas Street. A long-term noise measurement was taken near this location, L3, to describe the existing ambient noise environment.

R5: Location R5 represents the existing Inland Regional Center at approximately 228 feet east of the Project site across Waterman Avenue. A long-term noise measurement was taken near this location, L5, to describe the existing ambient noise environment.

R6: Location R6 represents the Santa Ana River area located south of the Project site at approximately 245 feet. A long-term noise measurement was taken near this location, L6, to describe the existing ambient noise environment.

R7: Location R7 represents the existing Quality Inn situated approximately 911 feet south of the Project site on Waterman Avenue. A long-term noise measurement was taken near this location, L7, to describe the existing ambient noise environment.

EXHIBIT 8-A: RECEIVER LOCATIONS

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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 Gateway South Building 4 Project. Exhibit 9-A identifies the representative receiver locations and noise source locations used to assess the operational noise levels.

9.1 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Gateway South Building 4 Project, operational source noise is typically evaluated against standards established under a City's Municipal Code. While the City of San Bernardino maintains several policies in the Municipal Code Noise Control Ordinance to control the negative effects of nuisance noise, it does not identify specific exterior noise level limits. However, the policies in the Municipal Code Development Code, Chapter 19.20, *Property Development Standards* contain the exterior and interior noise level standards for residential land uses. Therefore, the stationary noise sources such as idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods originating from a designated fixed location or private property such as the Gateway South Building 4 site, are evaluated against the policies adopted in the City's Development Code. (5)

The Project operational noise impacts are governed by the City of San Bernardino Municipal Code, Section 8.54, included in Appendix 3.2. Section 8.54.060 states when: *such noises are an accompaniment and effect of a lawful business, commercial or industrial enterprise carried on in an area zoned for that purpose*…these activities shall be exempt (Section 8.54.060(B)). (16) However, due to the Project's close proximity to residential land uses, located north of the Project site boundary, Development Code, Section 19.20.030.15(A), limits the operational stationary-source noise from the Gateway South Building 4 Project to an exterior noise level of 65 dBA Leq for residential land use. (5)

9.2 OPERATIONAL NOISE SOURCES

At the time this noise analysis was prepared the future tenants of the proposed Project were unknown. To present the potential worst-case noise conditions, this analysis assumes the Project would be operational 24 hours per day, seven days per week. The Project business operations would primarily be conducted within the enclosed buildings, except for traffic movement, parking, as well as loading and unloading of trucks at designated loading bays. The on-site Project-related noise sources are expected to include: idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods. This noise analysis is intended to describe noise level impacts associated with the expected typical warehouse and distribution storage activities at the Project site. As part of the Project's design, all on-site outdoor cargo handling equipment (CHE) (including yard trucks, hostlers, yard goats, pallet jacks, forklifts, and other on-site equipment) will be powered by non-diesel fueled engines and all on-site indoor forklifts shall be powered by electricity, compressed natural gas, or propane.

9.3 REFERENCE NOISE LEVELS

Since the future tenants of the proposed Project are unknown, the Project's operational noise levels were estimated based on reference noise level measurements of similar operational activities. The reference noise levels are intended to describe the expected operational noise sources that may include idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods. To estimate the Project off-site operational noise impacts associated with the Gateway South Building 4, the following reference noise level measurements were collected from existing logistics warehouse operations containing similar operational noise sources, as shown on Table 9-1. Appendix 9.1 includes reference noise source photos.

9.3.1 MOTIVATIONAL FULFILLMENT & LOGISTICS SERVICES DISTRIBUTION FACILITY (DRY GOODS)

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 with a loading dock area on the western side of the building façade. Two reference noise level measurements were taken at this location, including entry gate activity and unloading/docking activity noise sources. Up to ten trucks were observed in the loading dock area including a combination of track trailer semi-trucks, two-axle delivery trucks, and background forklift operations.

ENTRY GATE ACTIVITY

The entry gate activity noise level measurement was taken at the southern entry gate over a fifteen-minute period and represents multiple noise sources producing a reference noise level of 56.0 dBA Leq at a uniform distance of 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, and background forklift backup alarm noise.

UNLOADING/DOCKING ACTIVITY

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 Leq at a uniform 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 and air brakes noise.

9.3.2 WORST-CASE REFERENCE NOISE LEVELS

To describe the worst-case Project-only operational noise levels associated with the Gateway South Building 4 Project, this analysis relies on a reference noise level of 62.8 dBA Leq at a uniform distance of 50 feet representing unloading/docking activity taken at the Motivational Fulfillment & Logistics Services distribution facility, previously described in Section 9.3.1. This analysis assumes that tenants within the Project buildings would be operational 24 hours per day, seven days per week. As shown on Table 9-1, the reference noise level of 62.8 dBA at a uniform distance of 50 feet has a noise-source height of 8 feet. While the specific noise levels at the Project site will depend on the actual tenant, the intensity and the daytime / nighttime hours of operation, a reference noise level of 62.8 dBA Leq at a normalized distance of 50 feet is used to describe the peak Project operational noise activity since it represents similar operational characteristics. The reference noise levels are intended to describe noise level impacts associated with the expected typical warehouse and distribution storage operations at the Project site.

TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source	Duration (h:mm:ss)	Distance From Source (Feet)	Noise Source Height (Feet)	Hourly Activity (Minutes)[3]	Noise Level (dBA Leq)	
					@ Ref. Distance	@ 50 Feet
Entry Gate Activity[1]	0:15:00	20'	8'	60	64.0	56.0
Unloading/Docking Activity[1]	0:15:00	30'	8'	60	67.2	62.8
Roof-Top Air Conditioning Units[2]	96:00:00	5'	25'	39	77.2	57.2

[1] Reference noise level measurements were collected on 1/7/2015 from the existing operations of the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino.
[2] As measured by Urban Crossroads, Inc. on 7/27/2015 at the Santee Walmart located at 170 Town Center Parkway.
[3] Duration (minutes within the hour) of noise activity during peak hourly conditions.

9.4 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed warehouse operations that include idling trucks, delivery truck activities, parking, backup alarms, as well as loading and unloading of dry goods, 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. With geometric spreading, sound levels attenuate (or decrease) at a rate of 6 dB for each doubling of distance from a point source (e.g. idling trucks, delivery truck activities, parking, backup alarms, loading and unloading of dry goods) under the hard site conditions used in this analysis.

Table 9-2 presents the unmitigated Project operational noise levels based on the distances from the closest noise source to each nearby sensitive receiver location, as shown on Exhibit 9-A. Table 9-2 indicates that the noise levels associated with the Gateway South Building 4 Project are expected to range from 36.9 to 48.2 dBA Leq at the nearby sensitive receiver locations. Based on the results of the noise analysis, the Project operational noise levels will satisfy the City of San Bernardino 65 dBA Leq exterior noise level standards at the nearby sensitive receiver locations as shown on Table 9-3, and therefore, the operational noise impacts will be *less than significant*. The operational noise level calculations are included in Appendix 9.2.

TABLE 9-2: PROJECT OPERATIONAL NOISE LEVEL PROJECTIONS

Receiver Location[1]	Noise Sources[2]		Combined Operational Noise Levels (dBA Leq)[3]
	Unloading/ Docking Activity	Roof-Top Air Conditioning Unit	
R1	36.6	24.6	36.9
R2	42.3	27.5	42.4
R3	45.8	29.4	45.9
R4	39.2	30.2	39.7
R5	39.7	33.0	40.5
R6	48.0	35.3	48.2
R7	37.4	28.2	37.9

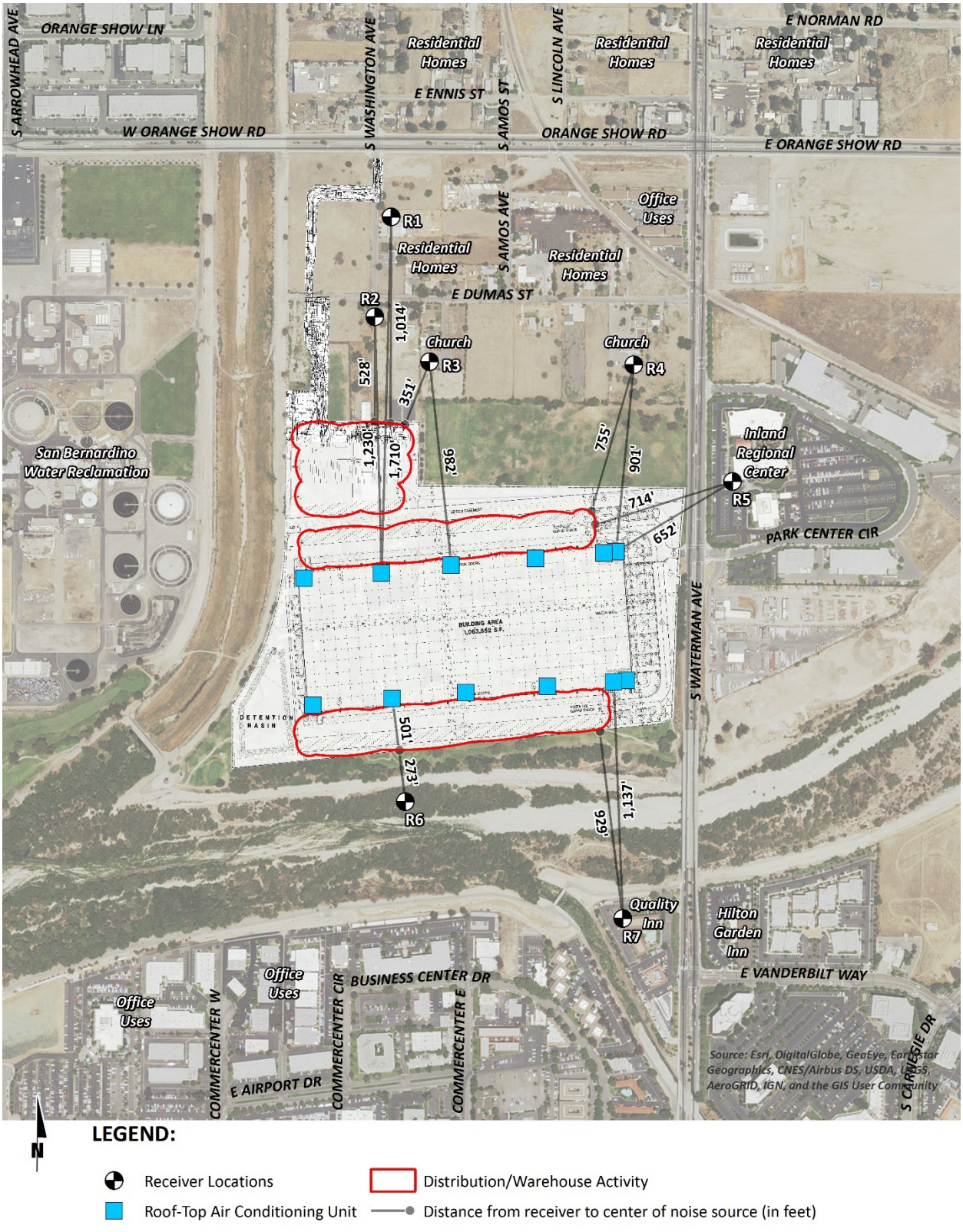
[1] See Exhibit 9-A for the receiver and noise source locations.
[2] Reference noise sources as shown on Table 9-1.
[3] Calculations for each noise source are provided in Appendix 9.2.

TABLE 9-3: PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Noise Level At Receiver Locations (dBA Leq)[2]	Noise Level Standard (dBA Leq)[3]	Threshold Exceeded?[4]
R1	36.9	65	No
R2	42.4	65	No
R3	45.9	65	No
R4	39.7	65	No
R5	40.5	65	No
R6	48.2	65	No
R6	37.9	65	No

[1] See Exhibit 9-A for the noise receiver and noise source locations.
[2] Estimated Project stationary source noise levels as shown on Table 9-2.
[3] Noise standards as shown on Table 3-1.
[4] Do the estimated Project stationary source noise levels exceed the noise standards on the affected land uses?

EXHIBIT 9-A: OPERATIONAL NOISE SOURCE LOCATIONS



9.5 PROJECT OPERATIONAL NOISE CONTRIBUTION

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

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

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels 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 ambient daytime and nighttime conditions are presented on Tables 9-4 and 9-5.

As indicated on Table 9-4, the highest Project-related daytime operational noise level increase will approach 1.2 dBA Leq. During the nighttime hours, the highest Project-related noise level increase will approach 1.6 dBA Leq, as shown on Table 9-5. Since the Project-related operational noise level contributions will not exceed the significance criteria discussed in Section 4, the increases at the sensitive receiver locations will be *less than significant*. On this basis, Project operational stationary-source noise would not result in a substantial temporary/periodic, or permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project, and impacts in these regards 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 Contribution[6]	Threshold Exceeded?[7]
R1	36.9	L2	54.9	55.0	0.1	No
R2	42.4	L4	51.4	51.9	0.5	No
R3	45.9	L4	52.3	53.2	0.9	No
R4	39.7	L3	60.9	60.9	0.0	No
R5	40.5	L5	62.5	62.5	0.0	No
R6	48.2	L6	53.1	54.3	1.2	No
R7	37.9	L7	52.3	52.5	0.2	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 Contribution[6]	Threshold Exceeded?[7]
R1	36.9	L2	54.9	55.0	0.1	No
R2	42.4	L4	51.4	51.9	0.5	No
R3	45.9	L4	51.4	52.5	1.1	No
R4	39.7	L3	58.9	59.0	0.1	No
R5	40.5	L5	61.2	61.2	0.0	No
R6	48.2	L6	51.8	53.4	1.6	No
R7	37.9	L7	50.2	50.4	0.2	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.

9.6 OPERATIONAL NOISE ABATEMENT MEASURES

To further reduce potential operational noise levels received at nearby noise-sensitive receiver locations, it is recommended that the Lead Agency require the following as Project Conditions of Approval:

- All on-site operating equipment under the control of the building user that is used in outdoor areas shall be equipped with properly functioning and well-maintained mufflers.
- Maintain quality pavement conditions on the property that are free of vertical deflection (i.e. speed bumps) to minimize truck noise.
- The truck access gates and loading docks within the truck court on the Project site shall be posted with signs which state:
    - Truck drivers shall turn off engines when not in use;
    - Diesel trucks servicing the Project shall not idle for more than five (5) minutes; and
    - Post telephone numbers of the building facilities manager to report idling violations.

9.7 OPERATIONAL VIBRATION IMPACTS

To assess the potential vibration impacts from truck haul trips associated with operational activities, the City of San Bernardino threshold for vibration of 0.7 in/sec (RMS) is used. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement conditions. Typical vibration levels for the Gateway South Building 4 heavy truck activity at normal traffic speeds will approach 0.001 in/sec (RMS), based on the FTA *Transit Noise Impact and Vibration Assessment*. Truck deliveries transiting on site will be travelling at very low speeds so it is expected that delivery truck vibration impacts at nearby homes will not exceed the vibration threshold of 0.7 in/sec (RMS), and therefore, will be *less than significant*.

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. In addition, the construction noise analysis is based on the closest distance to construction activities across all potential Project site access alternatives (interim and permanent Options 1 and 2) to present a conservative approach.

10.1 CONSTRUCTION NOISE STANDARDS

The City of San Bernardino has set restrictions to control noise impacts associated with the construction of the proposed Project. Section 8.54.070 of the City's Noise Control Ordinance states: *No person shall be engaged or employed, or cause any other person to be engaged or employed, in any work of construction, erection, alteration, repair, addition, movement, demolition, or improvement to any building or structure except within the hours of 7:00 a.m. and 8:00 p.m.* (16) While the City establishes limits to the hours during which construction activity may take place, it does not identify specific noise level limits for construction noise levels.

To evaluate whether the Project will generate a substantial periodic increase in short-term 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). (3) 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. (3) For the purposes of this analysis, the lowest, more conservative construction noise level threshold of 85 dBA Leq 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 period, they are expressed as Leq noise levels. Therefore, the noise level threshold of 85 dBA Leq 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.

10.2 CONSTRUCTION NOISE LEVELS

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

- Site Preparation
- Grading

- Building Construction
- Paving
- Architectural Coating

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to in excess of 80 dBA when measured at 50 feet. 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 used in this analysis are consistent with the *Gateway South Building 4 Air Quality Impact Analysis* prepared by Urban Crossroads, Inc. (27)

10.3 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 16-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 common reference distance of 50 feet.

EXHIBIT 10-A: CONSTRUCTION NOISE SOURCE AND RECEIVER LOCATIONS

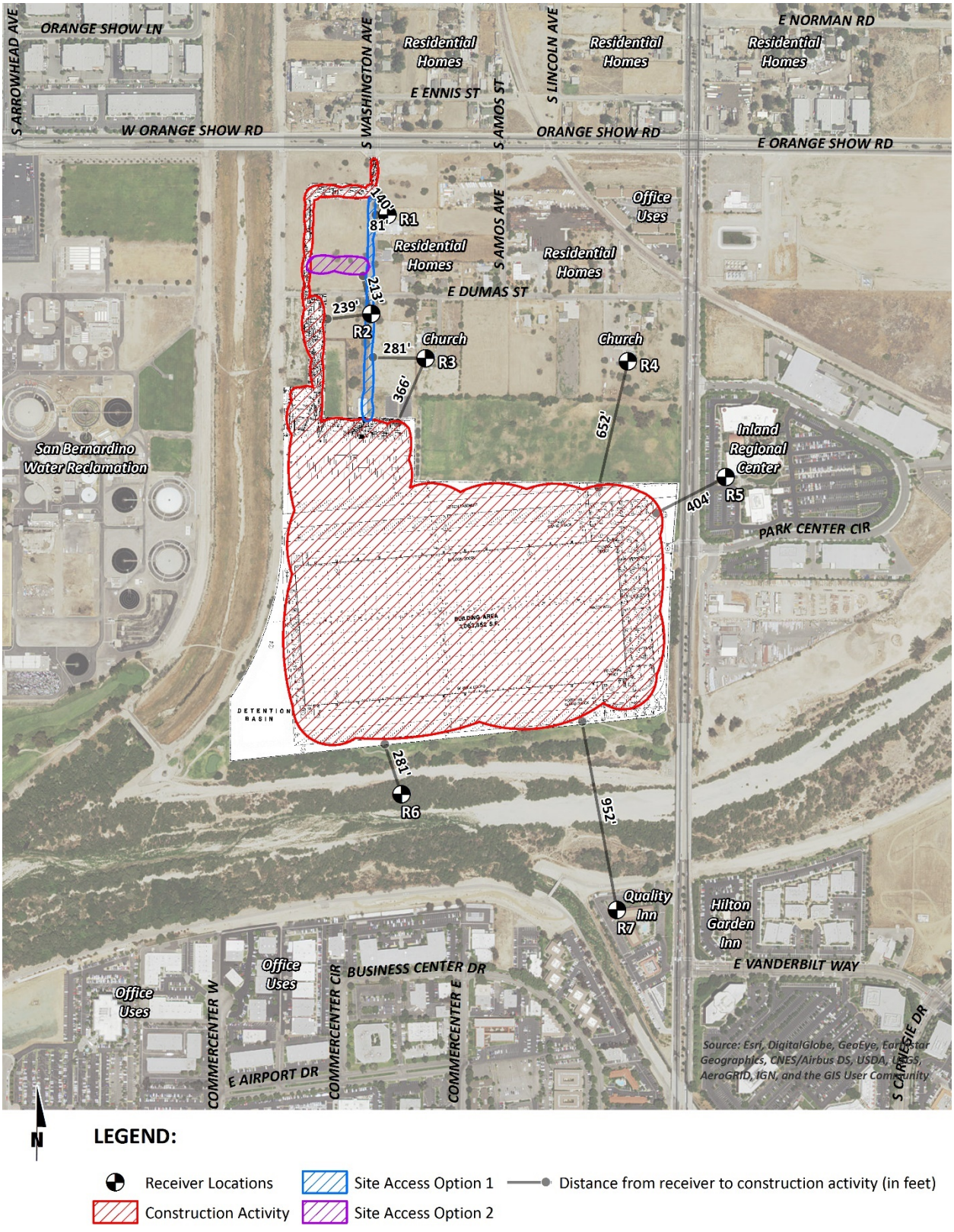


TABLE 10-1: CONSTRUCTION REFERENCE NOISE LEVELS

ID	Noise Source	Reference Distance From Source (Feet)	Reference Noise Levels @ Reference Distance (dBA Leq)	Reference Noise Levels @ 50 Feet (dBA Leq)[6]
1	Truck Pass-Bys & Dozer Activity[1]	30'	63.6	59.2
2	Dozer Activity[1]	30'	68.6	64.2
3	Construction Vehicle Maintenance Activities[2]	30'	71.9	67.5
4	Foundation Trenching[2]	30'	72.6	68.2
5	Rough Grading Activities[2]	30'	77.9	73.5
6	Residential Framing[3]	30'	66.7	62.3
7	Water Truck Pass-By & Backup Alarm[4]	30'	76.3	71.9
8	Dozer Pass-By[4]	30'	84.0	79.6
9	Two Scrapers & Water Truck Pass-By[4]	30'	83.4	79.0
10	Two Scrapers Pass-By[4]	30'	83.7	79.3
11	Scraper, Water Truck, & Dozer Activity[4]	30'	79.7	75.3
12	Concrete Mixer Truck Movements[5]	50'	71.2	71.2
13	Concrete Paver Activities[5]	30'	70.0	65.6
14	Concrete Mixer Pour & Paving Activities[5]	30'	70.3	65.9
15	Concrete Mixer Backup Alarms & Air Brakes[5]	50'	71.6	71.6
16	Concrete Mixer Pour Activities[5]	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).

10.4 CONSTRUCTION NOISE ANALYSIS

Tables 10-2 to 10-6 show the Project construction stages and the reference construction noise levels used for each stage. Table 10-7 provides a summary of the noise levels from each stage of construction at each of the sensitive receiver locations. Based on the reference construction noise levels, the Project-related construction noise levels when the peak reference noise level is operating at the closest point within the center of construction activity to the nearest the sensitive receiver location will range from 54.0 to 75.4 dBA Leq.

TABLE 10-2: SITE PREPARATION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA Leq)
Truck Pass-Bys & Dozer Activity	59.2
Water Truck Pass-By & Backup Alarm	71.9
Dozer Pass-By	79.6
Two Scrapers & Water Truck Pass-By	79.0
Two Scrapers Pass-By	79.3
Peak Reference Noise Level at 50 Feet (dBA Leq):	79.6

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA Leq)[3]	Estimated Noise Barrier Attenuation (dBA Leq)[4]	Construction Noise Level (dBA Leq)
R1	81'	-4.2	0.0	75.4
R2	213'	-12.6	0.0	67.0
R3	281'	-15.0	0.0	64.6
R4	652'	-22.3	0.0	57.3
R5	404'	-18.1	0.0	61.4
R6	952'	-25.6	0.0	54.0
R7	281'	-15.0	0.0	64.6

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

TABLE 10-3: GRADING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA Leq)
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Rough Grading Activities	73.5
Dozer Pass-By	79.6
Two Scrapers & Water Truck Pass-By	79.0
Two Scrapers Pass-By	79.3
Peak Reference Noise Level at 50 Feet (dBA Leq):	79.6

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA Leq)[3]	Estimated Noise Barrier Attenuation (dBA Leq)[4]	Construction Noise Level (dBA Leq)
R1	81'	-4.2	0.0	75.4
R2	213'	-12.6	0.0	67.0
R3	281'	-15.0	0.0	64.6
R4	652'	-22.3	0.0	57.3
R5	404'	-18.1	0.0	61.4
R6	952'	-25.6	0.0	54.0
R7	281'	-15.0	0.0	64.6

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

TABLE 10-4: BUILDING CONSTRUCTION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA Leq)
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Foundation Trenching	68.2
Water Truck Pass-By & Backup Alarm	71.9
Peak Reference Noise Level at 50 Feet (dBA Leq):	71.9

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA Leq)[3]	Estimated Noise Barrier Attenuation (dBA Leq)[4]	Construction Noise Level (dBA Leq)
R1	81'	-4.2	0.0	67.7
R2	213'	-12.6	0.0	59.3
R3	281'	-15.0	0.0	56.9
R4	652'	-22.3	0.0	49.6
R5	404'	-18.1	0.0	53.7
R6	952'	-25.6	0.0	46.3
R7	281'	-15.0	0.0	56.9

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

TABLE 10-5: PAVING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA Leq)
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
Peak Reference Noise Level at 50 Feet (dBA Leq):	71.6

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA Leq)[3]	Estimated Noise Barrier Attenuation (dBA Leq)[4]	Construction Noise Level (dBA Leq)
R1	81'	-4.2	0.0	67.4
R2	213'	-12.6	0.0	59.0
R3	281'	-15.0	0.0	56.6
R4	652'	-22.3	0.0	49.3
R5	404'	-18.1	0.0	53.5
R6	952'	-25.6	0.0	46.0
R7	281'	-15.0	0.0	56.6

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

TABLE 10-6: ARCHITECTURAL COATING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA Leq)
Construction Vehicle Maintenance Activities	67.5
Peak Reference Noise Level at 50 Feet (dBA Leq):	67.5

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA Leq)[3]	Estimated Noise Barrier Attenuation (dBA Leq)[4]	Construction Noise Level (dBA Leq)
R1	81'	-4.2	0.0	63.3
R2	213'	-12.6	0.0	54.9
R3	281'	-15.0	0.0	52.5
R4	652'	-22.3	0.0	45.2
R5	404'	-18.1	0.0	49.3
R6	952'	-25.6	0.0	41.9
R7	281'	-15.0	0.0	52.5

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

10.5 CONSTRUCTION NOISE THRESHOLDS OF SIGNIFICANCE

The construction noise analysis shows that the highest construction noise levels will occur when construction activities take place at the closest point from the center of Project construction activity to each of the nearby receiver locations. As shown on Table 10-7, the unmitigated construction noise levels are expected to range from 54.0 to 75.4 dBA Leq at the receiver locations in the City of San Bernardino.

TABLE 10-7: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY (DBA LEQ)

Receiver Location[1]	Construction Phase Hourly Noise Level (dBA Leq)					
	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Peak Activity[2]
R1	75.4	75.4	67.7	67.4	63.3	75.4
R2	67.0	67.0	59.3	59.0	54.9	67.0
R3	64.6	64.6	56.9	56.6	52.5	64.6
R4	57.3	57.3	49.6	49.3	45.2	57.3
R5	61.4	61.4	53.7	53.5	49.3	61.4
R6	54.0	54.0	46.3	46.0	41.9	54.0
R7	64.6	64.6	56.9	56.6	52.5	64.6

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

Table 10-8 shows the peak construction noise levels at the potentially impacted receiver locations are expected to approach 75.4 dBA Leq and will satisfy the 85 dBA Leq 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 LEQ)

Receiver Location[1]	Construction Noise Levels (dBA Leq)		
	Peak Activity[2]	Threshold[3]	Threshold Exceeded?[4]
R1	75.4	85	No
R2	67.0	85	No
R3	64.6	85	No
R4	57.3	85	No
R5	61.4	85	No
R6	54.0	85	No
R7	64.6	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 level threshold as shown on Table 4-2.
[4] Do the estimated Project construction noise levels satisfy the construction noise level threshold?

10.6 CONSTRUCTION NOISE ABATEMENT MEASURES

Construction noise is temporary, intermittent and of short duration, and will not present any long-term impacts. The following practices would reduce any temporary and intermittent noise level increases produced by the construction equipment at the nearby noise-sensitive residential land uses. Prior to approval of grading plans and/or issuance of building permits, plans shall include the following notes. The Project construction supervisor shall ensure compliance with the notes and the City shall conduct periodic inspection at its discretion.

- Noise-generating Project construction activities shall only occur between the hours of 7:00 a.m. and 8:00 p.m. on any day, as specified in the City of San Bernardino Noise Ordinance.
- The construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards.
- No stationary construction equipment shall be placed within 500 feet of residential homes and other noise-sensitive receivers. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise-sensitive receivers nearest the Project site.
- The construction contractor shall locate equipment staging in the western portion of the property, near the proposed western building façade, which is the area that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site.
- The construction contractor shall schedule haul truck deliveries to occur during the same hours specified for construction equipment (between the hours of 7:00 a.m. and 8:00 p.m. on any day) and design haul truck delivery routes to minimize the use of roads that pass by noise-sensitive land uses.

10.7 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 building, the vibration is usually short-term and is not of sufficient magnitude to cause building damage. It is not expected that heavy equipment such as large bulldozers would operate close enough to any residences to cause a vibration impact.
- 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 and paving. Using the vibration source level of construction

equipment provided on Table 6-10 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.

Based on the reference vibration levels provided by the FTA, a large bulldozer represents the peak source of vibration with a reference velocity of 0.089 in/sec (PPV) at 25 feet. At distances ranging from 81 to 952 feet from the Project site, construction vibration velocity levels are expected to approach 0.015 in/sec (PPV), as shown on Table 10-9. To assess the human perception of vibration levels in PPV, the velocities are converted to RMS vibration levels based on the Caltrans *Transportation and Construction Vibration Guidance Manual* conversion factor of 0.71. Table 10-9 shows the construction vibration levels in RMS are expected to approach 0.011 in/sec (RMS) at the nearby receiver locations. Based on the City of San Bernardino vibration standard of 0.7 in/sec, the construction-related vibration impacts are considered *less than significant.*

Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period, but will occur rather only during the times that heavy construction equipment is operating at the Project site perimeter. Moreover, construction at the Project site will be restricted to daytime hours consistent with City of San Bernardino requirements thereby eliminating potential vibration impacts during the sensitive nighttime hours.

TABLE 10-9: CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver[1]	Distance to Const. Activity (Feet)	Receiver PPV Levels (in/sec)[2]					RMS Velocity Levels (in/sec)[3]	Threshold Exceeded?[4]
		Small Bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer	Peak Vibration		
R1	81'	0.001	0.006	0.013	0.015	0.015	0.011	No
R2	281'	0.000	0.001	0.002	0.002	0.002	0.002	No
R3	652'	0.000	0.000	0.001	0.001	0.001	0.000	No
R4	652'	0.000	0.000	0.001	0.001	0.001	0.000	No
R5	404'	0.000	0.001	0.001	0.001	0.001	0.001	No
R6	952'	0.000	0.000	0.000	0.000	0.000	0.000	No
R7	281'	0.000	0.001	0.002	0.002	0.002	0.002	No

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

11 REFERENCES

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2. **California Department of Transportation.** *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects.* May 2011.
3. **National Institute for Occupational Safety and Health.** *Criteria for Recommended Standard: Occupational Noise Exposure.* June 1998.
4. **City of San Bernardino.** *General Plan, Noise Element.* November 2005.
5. —. *Municipal Code, Title 19, Article III, Chapter 19.20 - Property Development Standards.*
6. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
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8. **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.
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14. **Office of Planning and Research.** *State of California General Plan Guidelines.* October 2003.
15. **State of California.** *2013 California Green Building Standards Code.* January 2014.
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20. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
21. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.

22. **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.

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

24. **California Department of Transportation Environmental Program.** *I-80 Davis OGAC Pavement Noise Study.* September 2001.

25. **Canadian Ministry of Transportation and Highways, Highway Environment Branch.** *Open-Graded Asphalt 'Quiet Pavement' - Assessment of Traffic Noise Reduction Performance.* November 1995.

26. **California Department of Transportation.** *Highway Design Manual, Chapter 1100 Highway Traffic Noise Abatement.* May 2012.

27. **Urban Crossroads, Inc.** *Gateway South Building 4 Air Quality Impact Analysis.* April 2017.

12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Gateway South Building 4 Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5979.

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EDUCATION

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

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

PROFESSIONAL REGISTRATIONS

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

PROFESSIONAL AFFILIATIONS

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

PROFESSIONAL CERTIFICATIONS

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

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APPENDIX 3.1:

CITY OF SAN BERNARDINO DEVELOPMENT CODE

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ARTICLE III - GENERAL

CHAPTER 19.20
PROPERTY DEVELOPMENT STANDARDS

19.20.010 PURPOSE

These standards shall ensure that new or modified uses and development will produce an urban environment of stable, desirable character which is harmonious with the existing and future development, consistent with the General Plan.

19.20.020 APPLICABILITY

Any permit which authorizes new construction or modifications to an existing structure in excess of 25% of the structure floor area shall be subject to the standards set forth in this Chapter.

19.20.030 GENERAL STANDARDS

No permit shall be approved unless it conforms to all of the following standards set forth in this Chapter:

1. Access
2. Additional Height Restrictions
3. Antennae, Satellite Dish and Telecommunications Facilities
4. Design Considerations
5. Dust and Dirt
6. Environmental Resources/Constraints
7. Exterior Building Walls
8. Fences and Walls
9. Fire Protection
10. Fumes, Vapor and Gases
11. Glare
12. Hazardous Materials
13. Height Determination (Buildings and Structures)
14. Lighting
15. Noise
16. Odor
17. Projections into Setbacks
18. Public Street Improvements
19. Radioactivity
20. Refuse Storage/Disposal
21. Screening
22. Signs, Off-Street Parking, Off-Street Loading, and Landscaping
23. Solar Energy
24. Storage
25. Toxic Substances
26. Transportation Control Measures (TCM)
27. Underground Utilities
28. Vibration

MC 890 1/20/94, MC 1056 10/8/99

15. NOISE

No loudspeaker, bells, gongs, buzzers, mechanical equipment or other sounds, attention-attracting, or communication device associated with any use shall be discernible beyond any boundary line of the parcel, except fire protection devices, burglar alarms and church bells. The following provisions shall apply:

A. In residential areas, no exterior noise level shall exceed 65dBA and no interior noise level shall exceed 45dBA.

B. All residential developments shall incorporate the following standards to mitigate noise levels:

1. Increase the distance between the noise source and receiver.

2. Locate land uses not sensitive to noise (i.e., parking lots, garages, maintenance facilities, utility areas, etc.) between the noise source and the receiver.

3. Bedrooms should be located on the side of the structure away from major rights-of-way.

4. Quiet outdoor spaces may be provided next to a noisy right-of-way by creating a U-shaped development which faces away from the right-of-way.

C. The minimum acceptable surface weight for a noise barrier is four pounds per square foot (equivalent to ¾-inch plywood). The barrier shall be of a continuous material which is resistant to sound including:

1. Masonry block
2. Precast concrete
3. Earth berm or a combination of earth berm with block concrete.

D. Noise barriers shall interrupt the line-of-sight between noise source and receiver.

16. ODOR

No use shall emit any obnoxious odor or fumes.

17. PROJECTIONS/CONSTRUCTION AND EQUIPMENT PERMITTED INTO SETBACKS

The following list represents the only projections, construction, or equipment that shall be permitted within the required setbacks:

A. Front Setback: Roof overhangs, fireplace chimney, awnings & canopies

APPENDIX 3.2:

CITY OF SAN BERNARDINO MUNICIPAL CODE

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any stationary engine driven by means of internal combustion of gases therein, within the City of San Bernardino without placing upon the exhaust thereof a muffler or other device so as to silence the noise or report caused by the escaping of such gases from and through such exhaust. (Ord. 465 §1, 9-5-11.)

8.51.020 Violation - Penalty.

Any person, firm or corporation violating any provision of this chapter is guilty of an infraction, which upon conviction thereof is punishable in accordance with the provisions of §1.12.010 of this Code. (Ord. MC-460, 5-13-85; Ord. 465 §2, 9-5-11.)

Chapter 8.54
NOISE CONTROL

Sections:

8.54.010 Purpose and Intent.

A. It is the purpose and intent of these regulations to establish community-wide noise standards. It is further the purpose of these regulations to recognize that the existence of excessive noise within the City is a condition which is detrimental to the health, safety, welfare, and quality of life of the citizens and shall be regulated in the public interest.

B. In furtherance of the foregoing purpose, it is found and declared as follows:

1. The making, creation, or maintenance of such loud, unnecessary, unnatural, or unusual noises that are prolonged, unusual, annoying, disturbing and unnatural in their time, place, and use are a detriment to public health, comfort, convenience, safety, general welfare, and the peace and quiet of the City and its inhabitants; and

2. The public interest and necessity of the provisions and prohibitions hereinafter contained and enacted is declared as a matter of legislative determination and public policy, and it is further declared that the provisions and prohibitions hereinafter contained and enacted are in pursuance of, and for the purpose of, securing and promoting the public health, comfort, convenience, safety, general welfare and property, and the peace and quiet of the City and its inhabitants.

(Ord. MC-1246, 5-21-07; Ord. 1925 §1, 11-5-51.)

8.54.020 Prohibited Acts.

It shall be unlawful for any person to engage in the following activities:

A. Sounding any horn or signal device on any automobile, motorcycle, bus, or other motor vehicle in any other manner or circumstances or for any other purpose than required or permitted by the California Vehicle Code, or other laws, for an unnecessary or unreasonable period of time;

B. Racing the engine of any motor vehicle while the vehicle is not in motion, except when necessary to do so in the course of repairing, adjusting, or testing the same.

C. Operating or permitting the use of any motor vehicle on any public right-of-way or public place or on private property within a residential zone for which the exhaust muffler, intake muffler, or any other noise abatement device has been modified or changed in a manner such that the noise emitted by the motor vehicle is increased above that emitted by the vehicle as originally manufactured.

D. Using, operating, or permitting to be played, used or operated any radio receiving set, musical instrument, phonograph, or other sound amplification or production equipment for producing or reproducing sound in such a manner as to disturb the peace, quiet, or comfort of neighboring persons, or at any time with louder volume than is necessary for the convenient hearing of the person or persons who are in the room, vehicle, or other enclosure in which such machine or device is operated, and who are voluntary listeners thereto and that is:

1. Plainly audible across property boundaries;

2. Plainly audible through partitions common to two residences within a building;

3. Plainly audible at a distance of 50 feet in any direction from the source of the music or sound between the hours of 8:00 a.m. and 10:00 p.m.; or

4. Plainly audible at a distance of 25 feet in any direction from the source of the music or sound between the hours of 10:00 p.m. and 8:00 a.m.

E. The intentional sounding or permitting the sounding outdoors of any fire, burglar, or civil defense alarm, siren, whistle, or any motor vehicle burglar alarm, except for emergency purposes or for testing, unless such alarm is terminated within fifteen minutes of activation.

F. Yelling, shouting, whistling, or singing in a loud and boisterous manner on the public streets so as to disturb the quiet, comfort, or repose of persons in any office, dwelling, hotel, or other type of residence, or neighborhood.

G. The keeping of any animal, fowl, or bird which by causing frequent or long continued noise disturbs the comfort, quiet, or repose of any person or neighborhood.

H. The unnecessary or excessive blowing of whistles, sounding of horns, ringing of bells, or use of signaling devices by operators of trains, motor trucks, and other transportation equipment.

I. The creation of loud and excessive noise in connection with the loading or unloading of motor trucks and other vehicles.

J. The shouting and crying of peddlers, hawkers, and vendors which disturbs the peace and quiet of any considerable number of persons or neighborhood.

K. The doing of automobile, automotive body or fender repair work, or other work on metal objects and metal parts in a residential district so as to cause loud and excessive noise which disturbs the peace, quiet, and repose of any person occupying adjoining or closely situated property or neighborhood.

L. The operation or use between the hours of 10:00 p.m. and 8:00 a.m. of any pile driver, steam shovel, pneumatic hammers, derrick, steam or electric hoist, power driven saw, or any other tool or apparatus, the use of which is attended by loud and excessive noise, except with the approval of the City.

M. Creating excessive noise adjacent to any school, church, court, or library while the same is in use, or adjacent to any hospital or care facility, which unreasonably interferes with the workings of such institution, or which disturbs or unduly annoys patients in the hospital, provided conspicuous signs are displayed in such streets indicating the presence of a school, institution of learning, church, court, or hospital.

N. Making or knowingly and unreasonably permitting to be made any unreasonably loud, unnecessary, or unusual noise that disturbs the comfort, repose, health, peace and quiet, or which causes discomfort or annoyance to any reasonable person of normal sensitivity. The characteristics and conditions that may be considered in determining whether this section has been violated include, but are not limited to, the following:

1. The level of noise;

2. The level of background noise;

3. The proximity of the noise to sleeping facilities;

4. The nature and zoning of the areas within which the noise emanates;

5. The density of the inhabitation of the area within which the noise emanates;

6. The time of day or night the noise occurs;

7. The duration of the noise;

8. Whether the noise is recurrent, intermittent, or constant; and

9. Whether the noise is produced by a commercial or noncommercial activity.

(Ord. MC-1246, 5-21-07; Ord. 2102, 1956; Ord. 1925 §2, 1951.)

8.54.030 Issuance of Written Notice and Impoundment.

A. Any officer who encounters a violation of this section may issue a written notice to the Responsible Person demanding immediate abatement of the violation. The written notice shall inform the recipient that a second violation of the same provision within a seventy two (72) hour period may result in the issuance of a criminal citation, the imposition of criminal and civil penalties, and confiscation and impoundment, as evidence, of the components that are amplifying or transmitting the prohibited noise.

1. Responsible Person means (a) any person who owns, leases, or is lawfully in charge of the property or motor vehicle where the noise violation takes place, or (b) any person who owns or controls the source of the noise or violation. If the Responsible Person is a minor, then the parent or guardian who has custody of the child at the time of the violation shall be the Responsible Person who is liable under this chapter.

B. Any officer who encounters a second violation of this chapter within a seventy two (72) hour period following the issuance of a written notice is empowered to confiscate and impound, as evidence, any or all of the components amplifying or transmitting the sound. The immediate confiscation of a motor vehicle to which a component is attached may be made if the same may not be removed without causing harm to the vehicle or component.

C. Any person claiming legal ownership of the items confiscated and impounded under this chapter may request the return of the item by filing a written request with the police department within seven (7) calendar days of the confiscation. Such requests shall be processed in accordance with the procedures adopted by the department.

(Ord. MC-1246, 5-21-07; Ord. MC-649, 1-3-89; Ord. 1925 §3, 1951.)

8.54.040 Cost Recovery for Second Response.

A. Whenever any officer issues a written notice to a responsible person to discontinue a noise violation, the Responsible Person shall be liable for the actual cost of each subsequent response required to abate the violation within seventy two (72) hours of the issuance of the written warning.

B. The bill for the response charge shall be served upon the Responsible Person within thirty (30) days after the violation. If the Responsible Person has no last known business or residence address, the location of the violation shall be deemed to be the proper address for service. The bill shall include a notice of the right of the person being charged to request a hearing to dispute the imposition of the response charge or the amount of the charge.

C. The response charge shall be deemed to be a civil debt to the City.
(Ord. MC-1246, 5-21-07; Ord. MC-460, 5-13-85; Ord. 1925 §5, 1951.)

8.54.050 Controlled Hours of Operation.

It shall be unlawful for any person to engage in the following activities other than between the hours of 8:00 a.m. and 8:00 p.m. in residential zones and other than between the hours of 7:00 a.m. and 8:00 p.m. in all other zones:

A. Operate or permit the use of powered model vehicles and planes.

B. Load or unload any vehicle, or operate or permit the use of dollies, carts, forklifts, or other wheeled equipment that causes any impulsive sound, raucous, or unnecessary noise within one thousand (1,000) feet of a residence.

C. Operate or permit the use of domestic power tools, or machinery or any other equipment or tool in any garage, workshop, house, or any other structure.

D. Operate or permit the use of gasoline or electric powered leaf blowers, such as commonly used by gardeners and other persons for cleaning lawns, yards, driveways, gutters, and other property.

E. Operate or permit the use of privately operated street/parking lot sweepers or vacuums, except that emergency work and/or work necessitated by unusual conditions may be performed with the written consent of the City Manager.

F. Operate or permit the use of electrically operated compressor, fan, and other similar devices.

G. Operate or permit the use of any motor vehicle with a gross vehicle weight rating in excess of ten thousand (10,000) pounds, or of any auxiliary equipment attached to such a vehicle, including, but not limited to, refrigerated truck compressors for a period longer than fifteen (15) minutes in any hour while the vehicle is stationary and on a public right-of-way or public space except when movement of said vehicle is restricted by other traffic.

H. Repair, rebuild, reconstruct, or dismantle any motor vehicle or other mechanical equipment or devices in a manner so as to be plainly audible across property lines.
(Ord. MC-1246, 5-21-07)

8.54.060 Exemptions.

The following activities and noise sources shall be exempt from the provisions of this chapter:

A. The use of horns, sirens, or other signaling or warning devices by persons vested with legal authority to use the same, and in pursuit of their lawful duties, such as on ambulances, fire, police, or other governmental or official equipment.

B. Such noises as are an accompaniment and effect of a lawful business, commercial or industrial enterprise carried on in an area zoned for that purpose, except where there is evidence that such noise is a nuisance and that such a nuisance is a result of the employment of unnecessary and injurious methods of operation.

C. Activities conducted on the grounds of any public or private school during regular hours of operation.

D. Outdoor gatherings, public dances, shows, and sporting and entertainment events provided said events are authorized by the City.

E. Activities conducted at public spaces during regular hours of operation.

F. Any mechanical devices, apparatus, or equipment used, related to, or connected with emergency machinery, vehicle, or work.

G. Construction, repair, or excavation necessary for the immediate preservation of life or property.

H. Construction, operation, maintenance, and repairs of equipment, apparatus, or facilities of park and recreation departments, public work projects, or essential public services and facilities, including, but not limited to, trash collection and those of public utilities subject to the regulatory jurisdiction of the California Public Utilities Commission.

I. Construction, repair, or excavation work performed pursuant to a valid written agreement with the City, or any of its political subdivisions, which provides for noise mitigation measures.

J. Any activity to the extent that regulation thereof has been preempted by State or Federal law.

K. Sounds generated in connection with speech or communication protected by the United States Constitution or the California Constitution, except to the extent such sounds are subject to permissible time, place, and manner restrictions.

(Ord. MC-1246, 5-21-07)

8.54.070 Disturbances from Construction Activity.

No person shall be engaged or employed, or cause any other person to be engaged or employed, in any work of construction, erection, alteration, repair, addition, movement, demolition, or improvement to any building or structure except within the hours of 7:00 a.m. and 8:00 p.m. (Ord. MC-1246, 5-21-07)

8.54.080 Violation - Penalty.

Any person violating any of the provisions of this Chapter is guilty of an infraction or a misdemeanor, which upon conviction thereof is punishable in accordance with the provisions of Section 1.12.010 of this code. (Ord. MC-1246, 5-21-07)

APPENDIX 5.1:

STUDY AREA PHOTOS

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L1
34, 4' 46.331100", 117, 16' 45.056700"

L1_E
34, 4' 47.237500", 117, 16' 47.830800"

L1_W
34, 4' 47.237500", 117, 16' 47.830800"

L2
34, 4' 45.452200", 117, 17' 2.277800"

L2_E
34, 4' 45.452200", 117, 17' 2.277800"

L2_N
34, 4' 45.452200", 117, 17' 2.277800"

L2_S
34, 4' 45.452200", 117, 17' 2.277800"

L2_SW
34, 4' 45.452200", 117, 17' 2.277800"

L2_W
34, 4' 45.452200", 117, 17' 2.277800"

L3
34, 4' 42.431000", 117, 16' 43.985500"

L3_N
34, 4' 39.711900", 117, 16' 44.864500"

L3_NE
34, 4' 39.711900", 117, 16' 44.864500"

L3_SE
34, 4' 39.711900", 117, 16' 44.864500"

L3_W
34, 4' 39.711900", 117, 16' 44.864500"

L4
34, 4' 34.493400", 117, 16' 59.970700"

L4_N
34, 4' 34.493400", 117, 16' 59.970700"

L4_S
34, 4' 34.493400", 117, 16' 59.970700"

L4_W
34, 4' 34.493400", 117, 16' 59.970700"

L5
34, 4' 27.489600", 117, 16' 40.360100"

L5_E
34, 4' 27.489600", 117, 16' 40.360100"

L5_NW
34, 4' 27.489600", 117, 16' 40.360100"

L5_S
34, 4' 27.489600", 117, 16' 40.360100"

L6_E
34, 4' 18.686800", 117, 16' 47.363800"

L6_E2
34, 4' 18.686800", 117, 16' 47.363800"

L6_S
34, 4' 18.686800", 117, 16' 47.363800"

L7
34, 4' 11.023800", 117, 16' 48.819500"

L7_N
34, 4' 11.023800", 117, 16' 48.819500"

L7_NW
34, 4' 11.023800", 117, 16' 48.819500"

L7_SE
34, 4' 11.023800", 117, 16' 48.819500"

L8
34, 4' 9.252300", 117, 17' 10.325300"

L8_E
34, 4' 9.252300", 117, 17' 10.325300"

L8_NE
34, 4' 9.252300", 117, 17' 10.325300"

L8_S
34, 4' 9.252300", 117, 17' 10.325300"

L8_W
34, 4' 8.263500", 117, 17' 8.540000"

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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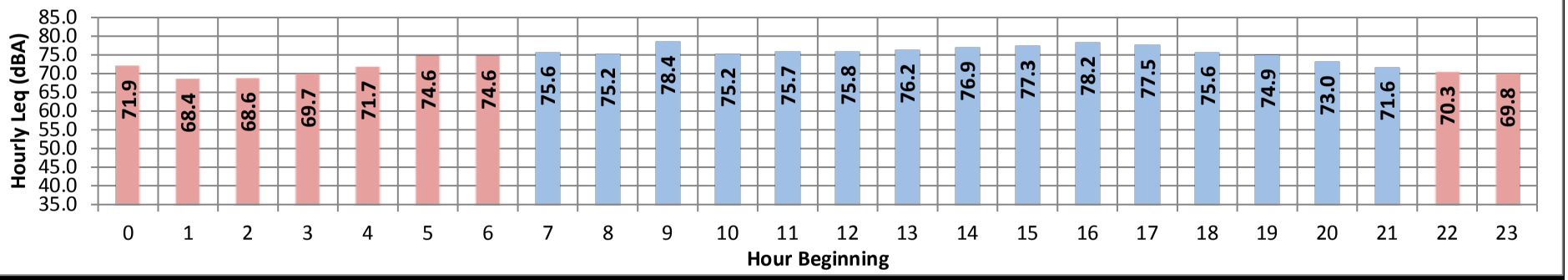
24-Hour Noise Level Measurement Summary

					Energy Average Leq		24-Hour
Project Name:	Gateway South	*JN:*	10189		*Day*	*Night*	*CNEL*
Location:	L1 - Located north of the Project site on Orange Show Road adjacent to existing residential homes.	*Analyst:*	A. Wolfe		76.1	71.7	79.4
		Date:	7/6/2016				

Hourly Leq dBA Readings (unadjusted)



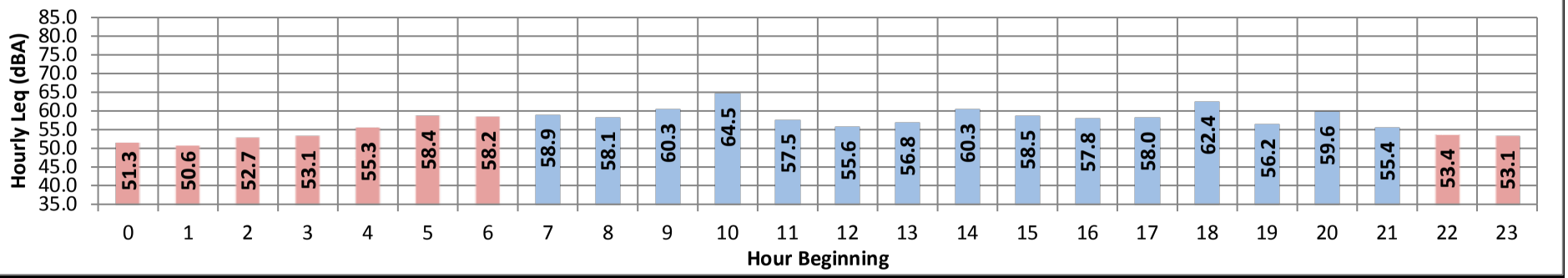
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	71.6	89.9	50.7	83.0	81.0	78.0	76.0	68.0	63.0	55.0	54.0	52.0
	Max	78.4	107.4	56.0	88.0	86.0	83.0	82.0	78.0	71.0	62.0	60.0	57.0
Energy Average:		76.1	Average:		85.9	83.9	81.2	79.9	73.9	67.5	57.5	56.1	54.3
Night	Min	68.4	86.8	50.0	81.0	78.0	74.0	71.0	62.0	56.0	51.0	51.0	50.0
	Max	74.6	101.8	55.9	86.0	84.0	81.0	79.0	73.0	68.0	60.0	58.0	56.0
Energy Average:		71.7	Average:		82.4	80.3	76.8	73.8	66.2	60.9	54.7	53.9	52.9
Hourly Summary													
Night	0	71.9	101.8	50.1	81.0	78.0	74.0	71.0	63.0	56.0	51.0	51.0	50.0
	1	68.4	86.8	50.0	81.0	79.0	75.0	71.1	62.0	58.0	51.0	51.0	50.0
	2	68.6	90.8	51.1	81.0	79.0	75.0	71.0	63.0	57.0	52.0	52.0	51.0
	3	69.7	87.5	52.5	82.0	80.0	76.0	73.0	65.0	59.0	54.0	54.0	53.0
	4	71.7	91.6	55.6	83.0	81.0	78.0	76.0	68.0	62.0	57.0	56.0	56.0
	5	74.6	96.6	55.9	86.0	84.0	81.0	78.0	71.0	66.0	58.0	57.0	56.0
	6	74.6	94.1	54.1	85.0	83.0	80.0	79.0	73.0	68.0	60.0	58.0	55.0
Day	7	75.6	95.5	56.0	86.0	84.0	81.0	80.0	73.0	69.0	60.0	58.0	57.0
	8	75.2	96.1	53.3	86.0	83.0	81.0	79.0	73.0	67.0	57.0	56.0	55.0
	9	78.4	107.4	53.3	86.0	84.0	81.0	80.0	74.0	67.0	58.0	56.0	54.0
	10	75.2	91.6	52.0	86.0	84.0	81.0	80.0	73.0	66.0	56.0	55.0	54.0
	11	75.7	97.8	51.1	86.0	84.0	81.0	80.0	74.0	66.0	55.0	54.0	52.0
	12	75.8	95.1	51.3	86.0	84.0	81.0	80.0	75.0	67.0	57.0	55.0	52.0
	13	76.2	93.5	52.1	86.0	84.0	82.0	81.0	76.0	68.0	57.0	55.0	53.0
	14	76.9	99.5	50.7	87.0	85.0	82.0	81.0	76.0	69.0	56.0	54.0	52.0
	15	77.3	99.1	52.2	87.0	85.0	83.0	81.0	76.0	69.0	58.0	56.0	53.0
	16	78.2	99.1	54.4	88.0	86.0	83.0	82.0	77.0	71.0	60.0	58.0	56.0
	17	77.5	94.8	55.7	86.0	85.0	83.0	82.0	78.0	70.0	62.0	60.0	57.0
	18	75.6	93.5	54.5	86.0	84.0	82.0	80.0	74.0	69.0	59.0	58.0	56.0
	19	74.9	99.0	53.9	86.0	83.0	80.0	79.0	72.0	67.0	57.0	56.0	55.0
	20	73.0	94.6	53.0	84.0	82.0	79.0	77.0	70.0	64.0	55.0	55.0	54.0
	21	71.6	89.9	52.9	83.0	81.0	78.0	76.0	68.0	63.0	55.0	55.0	54.0
Night	22	70.3	94.3	52.6	81.0	79.0	76.0	73.0	66.0	62.0	56.0	54.0	53.0
	23	69.8	91.0	51.6	82.0	80.0	76.0	72.0	65.0	60.0	53.0	52.0	52.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

				Energy Average Leq		24-Hour
Project Name:	Gateway South	*JN:*	10189	*Day*	*Night*	*CNEL*
Location:	L2 - Located north of the Project site on Washington Avenue south of Orange Show Road near existing residential homes.	*Analyst:*	A. Wolfe	59.4	54.9	62.7
		Date:	7/6/2016			

Hourly Leq dBA Readings (unadjusted)



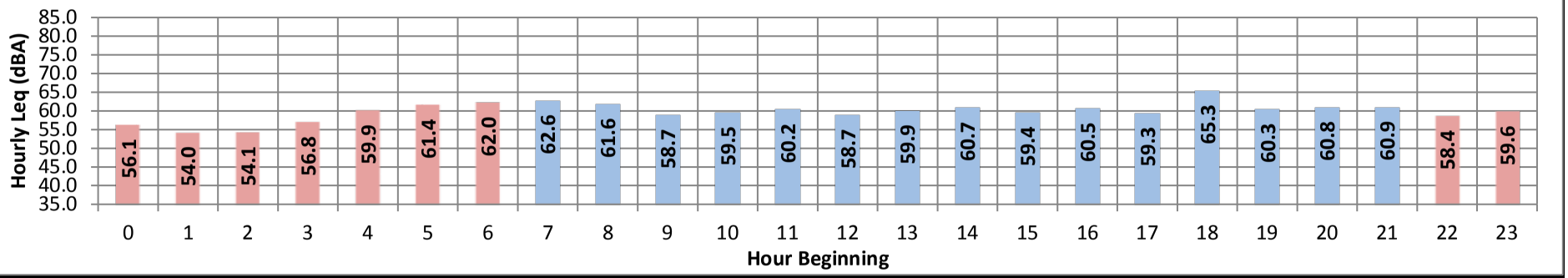
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	55.4	71.6	42.0	64.0	62.0	60.0	58.0	54.0	51.0	46.0	45.0	43.0
	Max	64.5	97.2	47.8	71.0	68.0	64.0	62.0	59.0	56.0	51.0	50.0	49.0
Energy Average:		59.4	Average:		67.2	64.7	61.7	60.3	56.2	53.1	48.3	47.2	45.7
Night	Min	50.6	66.5	41.9	60.0	58.0	56.0	54.0	49.0	45.0	43.0	42.0	42.0
	Max	58.4	79.6	46.3	69.0	66.0	63.0	62.0	58.0	54.0	48.0	48.0	47.0
Energy Average:		54.9	Average:		63.2	61.3	58.8	57.2	52.9	49.1	45.6	45.1	44.1
Hourly Summary													
Night	0	51.3	72.3	42.9	62.0	59.0	56.0	54.0	49.0	46.0	44.0	44.0	43.0
	1	50.6	66.5	41.9	60.0	58.0	56.0	55.0	50.0	45.0	43.0	42.0	42.0
	2	52.7	79.6	41.9	62.0	60.0	57.0	55.0	50.0	46.0	43.0	43.0	42.0
	3	53.1	71.9	42.5	62.0	61.0	58.0	57.0	52.0	48.0	45.0	44.0	43.0
	4	55.3	75.9	44.1	64.0	62.0	60.0	59.0	54.0	51.0	47.0	46.0	44.0
	5	58.4	79.6	46.3	69.0	66.0	63.0	61.0	58.0	53.0	48.0	48.0	47.0
	6	58.2	75.7	44.1	66.0	65.0	63.0	62.0	58.0	54.0	47.0	46.0	45.0
Day	7	58.9	74.7	42.8	67.0	66.0	63.0	62.0	59.0	56.0	47.0	46.0	44.0
	8	58.1	74.6	42.4	67.0	65.0	63.0	62.0	58.0	54.0	46.0	45.0	43.0
	9	60.3	83.0	42.0	71.0	68.0	64.0	62.0	57.0	54.0	47.0	45.0	43.0
	10	64.5	97.2	43.7	68.0	65.0	62.0	60.0	56.0	52.0	47.0	46.0	44.0
	11	57.5	84.4	43.0	65.0	63.0	60.0	59.0	55.0	52.0	47.0	45.0	43.0
	12	55.6	71.6	44.7	65.0	63.0	60.0	59.0	55.0	52.0	48.0	46.0	45.0
	13	56.8	74.8	44.2	68.0	65.0	62.0	60.0	55.0	51.0	47.0	46.0	45.0
	14	60.3	85.6	44.5	70.0	68.0	63.0	62.0	57.0	53.0	48.0	47.0	45.0
	15	58.5	78.3	45.9	68.0	66.0	63.0	61.0	57.0	54.0	50.0	49.0	47.0
	16	57.8	79.1	47.5	67.0	65.0	62.0	61.0	57.0	54.0	50.0	49.0	48.0
	17	58.0	75.4	47.8	67.0	65.0	62.0	61.0	57.0	55.0	51.0	50.0	49.0
	18	62.4	91.3	46.7	69.0	64.0	60.0	59.0	56.0	54.0	50.0	49.0	48.0
	19	56.2	72.9	47.3	66.0	63.0	60.0	59.0	55.0	53.0	50.0	49.0	48.0
	20	59.6	86.1	46.7	66.0	63.0	61.0	59.0	55.0	52.0	48.0	48.0	47.0
	21	55.4	77.0	46.6	64.0	62.0	60.0	58.0	54.0	51.0	48.0	48.0	47.0
Night	22	53.4	68.3	45.8	62.0	61.0	58.0	56.0	53.0	50.0	47.0	47.0	46.0
	23	53.1	75.3	45.0	62.0	60.0	58.0	56.0	52.0	49.0	46.0	46.0	45.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

			Energy Average Leq		24-Hour
Project Name: Gateway South	*JN:* 10189		*Day*	*Night*	*CNEL*
Location: L3 - Located north of the Project site on Dumas Street, west of Waterman Avenue, near an existing church and residential homes.	*Analyst:* A. Wolfe		60.9	58.9	66.0
	Date: 7/6/2016				

Hourly Leq dBA Readings (unadjusted)



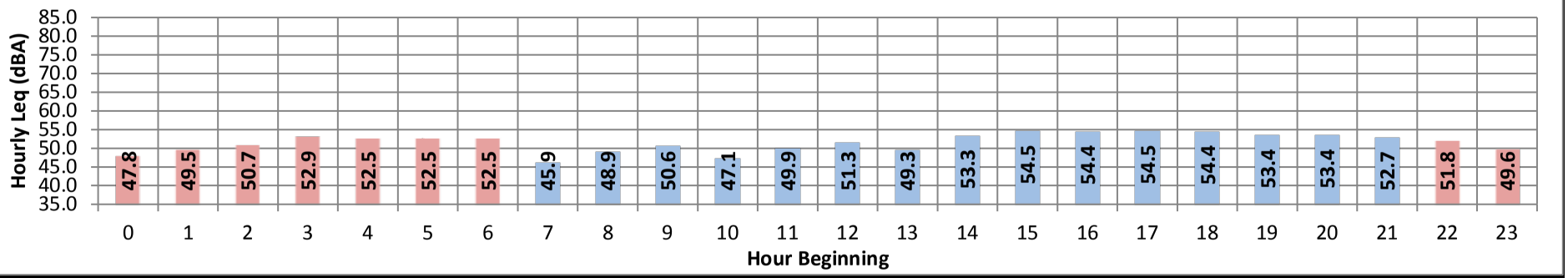
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	58.7	73.3	44.5	67.0	66.0	63.0	62.0	58.0	55.0	48.0	46.0	45.0
	Max	65.3	97.0	50.7	71.0	69.0	67.0	66.0	63.0	60.0	53.0	52.0	51.0
Energy Average:		60.9	Average:		68.8	67.1	64.3	63.1	59.7	56.6	50.7	49.5	48.1
Night	Min	54.0	70.8	45.6	64.0	63.0	59.0	57.0	51.0	48.0	47.0	46.0	46.0
	Max	62.0	85.2	50.4	71.0	69.0	67.0	65.0	62.0	57.0	52.0	51.0	51.0
Energy Average:		58.9	Average:		68.0	65.8	62.8	61.2	55.9	52.0	49.2	48.6	48.0
Hourly Summary													
Night	0	56.1	75.6	46.0	66.0	64.0	61.0	60.0	54.0	50.0	48.0	47.0	47.0
	1	54.0	71.7	45.6	64.0	63.0	59.0	57.0	52.0	48.0	47.0	46.0	46.0
	2	54.1	70.8	45.9	65.0	63.0	60.0	58.0	51.0	49.0	47.0	47.0	46.0
	3	56.8	78.3	45.6	67.0	65.0	62.0	60.0	53.0	50.0	48.0	47.0	46.0
	4	59.9	79.2	48.2	71.0	68.0	65.0	63.0	57.0	53.0	50.0	49.0	49.0
	5	61.4	79.7	50.4	71.0	69.0	66.0	65.0	60.0	55.0	52.0	51.0	51.0
	6	62.0	80.6	48.6	71.0	69.0	67.0	65.0	62.0	57.0	51.0	51.0	49.0
Day	7	62.6	82.4	46.5	70.0	69.0	67.0	66.0	63.0	60.0	52.0	50.0	48.0
	8	61.6	79.0	44.8	70.0	68.0	66.0	65.0	62.0	59.0	50.0	48.0	46.0
	9	58.7	73.3	44.5	67.0	66.0	63.0	62.0	59.0	55.0	48.0	47.0	46.0
	10	59.5	76.9	44.6	69.0	67.0	64.0	63.0	59.0	56.0	49.0	47.0	46.0
	11	60.2	81.0	44.6	69.0	67.0	64.0	62.0	59.0	56.0	48.0	46.0	45.0
	12	58.7	75.1	45.5	68.0	66.0	63.0	62.0	58.0	56.0	49.0	48.0	46.0
	13	59.9	80.4	45.6	69.0	68.0	64.0	63.0	59.0	56.0	50.0	49.0	47.0
	14	60.7	82.1	44.8	71.0	68.0	65.0	64.0	59.0	56.0	50.0	48.0	46.0
	15	59.4	80.6	47.6	68.0	66.0	64.0	62.0	59.0	56.0	51.0	50.0	48.0
	16	60.5	80.3	49.2	70.0	67.0	64.0	63.0	60.0	57.0	52.0	51.0	50.0
	17	59.3	74.3	48.5	67.0	66.0	63.0	62.0	59.0	57.0	52.0	52.0	50.0
	18	65.3	97.0	50.7	68.0	67.0	64.0	63.0	59.0	56.0	53.0	52.0	51.0
	19	60.3	83.6	49.8	68.0	66.0	64.0	63.0	60.0	56.0	52.0	52.0	51.0
	20	60.8	83.3	50.5	69.0	68.0	65.0	64.0	60.0	57.0	52.0	52.0	51.0
	21	60.9	84.5	50.0	69.0	67.0	65.0	63.0	60.0	56.0	52.0	51.0	51.0
Night	22	58.4	73.4	49.2	68.0	66.0	63.0	62.0	58.0	54.0	51.0	50.0	50.0
	23	59.6	85.2	47.0	69.0	65.0	62.0	61.0	56.0	52.0	49.0	49.0	48.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

				Energy Average Leq		24-Hour
Project Name:	Gateway South	*JN:*	10189	*Day*	*Night*	*CNEL*
Location:	L4 - Located north of the Project site in the existing parking lot of the San Bernardino Public Golf Course.	*Analyst:*	A. Wolfe	52.3	51.4	58.3
		Date:	7/6/2016			

Hourly Leq dBA Readings (unadjusted)



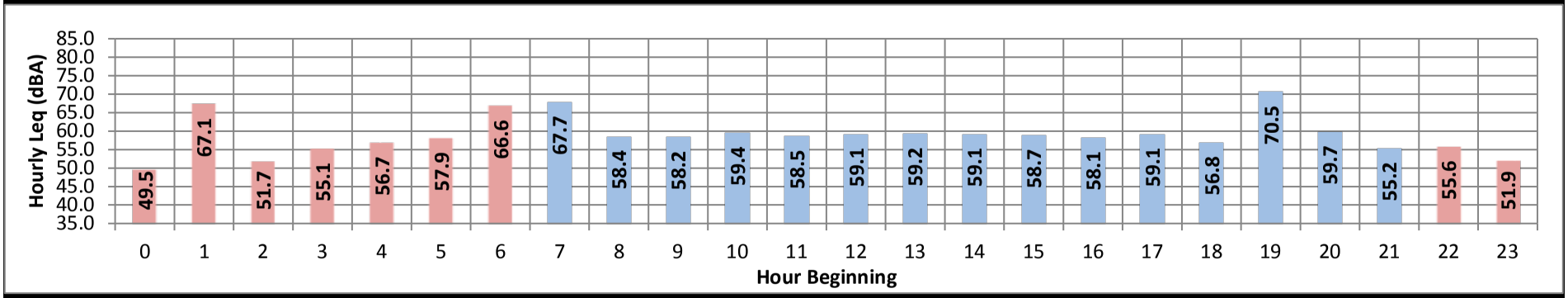
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	45.9	57.0	42.9	53.0	50.0	48.0	47.0	45.0	45.0	44.0	43.0	43.0
	Max	54.5	79.2	50.7	65.0	60.0	57.0	55.0	54.0	53.0	52.0	52.0	51.0
Energy Average:		52.3	Average:		59.4	56.3	53.5	52.1	50.3	49.4	48.1	47.7	47.3
Night	Min	47.8	55.6	45.1	52.0	51.0	49.0	48.0	48.0	47.0	46.0	46.0	45.0
	Max	52.9	68.1	50.1	60.0	60.0	55.0	55.0	54.0	52.0	51.0	51.0	50.0
Energy Average:		51.4	Average:		55.8	54.6	52.8	52.2	51.2	50.0	48.2	47.9	47.2
Hourly Summary													
Night	0	47.8	57.1	45.1	52.0	51.0	49.0	48.0	48.0	47.0	46.0	46.0	45.0
	1	49.5	59.1	46.1	52.0	52.0	51.0	51.0	50.0	49.0	47.0	47.0	46.0
	2	50.7	68.1	46.6	55.0	53.0	52.0	51.0	51.0	50.0	48.0	48.0	47.0
	3	52.9	64.8	48.2	60.0	60.0	55.0	54.0	52.0	51.0	50.0	49.0	49.0
	4	52.5	62.4	50.1	56.0	55.0	54.0	53.0	52.0	52.0	51.0	51.0	50.0
	5	52.5	64.7	47.9	57.0	56.0	55.0	55.0	53.0	51.0	49.0	48.0	48.0
	6	52.5	64.3	45.1	59.0	56.0	55.0	54.0	54.0	50.0	46.0	46.0	45.0
Day	7	45.9	57.0	42.9	53.0	50.0	48.0	47.0	45.0	45.0	44.0	43.0	43.0
	8	48.9	66.2	44.0	57.0	54.0	51.0	50.0	48.0	47.0	45.0	45.0	44.0
	9	50.6	70.3	43.3	62.0	58.0	55.0	52.0	47.0	46.0	44.0	44.0	43.0
	10	47.1	58.0	43.6	53.0	52.0	50.0	49.0	47.0	46.0	45.0	44.0	44.0
	11	49.9	67.6	44.5	58.0	55.0	52.0	51.0	49.0	47.0	46.0	45.0	45.0
	12	51.3	69.3	44.8	63.0	57.0	52.0	50.0	49.0	48.0	46.0	46.0	45.0
	13	49.3	65.4	45.5	57.0	54.0	51.0	50.0	48.0	47.0	46.0	46.0	46.0
	14	53.3	71.0	45.6	65.0	60.0	56.0	54.0	51.0	50.0	48.0	48.0	46.0
	15	54.5	79.2	49.1	59.0	56.0	54.0	53.0	52.0	51.0	50.0	50.0	49.0
	16	54.4	73.7	49.9	64.0	59.0	55.0	54.0	53.0	52.0	51.0	50.0	50.0
	17	54.5	68.7	50.7	62.0	60.0	57.0	55.0	54.0	53.0	52.0	52.0	51.0
	18	54.4	70.0	50.0	62.0	59.0	56.0	55.0	54.0	53.0	52.0	51.0	51.0
	19	53.4	65.1	50.7	58.0	56.0	55.0	54.0	53.0	53.0	52.0	51.0	51.0
	20	53.4	64.8	50.6	59.0	58.0	55.0	54.0	53.0	52.0	51.0	51.0	51.0
	21	52.7	63.8	49.4	59.0	56.0	55.0	54.0	52.0	51.0	50.0	50.0	50.0
Night	22	51.8	62.1	48.2	58.0	56.0	53.0	53.0	51.0	51.0	49.0	49.0	48.0
	23	49.6	55.6	46.3	53.0	52.0	51.0	51.0	50.0	49.0	48.0	47.0	47.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

			Energy Average Leq		24-Hour
Project Name:	Gateway South	*JN:* 10189	*Day*	*Night*	*CNEL*
Location:	L5 - Located east of the Project site on Park Center Circle adjacent to existing office buildings.	*Analyst:* A. Wolfe	62.5	61.2	68.6
		Date: 7/6/2016			

Hourly Leq dBA Readings (unadjusted)



Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	55.2	68.5	44.7	64.0	62.0	59.0	58.0	55.0	52.0	49.0	48.0	46.0
	Max	70.5	84.9	49.2	80.0	80.0	78.0	76.0	71.0	59.0	52.0	51.0	50.0
Energy Average:		62.5	Average:		68.7	66.3	64.0	62.7	58.7	55.1	50.7	49.7	48.3
Night	Min	49.5	62.8	43.7	57.0	56.0	54.0	52.0	49.0	47.0	45.0	45.0	44.0
	Max	67.1	79.5	49.3	76.0	76.0	75.0	73.0	65.0	61.0	54.0	52.0	50.0
Energy Average:		61.2	Average:		64.9	63.7	61.4	60.1	54.9	51.4	48.3	48.0	46.8
Hourly Summary													
Night	0	49.5	62.8	43.7	57.0	56.0	54.0	52.0	49.0	47.0	45.0	45.0	44.0
	1	67.1	79.5	44.9	76.0	76.0	75.0	73.0	57.0	49.0	46.0	46.0	45.0
	2	51.7	71.8	43.9	60.0	59.0	56.0	55.0	51.0	48.0	46.0	46.0	44.0
	3	55.1	74.3	46.7	63.0	61.0	59.0	57.0	54.0	52.0	49.0	49.0	48.0
	4	56.7	78.3	48.6	64.0	63.0	60.0	59.0	56.0	53.0	50.0	50.0	49.0
	5	57.9	72.3	49.3	66.0	64.0	62.0	61.0	58.0	55.0	51.0	51.0	50.0
	6	66.6	74.5	47.5	73.0	73.0	72.0	72.0	65.0	61.0	54.0	52.0	50.0
Day	7	67.7	79.4	44.7	74.0	73.0	72.0	72.0	71.0	59.0	52.0	49.0	46.0
	8	58.4	75.2	45.3	68.0	66.0	63.0	61.0	58.0	55.0	50.0	49.0	47.0
	9	58.2	76.3	45.8	67.0	65.0	63.0	61.0	57.0	54.0	49.0	48.0	46.0
	10	59.4	84.9	46.3	68.0	65.0	63.0	62.0	58.0	54.0	49.0	48.0	47.0
	11	58.5	74.4	47.3	66.0	65.0	63.0	62.0	58.0	56.0	51.0	50.0	48.0
	12	59.1	76.9	47.6	68.0	66.0	63.0	62.0	58.0	55.0	51.0	50.0	49.0
	13	59.2	77.9	47.6	69.0	65.0	63.0	62.0	58.0	56.0	51.0	50.0	48.0
	14	59.1	74.9	49.0	68.0	66.0	64.0	62.0	59.0	56.0	52.0	51.0	50.0
	15	58.7	74.6	49.0	67.0	65.0	62.0	61.0	58.0	56.0	52.0	51.0	50.0
	16	58.1	76.9	49.1	65.0	63.0	62.0	61.0	58.0	56.0	51.0	51.0	50.0
	17	59.1	83.1	49.1	67.0	65.0	62.0	61.0	58.0	55.0	51.0	50.0	49.0
	18	56.8	68.5	48.5	65.0	63.0	61.0	60.0	57.0	54.0	51.0	50.0	49.0
	19	70.5	81.9	48.7	80.0	80.0	78.0	76.0	60.0	55.0	51.0	50.0	49.0
	20	59.7	76.1	49.2	75.0	66.0	62.0	60.0	57.0	54.0	51.0	50.0	49.0
	21	55.2	72.0	48.0	64.0	62.0	59.0	58.0	55.0	52.0	49.0	49.0	48.0
Night	22	55.6	77.7	45.8	64.0	62.0	58.0	57.0	53.0	50.0	48.0	47.0	46.0
	23	51.9	66.0	45.1	61.0	59.0	57.0	55.0	51.0	48.0	46.0	46.0	45.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Project Name: Gateway South

Location: L6 - Located near the southern Project site boundary and the Santa Ana River.

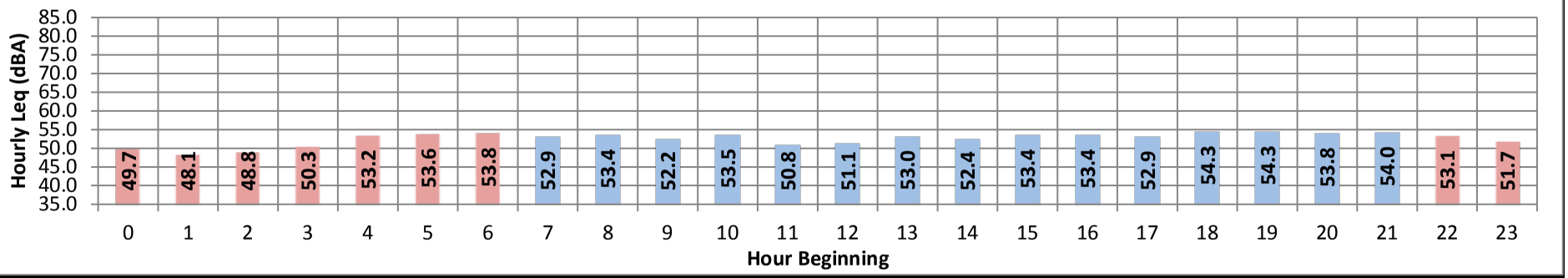
JN: 10189

Analyst: A. Wolfe

Date: 7/6/2016

Energy Average Leq		*24-Hour*
Day	*Night*	*CNEL*
53.1	51.8	58.9

Hourly Leq dBA Readings (unadjusted)



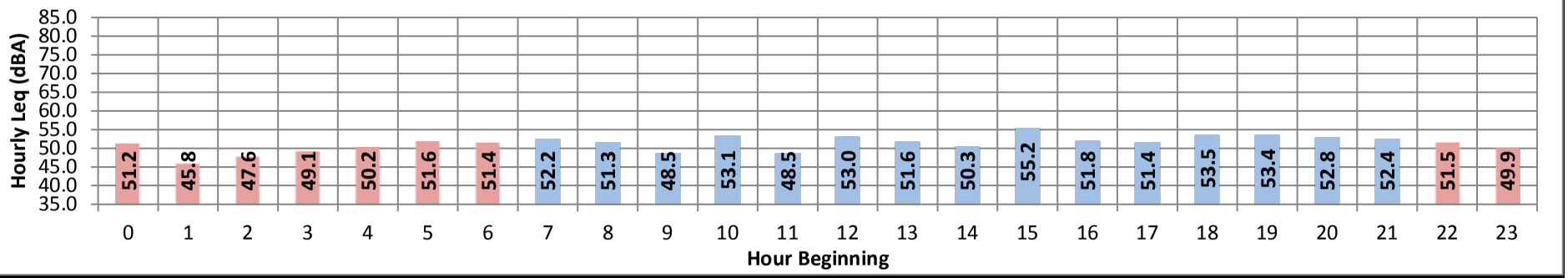
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	50.8	63.5	42.5	56.0	55.0	54.0	53.0	51.0	49.0	45.0	45.0	44.0
	Max	54.3	74.6	50.1	63.0	60.0	57.0	56.0	54.0	53.0	51.0	51.0	50.0
Energy Average:		53.1	Average:		59.7	57.8	55.7	54.7	52.7	51.0	48.4	47.7	46.7
Night	Min	48.1	57.3	43.8	54.0	53.0	51.0	50.0	48.0	46.0	45.0	45.0	44.0
	Max	53.8	71.8	49.7	61.0	58.0	57.0	56.0	54.0	53.0	51.0	50.0	50.0
Energy Average:		51.8	Average:		57.4	56.1	54.2	53.1	51.3	49.8	48.1	47.4	46.8
Hourly Summary													
Night	0	49.7	68.1	44.5	55.0	54.0	53.0	51.0	50.0	48.0	47.0	46.0	45.0
	1	48.1	57.3	43.8	55.0	54.0	51.0	50.0	48.0	46.0	45.0	45.0	44.0
	2	48.8	59.2	44.8	54.0	53.0	51.0	51.0	49.0	48.0	46.0	46.0	45.0
	3	50.3	64.5	44.7	57.0	55.0	53.0	51.0	50.0	49.0	47.0	46.0	45.0
	4	53.2	64.9	47.2	59.0	58.0	57.0	56.0	54.0	51.0	49.0	48.0	48.0
	5	53.6	66.6	49.7	59.0	58.0	56.0	55.0	54.0	52.0	51.0	50.0	50.0
	6	53.8	62.8	48.2	58.0	58.0	56.0	56.0	54.0	53.0	51.0	50.0	49.0
Day	7	52.9	69.3	45.1	58.0	57.0	56.0	55.0	53.0	52.0	48.0	47.0	45.0
	8	53.4	74.4	43.0	61.0	58.0	56.0	55.0	53.0	51.0	46.0	45.0	44.0
	9	52.2	70.1	43.6	60.0	57.0	55.0	54.0	52.0	50.0	46.0	45.0	44.0
	10	53.5	72.1	42.7	63.0	60.0	56.0	55.0	52.0	49.0	45.0	45.0	44.0
	11	50.8	63.5	42.5	56.0	55.0	54.0	53.0	51.0	49.0	46.0	45.0	44.0
	12	51.1	68.4	44.7	57.0	56.0	54.0	53.0	51.0	49.0	47.0	46.0	45.0
	13	53.0	74.6	44.6	58.0	56.0	54.0	54.0	52.0	50.0	48.0	47.0	46.0
	14	52.4	70.3	45.1	59.0	58.0	56.0	55.0	52.0	50.0	48.0	47.0	46.0
	15	53.4	71.3	46.3	61.0	58.0	56.0	55.0	53.0	51.0	49.0	48.0	47.0
	16	53.4	68.1	47.7	60.0	58.0	56.0	55.0	53.0	52.0	50.0	49.0	49.0
	17	52.9	64.0	48.6	58.0	57.0	55.0	55.0	53.0	52.0	50.0	49.0	49.0
	18	54.3	70.4	49.0	62.0	60.0	57.0	56.0	54.0	52.0	51.0	50.0	49.0
	19	54.3	69.2	49.6	62.0	60.0	57.0	55.0	54.0	53.0	51.0	51.0	50.0
	20	53.8	64.1	50.1	59.0	57.0	56.0	55.0	54.0	53.0	51.0	51.0	50.0
	21	54.0	67.5	49.3	62.0	60.0	57.0	56.0	53.0	52.0	50.0	50.0	49.0
Night	22	53.1	71.8	47.6	61.0	58.0	56.0	55.0	52.0	51.0	49.0	49.0	48.0
	23	51.7	66.0	46.0	59.0	57.0	55.0	53.0	51.0	50.0	48.0	47.0	47.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

			Energy Average Leq		24-Hour
Project Name:	Gateway South	*JN:* 10189	*Day*	*Night*	*CNEL*
Location:	L7 - Located south of the Project site in an existing parking lot for a Quality Inn hotel on Waterman Avenue.	*Analyst:* A. Wolfe	52.3	50.2	57.4
		Date: 7/6/2016			

Hourly Leq dBA Readings (unadjusted)



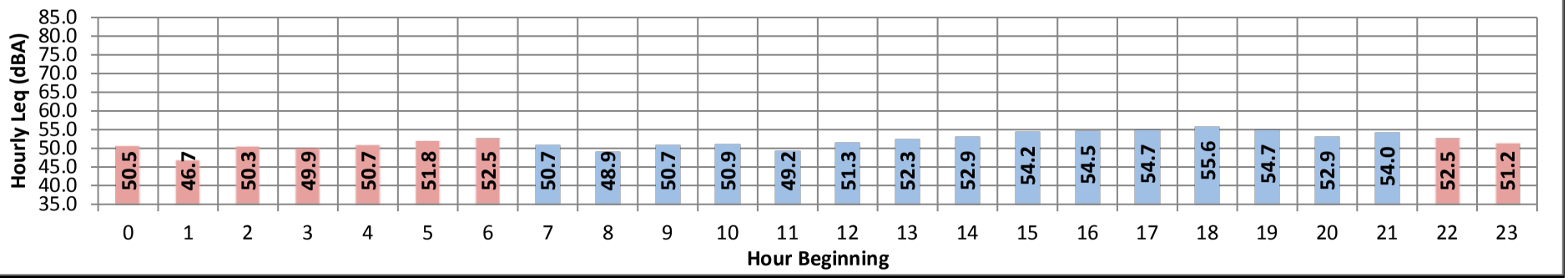
Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	48.5	61.2	42.1	54.0	53.0	51.0	50.0	48.0	46.0	44.0	43.0	42.0
	Max	55.2	81.9	48.9	64.0	61.0	58.0	57.0	53.0	52.0	50.0	50.0	49.0
Energy Average:		52.3	Average:		59.4	57.1	54.7	53.5	50.7	49.1	47.3	46.7	45.8
Night	Min	45.8	55.0	41.6	51.0	50.0	49.0	47.0	45.0	44.0	43.0	43.0	42.0
	Max	51.6	71.9	47.0	62.0	59.0	55.0	53.0	51.0	50.0	48.0	48.0	47.0
Energy Average:		50.2	Average:		56.4	54.4	52.4	51.3	49.2	48.0	45.9	45.7	44.8
Hourly Summary													
Night	0	51.2	71.9	41.6	62.0	59.0	55.0	53.0	48.0	46.0	43.0	43.0	42.0
	1	45.8	61.1	42.1	53.0	51.0	49.0	47.0	45.0	44.0	43.0	43.0	42.0
	2	47.6	55.0	43.1	51.0	50.0	50.0	49.0	48.0	47.0	45.0	44.0	43.0
	3	49.1	62.7	44.7	56.0	52.0	51.0	50.0	49.0	48.0	46.0	46.0	45.0
	4	50.2	64.5	45.0	55.0	54.0	53.0	52.0	50.0	49.0	46.0	46.0	46.0
	5	51.6	66.8	46.0	58.0	56.0	54.0	53.0	51.0	50.0	48.0	48.0	46.0
	6	51.4	69.7	45.7	57.0	56.0	54.0	53.0	51.0	50.0	48.0	47.0	47.0
Day	7	52.2	66.9	43.2	60.0	57.0	55.0	55.0	51.0	49.0	46.0	46.0	44.0
	8	51.3	79.4	42.8	58.0	57.0	54.0	52.0	49.0	47.0	45.0	44.0	43.0
	9	48.5	66.6	42.1	56.0	54.0	52.0	50.0	48.0	46.0	44.0	43.0	42.0
	10	53.1	71.7	43.1	64.0	61.0	57.0	56.0	50.0	47.0	45.0	44.0	43.0
	11	48.5	61.2	43.7	54.0	53.0	51.0	50.0	49.0	47.0	45.0	45.0	44.0
	12	53.0	71.6	44.2	63.0	60.0	58.0	57.0	50.0	48.0	46.0	45.0	45.0
	13	51.6	70.5	44.8	58.0	56.0	54.0	53.0	51.0	49.0	47.0	46.0	46.0
	14	50.3	62.7	44.2	58.0	56.0	53.0	52.0	50.0	49.0	46.0	46.0	45.0
	15	55.2	81.9	45.6	61.0	57.0	55.0	54.0	52.0	50.0	48.0	47.0	46.0
	16	51.8	63.1	47.1	59.0	58.0	55.0	53.0	51.0	50.0	49.0	48.0	47.0
	17	51.4	65.5	47.4	58.0	56.0	54.0	53.0	51.0	50.0	49.0	48.0	48.0
	18	53.5	70.1	48.2	63.0	59.0	56.0	55.0	52.0	51.0	50.0	49.0	48.0
	19	53.4	76.6	48.7	61.0	59.0	56.0	54.0	53.0	51.0	50.0	50.0	49.0
	20	52.8	64.9	48.9	58.0	57.0	56.0	54.0	52.0	52.0	50.0	50.0	49.0
	21	52.4	65.1	47.6	60.0	57.0	55.0	54.0	52.0	51.0	49.0	49.0	48.0
Night	22	51.5	64.0	47.0	59.0	57.0	54.0	53.0	51.0	50.0	48.0	48.0	47.0
	23	49.9	62.2	44.8	57.0	55.0	52.0	52.0	50.0	48.0	46.0	46.0	45.0

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

				Energy Average Leq		24-Hour
Project Name:	Gateway South	*JN:*	10189	*Day*	*Night*	*CNEL*
Location:	L8 - Located south of the Project site adjacent to office buildings on Commercenter West and the Santa Ana River Trail.	*Analyst:*	A. Wolfe	53.0	51.0	58.2
		Date:	7/6/2016			

Hourly Leq dBA Readings (unadjusted)



Time Period	*Hour*	*Leq*	*Lmax*	*Lmin*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	48.9	63.2	44.7	54.0	52.0	51.0	50.0	48.0	47.0	46.0	45.0	45.0
	Max	55.6	77.2	51.4	64.0	60.0	58.0	57.0	55.0	54.0	53.0	53.0	52.0
Energy Average:		53.0	Average:		59.8	57.4	54.7	53.5	51.6	50.7	49.2	48.9	48.3
Night	Min	46.7	60.6	43.1	50.0	49.0	48.0	48.0	47.0	46.0	44.0	44.0	44.0
	Max	52.5	72.8	48.9	62.0	59.0	55.0	54.0	52.0	51.0	50.0	50.0	49.0
Energy Average:		51.0	Average:		56.1	54.3	52.6	51.8	50.2	49.0	47.6	47.3	46.7
Hourly Summary													
Night	0	50.5	65.1	44.7	62.0	59.0	54.0	52.0	48.0	47.0	46.0	45.0	45.0
	1	46.7	60.6	43.1	50.0	49.0	48.0	48.0	47.0	46.0	44.0	44.0	44.0
	2	50.3	72.8	45.0	54.0	52.0	51.0	51.0	49.0	48.0	46.0	46.0	45.0
	3	49.9	63.0	45.2	55.0	52.0	51.0	51.0	50.0	49.0	47.0	47.0	46.0
	4	50.7	61.5	46.7	55.0	54.0	53.0	52.0	51.0	49.0	48.0	48.0	47.0
	5	51.8	68.8	48.8	54.0	53.0	53.0	52.0	52.0	51.0	50.0	49.0	49.0
	6	52.5	69.1	48.9	58.0	56.0	54.0	53.0	52.0	51.0	50.0	50.0	49.0
Day	7	50.7	68.8	46.3	57.0	55.0	52.0	51.0	50.0	49.0	48.0	47.0	47.0
	8	48.9	67.4	44.7	56.0	55.0	52.0	51.0	48.0	47.0	46.0	45.0	45.0
	9	50.7	67.0	44.7	60.0	58.0	54.0	52.0	49.0	48.0	46.0	46.0	45.0
	10	50.9	70.1	45.2	61.0	59.0	54.0	52.0	49.0	48.0	47.0	46.0	46.0
	11	49.2	67.1	45.2	54.0	52.0	51.0	50.0	49.0	48.0	46.0	46.0	45.0
	12	51.3	64.3	46.4	59.0	57.0	54.0	53.0	51.0	50.0	48.0	48.0	47.0
	13	52.3	76.7	46.9	59.0	55.0	53.0	52.0	51.0	50.0	48.0	48.0	47.0
	14	52.9	69.0	47.4	62.0	59.0	56.0	54.0	52.0	51.0	49.0	48.0	48.0
	15	54.2	77.2	48.6	62.0	58.0	56.0	55.0	53.0	52.0	50.0	50.0	49.0
	16	54.5	66.8	50.9	61.0	59.0	57.0	56.0	54.0	53.0	52.0	52.0	51.0
	17	54.7	64.7	51.3	60.0	59.0	56.0	56.0	54.0	54.0	52.0	52.0	52.0
	18	55.6	69.8	51.4	62.0	60.0	58.0	57.0	55.0	54.0	53.0	53.0	52.0
	19	54.7	68.0	50.8	62.0	60.0	57.0	56.0	54.0	53.0	52.0	52.0	51.0
	20	52.9	63.2	49.4	58.0	56.0	55.0	54.0	53.0	52.0	51.0	50.0	50.0
	21	54.0	76.7	48.9	64.0	59.0	56.0	54.0	52.0	51.0	50.0	50.0	49.0
Night	22	52.5	66.9	47.6	60.0	58.0	55.0	54.0	52.0	50.0	49.0	49.0	48.0
	23	51.2	61.8	46.8	57.0	56.0	54.0	53.0	51.0	50.0	48.0	48.0	47.0

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: Washington Av.
Road Segment: s/o Orange Show Rd.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	50 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	58.73	-12.73	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	70.80	-24.22	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	77.97	-27.33	3.32	-1.20	-5.77	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:	48.1	46.5	41.8	38.5	47.0	47.4
Medium Trucks:	48.7	47.1	41.4	39.8	48.0	48.3
Heavy Trucks:	52.8	50.4	47.4	46.6	53.7	54.0
Vehicle Noise:	55.1	53.1	49.2	48.0	55.4	55.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	3	7	15	32
CNEL:	3	7	15	33

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Waterman Av.
Road Segment: s/o Orange Show Rd.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,580 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.39	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.10	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.22	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.7	70.1	65.4	62.1	70.7	71.0
Medium Trucks:	71.0	69.4	63.7	62.2	70.3	70.6
Heavy Trucks:	72.3	69.9	66.9	66.2	73.2	73.5
Vehicle Noise:	76.5	74.6	70.3	68.7	76.4	76.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	133	287	619	1,333
CNEL:	139	300	646	1,392

Monday, April 17, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Waterman Av.
Road Segment: s/o Dumas St.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,350 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.98	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.51	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.62	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.3	69.7	65.0	61.7	70.3	70.6
Medium Trucks:	70.6	69.0	63.3	61.8	69.9	70.2
Heavy Trucks:	71.9	69.5	66.5	65.8	72.8	73.1
Vehicle Noise:	76.1	74.2	69.9	68.3	76.0	76.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	125	270	581	1,253
CNEL:	131	282	607	1,308

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Waterman Av.
Road Segment: s/o Park Center Dr.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,980 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.01	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.48	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.59	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.3	70.7	66.1	62.8	71.3	71.6
Medium Trucks:	71.7	70.0	64.3	62.8	71.0	71.2
Heavy Trucks:	72.9	70.5	67.5	66.8	73.9	74.1
Vehicle Noise:	77.1	75.2	70.9	69.3	77.0	77.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	147	316	681	1,468
CNEL:	153	330	711	1,532

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Waterman Av.
Road Segment: n/o Hospitality Ln.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	25,000 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	2,500 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	50 mph		
Near/Far Lane Distance:	60 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	50.0 feet		
Centerline Dist. to Observer:	50.0 feet		
Barrier Distance to Observer:	0.0 feet		
Observer Height (Above Pad):	5.0 feet		
Pad Elevation:	0.0 feet		
Road Elevation:	0.0 feet		
Road Grade:	0.0%		
Left View:	-90.0 degrees		
Right View:	90.0 degrees		

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.25	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.24	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.35	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.6	69.9	65.3	62.0	70.5	70.9
Medium Trucks:	70.9	69.3	63.6	62.0	70.2	70.5
Heavy Trucks:	72.2	69.8	66.8	66.0	73.1	73.4
Vehicle Noise:	76.3	74.4	70.2	68.6	76.3	76.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	131	281	606	1,305
CNEL:	136	294	633	1,363

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Waterman Av.
Road Segment: s/o Hospitality Ln.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	40,600 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	4,060 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	50 mph		
Near/Far Lane Distance:	60 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	50.0 feet		
Centerline Dist. to Observer:	50.0 feet		
Barrier Distance to Observer:	0.0 feet		
Observer Height (Above Pad):	5.0 feet		
Pad Elevation:	0.0 feet		
Road Elevation:	0.0 feet		
Road Grade:	0.0%		
Left View:	-90.0 degrees		
Right View:	90.0 degrees		

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.35	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-8.14	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.25	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.7	72.1	67.4	64.1	72.6	73.0
Medium Trucks:	73.0	71.4	65.7	64.1	72.3	72.6
Heavy Trucks:	74.3	71.9	68.9	68.1	75.2	75.5
Vehicle Noise:	78.4	76.6	72.3	70.7	78.4	78.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	180	389	837	1,804
CNEL:	188	406	874	1,883

Monday, April 17, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Auto Center Rd.
Road Segment: e/o I-215 Fwy.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	38,400 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	3,840 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	40 mph		
Near/Far Lane Distance:	60 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	50.0 feet		
Centerline Dist. to Observer:	50.0 feet		
Barrier Distance to Observer:	0.0 feet		
Observer Height (Above Pad):	5.0 feet		
Pad Elevation:	0.0 feet		
Road Elevation:	0.0 feet		
Road Grade:	0.0%		
Left View:	-90.0 degrees		
Right View:	90.0 degrees		

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	4.08	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-7.41	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-10.52	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.7	69.1	64.4	61.1	69.7	70.0
Medium Trucks:	70.4	68.8	63.1	61.6	69.8	70.0
Heavy Trucks:	72.6	70.2	67.2	66.5	73.5	73.8
Vehicle Noise:	76.1	74.2	70.0	68.6	76.2	76.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	129	277	598	1,288
CNEL:	134	290	624	1,344

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Orange Show Rd.
Road Segment: e/o E St.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	31,200 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	3,120 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	50 mph		
Near/Far Lane Distance:	60 feet		
Site Data		**Vehicle Mix**	
Barrier Height:	**0.0 feet**		
Barrier Type (0-Wall, 1-Berm):	0.0		
Centerline Dist. to Barrier:	50.0 feet		
Centerline Dist. to Observer:	50.0 feet		
Barrier Distance to Observer:	0.0 feet		
Observer Height (Above Pad):	5.0 feet		
Pad Elevation:	0.0 feet		
Road Elevation:	0.0 feet		
Road Grade:	0.0%		
Left View:	-90.0 degrees		
Right View:	90.0 degrees		

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.21	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.28	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.39	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.5	70.9	66.3	63.0	71.5	71.8
Medium Trucks:	71.9	70.2	64.5	63.0	71.2	71.4
Heavy Trucks:	73.1	70.7	67.7	67.0	74.1	74.3
Vehicle Noise:	77.3	75.4	71.1	69.5	77.2	77.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	151	326	702	1,513
CNEL:	158	340	733	1,580

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o Arrowhead Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,440 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.14	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.35	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.46	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.4	69.8	65.2	61.9	70.4	70.8
Medium Trucks:	70.8	69.2	63.5	61.9	70.1	70.4
Heavy Trucks:	72.1	69.7	66.7	65.9	73.0	73.3
Vehicle Noise:	76.2	74.3	70.1	68.5	76.1	76.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	128	277	596	1,285
CNEL:	134	289	622	1,341

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o Washington Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,410 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.09	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.40	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.51	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.4	69.8	65.1	61.8	70.4	70.7
Medium Trucks:	70.7	69.1	63.4	61.9	70.0	70.3
Heavy Trucks:	72.0	69.6	66.6	65.9	72.9	73.2
Vehicle Noise:	76.2	74.3	70.0	68.4	76.1	76.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	127	274	591	1,274
CNEL:	133	287	617	1,330

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o Waterman Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,120 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.53	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.96	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-14.07	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	69.2	64.6	61.3	69.8	70.2
Medium Trucks:	70.2	68.6	62.9	61.3	69.5	69.7
Heavy Trucks:	71.4	69.1	66.1	65.3	72.4	72.6
Vehicle Noise:	75.6	73.7	69.5	67.9	75.5	75.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	117	252	543	1,170
CNEL:	122	263	567	1,221

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project | Project Name: Gateway South
Road Name: Washington Av. | Job Number: 10189
Road Segment: s/o Orange Show Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	773 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	77 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	82.9%	7.1%	10.0%	58.50%
Medium Trucks:	82.8%	5.6%	11.7%	11.91%
Heavy Trucks:	69.3%	8.7%	22.0%	29.58%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	58.73	-12.73	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	70.80	-19.64	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	77.97	-15.69	3.32	-1.20	-5.77	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:	48.1	46.5	41.8	38.5	47.0	47.4
Medium Trucks:	53.3	51.7	46.0	44.4	52.6	52.8
Heavy Trucks:	64.4	62.0	59.0	58.3	65.3	65.6
Vehicle Noise:	64.8	62.5	59.3	58.5	65.6	65.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	15	33	71	153
CNEL:	16	34	74	160

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Waterman Av.
Road Segment: s/o Orange Show Rd.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,610 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,661 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.61%
Medium Trucks:	82.8%	5.6%	11.7%	6.25%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.53	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.08	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.07	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.8	70.2	65.6	62.3	70.8	71.2
Medium Trucks:	71.1	69.4	63.7	62.2	70.4	70.6
Heavy Trucks:	72.4	70.1	67.1	66.3	73.4	73.6
Vehicle Noise:	76.6	74.7	70.4	68.8	76.5	76.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	136	292	630	1,356
CNEL:	142	305	657	1,416

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Waterman Av.
Road Segment: s/o Dumas St.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,310 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,431 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.62%
Medium Trucks:	82.8%	5.6%	11.7%	6.24%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.14	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.49	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.47	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.4	69.8	65.2	61.9	70.4	70.8
Medium Trucks:	70.6	69.0	63.3	61.8	70.0	70.2
Heavy Trucks:	72.0	69.7	66.7	65.9	73.0	73.2
Vehicle Noise:	76.2	74.3	70.0	68.4	76.1	76.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	128	275	593	1,277
CNEL:	133	287	619	1,333

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Waterman Av.
Road Segment: s/o Park Center Dr.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,508 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,051 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.44%
Medium Trucks:	82.8%	5.6%	11.7%	6.54%
Heavy Trucks:	69.3%	8.7%	22.0%	4.02%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.06	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.29	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.41	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.4	70.8	66.1	62.8	71.3	71.7
Medium Trucks:	71.8	70.2	64.5	63.0	71.2	71.4
Heavy Trucks:	74.1	71.7	68.7	68.0	75.0	75.3
Vehicle Noise:	77.7	75.7	71.6	70.1	77.7	78.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	163	350	755	1,626
CNEL:	170	366	788	1,697

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Waterman Av.
Road Segment: n/o Hospitality Ln.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,708 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,571 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.25%
Medium Trucks:	82.8%	5.6%	11.7%	6.56%
Heavy Trucks:	69.3%	8.7%	22.0%	4.19%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.31	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.02	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.97	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.6	70.0	65.4	62.1	70.6	70.9
Medium Trucks:	71.1	69.5	63.8	62.2	70.4	70.7
Heavy Trucks:	73.5	71.2	68.2	67.4	74.5	74.7
Vehicle Noise:	77.0	75.0	70.9	69.4	77.0	77.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	147	317	683	1,472
CNEL:	154	331	713	1,536

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Waterman Av.
Road Segment: s/o Hospitality Ln.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	41,128 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,113 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.91%
Medium Trucks:	82.8%	5.6%	11.7%	6.48%
Heavy Trucks:	69.3%	8.7%	22.0%	3.61%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.38	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-8.04	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-10.58	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.7	72.1	67.4	64.1	72.7	73.0
Medium Trucks:	73.1	71.5	65.8	64.2	72.4	72.7
Heavy Trucks:	74.9	72.6	69.6	68.8	75.9	76.1
Vehicle Noise:	78.7	76.8	72.6	71.1	78.7	79.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	191	411	886	1,909
CNEL:	199	429	925	1,992

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Auto Center Rd.
Road Segment: e/o I-215 Fwy.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	39,205 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,921 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.86%
Medium Trucks:	82.8%	5.6%	11.7%	6.46%
Heavy Trucks:	69.3%	8.7%	22.0%	3.68%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	4.14	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-7.29	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-9.73	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	69.1	64.5	61.2	69.7	70.1
Medium Trucks:	70.6	68.9	63.2	61.7	69.9	70.1
Heavy Trucks:	73.4	71.0	68.0	67.3	74.3	74.6
Vehicle Noise:	76.5	74.6	70.5	69.1	76.6	76.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	139	299	644	1,388
CNEL:	145	312	672	1,448

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Orange Show Rd.
Road Segment: e/o E St.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	32,061 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,206 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.75%
Medium Trucks:	82.8%	5.6%	11.7%	6.46%
Heavy Trucks:	69.3%	8.7%	22.0%	3.80%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.29	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.13	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.44	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.6	71.0	66.4	63.0	71.6	71.9
Medium Trucks:	72.0	70.4	64.7	63.1	71.3	71.6
Heavy Trucks:	74.1	71.7	68.7	67.9	75.0	75.3
Vehicle Noise:	77.7	75.8	71.7	70.1	77.8	78.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	164	354	763	1,643
CNEL:	172	370	796	1,715

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Orange Show Rd.
Road Segment: e/o Arrowhead Av.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,283 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,528 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.57%
Medium Trucks:	82.8%	5.6%	11.7%	6.46%
Heavy Trucks:	69.3%	8.7%	22.0%	3.97%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.25	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.16	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.28	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.6	70.0	65.3	62.0	70.5	70.9
Medium Trucks:	71.0	69.4	63.7	62.1	70.3	70.5
Heavy Trucks:	73.2	70.8	67.8	67.1	74.2	74.4
Vehicle Noise:	76.8	74.9	70.7	69.2	76.8	77.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	143	307	662	1,425
CNEL:	149	321	691	1,488

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o Washington Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,711 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,471 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.54%
Medium Trucks:	82.8%	5.6%	11.7%	6.29%
Heavy Trucks:	69.3%	8.7%	22.0%	3.17%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.20	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.38	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.36	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.5	69.9	65.3	62.0	70.5	70.8
Medium Trucks:	70.8	69.1	63.4	61.9	70.1	70.3
Heavy Trucks:	72.2	69.8	66.8	66.0	73.1	73.4
Vehicle Noise:	76.3	74.4	70.1	68.5	76.2	76.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	130	279	601	1,296
CNEL:	135	291	628	1,353

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o Waterman Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,366 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,137 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.52%
Medium Trucks:	82.8%	5.6%	11.7%	6.37%
Heavy Trucks:	69.3%	8.7%	22.0%	3.11%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.57	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.96	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-14.07	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.9	69.3	64.6	61.3	69.9	70.2
Medium Trucks:	70.2	68.6	62.9	61.3	69.5	69.7
Heavy Trucks:	71.4	69.1	66.1	65.3	72.4	72.6
Vehicle Noise:	75.6	73.7	69.5	67.9	75.5	75.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	117	252	544	1,171
CNEL:	122	263	568	1,223

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA 2018 | Project Name: Gateway South
Road Name: Washington Av. | Job Number: 10189
Road Segment: s/o Orange Show Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	50 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	58.73	-12.73	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	70.80	-24.22	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	77.97	-27.33	3.32	-1.20	-5.77	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:	48.1	46.5	41.8	38.5	47.0	47.4
Medium Trucks:	48.7	47.1	41.4	39.8	48.0	48.3
Heavy Trucks:	52.8	50.4	47.4	46.6	53.7	54.0
Vehicle Noise:	55.1	53.1	49.2	48.0	55.4	55.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	3	7	15	32
CNEL:	3	7	15	33

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA 2018 | Project Name: Gateway South
Road Name: Waterman Av. | Job Number: 10189
Road Segment: s/o Orange Show Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,650 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.50	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.99	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.10	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.8	70.2	65.6	62.3	70.8	71.1
Medium Trucks:	71.1	69.5	63.8	62.3	70.5	70.7
Heavy Trucks:	72.4	70.0	67.0	66.3	73.3	73.6
Vehicle Noise:	76.6	74.7	70.4	68.8	76.5	76.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	136	292	630	1,357
CNEL:	142	305	658	1,417

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA 2018 | Project Name: Gateway South
Road Name: Waterman Av. | Job Number: 10189
Road Segment: s/o Dumas St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,420	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.11	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.38	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.49	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.4	69.8	65.2	61.9	70.4	70.7
Medium Trucks:	70.8	69.1	63.4	61.9	70.1	70.3
Heavy Trucks:	72.0	69.6	66.6	65.9	73.0	73.2
Vehicle Noise:	76.2	74.3	70.0	68.4	76.1	76.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	128	275	593	1,277
CNEL:	133	287	619	1,334

Monday, April 17, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA 2018 | Project Name: Gateway South
Road Name: Waterman Av. | Job Number: 10189
Road Segment: s/o Park Center Dr.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,070	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.14	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.35	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.46	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.4	70.8	66.2	62.9	71.4	71.8
Medium Trucks:	71.8	70.2	64.5	62.9	71.1	71.3
Heavy Trucks:	73.0	70.7	67.7	66.9	74.0	74.3
Vehicle Noise:	77.2	75.3	71.1	69.5	77.1	77.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	150	323	695	1,497
CNEL:	156	337	725	1,563

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA 2018 | Project Name: Gateway South
Road Name: Waterman Av. | Job Number: 10189
Road Segment: n/o Hospitality Ln.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,580	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.39	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.10	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.22	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.7	70.1	65.4	62.1	70.7	71.0
Medium Trucks:	71.0	69.4	63.7	62.2	70.3	70.6
Heavy Trucks:	72.3	69.9	66.9	66.2	73.2	73.5
Vehicle Noise:	76.5	74.6	70.3	68.7	76.4	76.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	133	287	619	1,333
CNEL:	139	300	646	1,392

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA 2018 | Project Name: Gateway South
Road Name: Waterman Av. | Job Number: 10189
Road Segment: s/o Hospitality Ln.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	41,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,180	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.48	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-8.01	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.12	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.8	72.2	67.5	64.2	72.8	73.1
Medium Trucks:	73.1	71.5	65.8	64.3	72.4	72.7
Heavy Trucks:	74.4	72.0	69.0	68.3	75.3	75.6
Vehicle Noise:	78.6	76.7	72.4	70.8	78.5	78.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	184	396	854	1,839
CNEL:	192	414	891	1,920

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA 2018 | Project Name: Gateway South
Road Name: Auto Center Rd. | Job Number: 10189
Road Segment: e/o I-215 Fwy.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	39,600	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,960	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	4.21	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-7.28	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-10.39	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	69.2	64.6	61.3	69.8	70.1
Medium Trucks:	70.6	69.0	63.3	61.7	69.9	70.1
Heavy Trucks:	72.7	70.4	67.4	66.6	73.7	73.9
Vehicle Noise:	76.3	74.3	70.2	68.7	76.3	76.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	131	283	610	1,315
CNEL:	137	296	637	1,372

Monday, April 17, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA 2018 | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o E St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	32,100	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,210	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.33	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.16	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.27	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.6	71.0	66.4	63.1	71.6	72.0
Medium Trucks:	72.0	70.4	64.7	63.1	71.3	71.5
Heavy Trucks:	73.2	70.9	67.9	67.1	74.2	74.4
Vehicle Noise:	77.4	75.5	71.3	69.7	77.3	77.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	154	332	716	1,542
CNEL:	161	347	747	1,610

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA 2018 | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o Arrowhead Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,200	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,520	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.28	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.21	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.32	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.6	70.0	65.3	62.0	70.6	70.9
Medium Trucks:	70.9	69.3	63.6	62.1	70.2	70.5
Heavy Trucks:	72.2	69.8	66.8	66.1	73.1	73.4
Vehicle Noise:	76.4	74.5	70.2	68.6	76.3	76.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	131	283	609	1,312
CNEL:	137	295	636	1,370

Monday, April 17, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA 2018 | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o Washington Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,480	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.21	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.28	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.39	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.5	69.9	65.3	62.0	70.5	70.8
Medium Trucks:	70.9	69.2	63.5	62.0	70.2	70.4
Heavy Trucks:	72.1	69.7	66.7	66.0	73.1	73.3
Vehicle Noise:	76.3	74.4	70.1	68.5	76.2	76.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	130	280	603	1,299
CNEL:	136	292	629	1,356

Monday, April 17, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EA 2018
Road Name: Orange Show Rd.
Road Segment: e/o Waterman Av.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,180 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.65	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.84	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.95	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.0	69.4	64.7	61.4	69.9	70.3
Medium Trucks:	70.3	68.7	63.0	61.4	69.6	69.9
Heavy Trucks:	71.6	69.2	66.2	65.4	72.5	72.8
Vehicle Noise:	75.7	73.9	69.6	68.0	75.7	75.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	119	257	553	1,192
CNEL:	124	268	577	1,244

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP 2018
Road Name: Washington Av.
Road Segment: s/o Orange Show Rd.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	773 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	77 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	82.9%	7.1%	10.0%	58.50%
Medium Trucks:	82.8%	5.6%	11.7%	11.91%
Heavy Trucks:	69.3%	8.7%	22.0%	29.58%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	58.73	-12.73	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	70.80	-19.64	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	77.97	-15.69	3.32	-1.20	-5.77	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:	48.1	46.5	41.8	38.5	47.0	47.4
Medium Trucks:	53.3	51.7	46.0	44.4	52.6	52.8
Heavy Trucks:	64.4	62.0	59.0	58.3	65.3	65.6
Vehicle Noise:	64.8	62.5	59.3	58.5	65.6	65.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	15	33	71	153
CNEL:	16	34	74	160

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP 2018
Road Name: Waterman Av.
Road Segment: s/o Orange Show Rd.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,310 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,731 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.60%
Medium Trucks:	82.8%	5.6%	11.7%	6.26%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.64	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.97	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.96	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.9	70.3	65.7	62.4	70.9	71.3
Medium Trucks:	71.2	69.6	63.9	62.3	70.5	70.7
Heavy Trucks:	72.5	70.2	67.2	66.4	73.5	73.8
Vehicle Noise:	76.7	74.8	70.5	68.9	76.6	76.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	138	297	641	1,380
CNEL:	144	310	669	1,441

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP 2018
Road Name: Waterman Av.
Road Segment: s/o Dumas St.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,010 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,501 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.62%
Medium Trucks:	82.8%	5.6%	11.7%	6.24%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.26	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.36	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.34	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.6	70.0	65.3	62.0	70.5	70.9
Medium Trucks:	70.8	69.2	63.5	61.9	70.1	70.3
Heavy Trucks:	72.2	69.8	66.8	66.0	73.1	73.4
Vehicle Noise:	76.3	74.4	70.2	68.5	76.2	76.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	130	280	604	1,301
CNEL:	136	293	631	1,359

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP 2018 | Project Name: Gateway South
Road Name: Waterman Av. | Job Number: 10189
Road Segment: s/o Park Center Dr.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,408 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,141 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.47%
Medium Trucks:	82.8%	5.6%	11.7%	6.54%
Heavy Trucks:	69.3%	8.7%	22.0%	4.00%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.19	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.17	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.31	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.5	70.9	66.2	62.9	71.5	71.8
Medium Trucks:	72.0	70.4	64.7	63.1	71.3	71.5
Heavy Trucks:	74.2	71.8	68.8	68.1	75.1	75.4
Vehicle Noise:	77.8	75.8	71.7	70.2	77.8	78.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	165	356	768	1,654
CNEL:	173	372	801	1,726

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP 2018 | Project Name: Gateway South
Road Name: Waterman Av. | Job Number: 10189
Road Segment: n/o Hospitality Ln.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,508 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,651 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.28%
Medium Trucks:	82.8%	5.6%	11.7%	6.56%
Heavy Trucks:	69.3%	8.7%	22.0%	4.16%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.45	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.89	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.87	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.8	70.1	65.5	62.2	70.7	71.1
Medium Trucks:	71.2	69.6	63.9	62.4	70.6	70.8
Heavy Trucks:	73.6	71.3	68.3	67.5	74.6	74.8
Vehicle Noise:	77.1	75.2	71.0	69.6	77.1	77.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	150	323	695	1,498
CNEL:	156	337	726	1,564

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP 2018 | Project Name: Gateway South
Road Name: Waterman Av. | Job Number: 10189
Road Segment: s/o Hospitality Ln.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	42,328 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,233 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.92%
Medium Trucks:	82.8%	5.6%	11.7%	6.48%
Heavy Trucks:	69.3%	8.7%	22.0%	3.60%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.51	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-7.91	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-10.47	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.8	72.2	67.6	64.3	72.8	73.1
Medium Trucks:	73.2	71.6	65.9	64.3	72.5	72.8
Heavy Trucks:	75.0	72.7	69.7	68.9	76.0	76.2
Vehicle Noise:	78.9	77.0	72.8	71.2	78.8	79.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	194	419	902	1,943
CNEL:	203	437	941	2,028

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP 2018 | Project Name: Gateway South
Road Name: Auto Center Rd. | Job Number: 10189
Road Segment: e/o I-215 Fwy.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	40,405 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,041 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.88%
Medium Trucks:	82.8%	5.6%	11.7%	6.46%
Heavy Trucks:	69.3%	8.7%	22.0%	3.66%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	4.27	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-7.16	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-9.62	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.9	69.3	64.6	61.3	69.9	70.2
Medium Trucks:	70.7	69.1	63.4	61.8	70.0	70.3
Heavy Trucks:	73.5	71.1	68.1	67.4	74.4	74.7
Vehicle Noise:	76.7	74.7	70.6	69.2	76.8	77.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	141	304	656	1,413
CNEL:	147	318	684	1,475

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP 2018 | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o E St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	32,961 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,296 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.76%
Medium Trucks:	82.8%	5.6%	11.7%	6.46%
Heavy Trucks:	69.3%	8.7%	22.0%	3.78%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.42	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.01	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.34	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.7	71.1	66.5	63.2	71.7	72.0
Medium Trucks:	72.1	70.5	64.8	63.2	71.4	71.7
Heavy Trucks:	74.2	71.8	68.8	68.0	75.1	75.4
Vehicle Noise:	77.9	75.9	71.8	70.2	77.9	78.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	167	360	776	1,671
CNEL:	174	376	810	1,745

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP 2018 | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o Arrowhead Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,083 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,608 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.59%
Medium Trucks:	82.8%	5.6%	11.7%	6.46%
Heavy Trucks:	69.3%	8.7%	22.0%	3.95%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.39	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.03	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.17	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.7	70.1	65.4	62.1	70.7	71.0
Medium Trucks:	71.1	69.5	63.8	62.2	70.4	70.7
Heavy Trucks:	73.3	71.0	68.0	67.2	74.3	74.5
Vehicle Noise:	76.9	75.0	70.8	69.3	76.9	77.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	145	313	674	1,452
CNEL:	152	326	703	1,515

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP 2018 | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o Washington Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,411 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,541 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.54%
Medium Trucks:	82.8%	5.6%	11.7%	6.30%
Heavy Trucks:	69.3%	8.7%	22.0%	3.17%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.32	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.25	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.24	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.6	70.0	65.4	62.1	70.6	70.9
Medium Trucks:	70.9	69.3	63.6	62.0	70.2	70.4
Heavy Trucks:	72.3	69.9	66.9	66.1	73.2	73.5
Vehicle Noise:	76.4	74.5	70.3	68.6	76.3	76.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	132	284	613	1,320
CNEL:	138	297	640	1,378

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAP 2018 | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o Waterman Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,966 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,197 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.52%
Medium Trucks:	82.8%	5.6%	11.7%	6.37%
Heavy Trucks:	69.3%	8.7%	22.0%	3.11%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.69	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.84	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.95	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.0	69.4	64.7	61.4	70.0	70.3
Medium Trucks:	70.3	68.7	63.0	61.4	69.6	69.9
Heavy Trucks:	71.6	69.2	66.2	65.4	72.5	72.8
Vehicle Noise:	75.8	73.9	69.6	68.0	75.7	75.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	119	257	554	1,193
CNEL:	125	268	578	1,246

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC 2018
Road Name: Washington Av.
Road Segment: s/o Orange Show Rd.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	80 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	58.73	-10.69	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	70.80	-22.18	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	77.97	-25.29	3.32	-1.20	-5.77	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	48.5	43.9	40.6	49.1	49.4
Medium Trucks:	50.7	49.1	43.4	41.9	50.1	50.3
Heavy Trucks:	54.8	52.4	49.4	48.7	55.7	56.0
Vehicle Noise:	57.2	55.2	51.3	50.0	57.5	57.7

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

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC 2018
Road Name: Waterman Av.
Road Segment: s/o Orange Show Rd.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,080 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.15	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.34	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.45	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.5	70.9	66.2	62.9	71.4	71.8
Medium Trucks:	71.8	70.2	64.5	62.9	71.1	71.4
Heavy Trucks:	73.1	70.7	67.7	66.9	74.0	74.3
Vehicle Noise:	77.2	75.4	71.1	69.5	77.2	77.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	150	323	696	1,500
CNEL:	157	337	727	1,566

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC 2018
Road Name: Waterman Av.
Road Segment: s/o Dumas St.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,500 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,850 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.82	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.67	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.78	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.1	70.5	65.9	62.6	71.1	71.4
Medium Trucks:	71.5	69.9	64.1	62.6	70.8	71.0
Heavy Trucks:	72.7	70.3	67.3	66.6	73.7	73.9
Vehicle Noise:	76.9	75.0	70.8	69.1	76.8	77.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	142	307	661	1,425
CNEL:	149	320	690	1,487

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC 2018
Road Name: Waterman Av.
Road Segment: s/o Park Center Dr.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,490 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.70	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-8.79	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.90	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.0	71.4	66.8	63.4	72.0	72.3
Medium Trucks:	72.3	70.7	65.0	63.5	71.7	71.9
Heavy Trucks:	73.6	71.2	68.2	67.5	74.5	74.8
Vehicle Noise:	77.8	75.9	71.6	70.0	77.7	78.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	163	351	757	1,631
CNEL:	170	367	790	1,703

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC 2018 | Project Name: Gateway South
Road Name: Waterman Av. | Job Number: 10189
Road Segment: n/o Hospitality Ln.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,990 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.03	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.46	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.58	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.3	70.7	66.1	62.8	71.3	71.6
Medium Trucks:	71.7	70.1	64.4	62.8	71.0	71.2
Heavy Trucks:	72.9	70.6	67.6	66.8	73.9	74.1
Vehicle Noise:	77.1	75.2	71.0	69.3	77.0	77.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	147	317	683	1,471
CNEL:	154	331	713	1,536

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC 2018 | Project Name: Gateway South
Road Name: Waterman Av. | Job Number: 10189
Road Segment: s/o Hospitality Ln.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,560 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.86	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-7.63	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-10.74	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.2	72.6	67.9	64.6	73.1	73.5
Medium Trucks:	73.5	71.9	66.2	64.6	72.8	73.1
Heavy Trucks:	74.8	72.4	69.4	68.6	75.7	76.0
Vehicle Noise:	78.9	77.1	72.8	71.2	78.9	79.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	195	420	905	1,949
CNEL:	203	438	944	2,035

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC 2018 | Project Name: Gateway South
Road Name: Auto Center Rd. | Job Number: 10189
Road Segment: e/o I-215 Fwy.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,540 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	4.81	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-6.68	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-9.79	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.4	69.8	65.2	61.9	70.4	70.7
Medium Trucks:	71.2	69.6	63.9	62.3	70.5	70.7
Heavy Trucks:	73.3	71.0	67.9	67.2	74.3	74.5
Vehicle Noise:	76.9	74.9	70.8	69.3	76.9	77.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	144	310	668	1,440
CNEL:	150	324	698	1,503

Monday, April 17, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC 2018 | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o E St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,730 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.99	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-8.50	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.62	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.3	71.7	67.0	63.7	72.3	72.6
Medium Trucks:	72.6	71.0	65.3	63.8	71.9	72.2
Heavy Trucks:	73.9	71.5	68.5	67.8	74.8	75.1
Vehicle Noise:	78.1	76.2	71.9	70.3	78.0	78.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	170	367	791	1,705
CNEL:	178	383	826	1,780

Monday, April 17, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC 2018 | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o Arrowhead Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,100	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,910	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.91	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.58	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.69	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.2	70.6	66.0	62.7	71.2	71.5
Medium Trucks:	71.6	69.9	64.2	62.7	70.9	71.1
Heavy Trucks:	72.8	70.4	67.4	66.7	73.8	74.0
Vehicle Noise:	77.0	75.1	70.8	69.2	76.9	77.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	144	311	671	1,445
CNEL:	151	325	700	1,508

Monday, April 17, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC 2018 | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o Washington Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,870	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.85	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.64	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.75	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.2	70.5	65.9	62.6	71.1	71.5
Medium Trucks:	71.5	69.9	64.2	62.6	70.8	71.1
Heavy Trucks:	72.8	70.4	67.4	66.6	73.7	74.0
Vehicle Noise:	76.9	75.0	70.8	69.2	76.9	77.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	143	308	664	1,431
CNEL:	149	322	694	1,494

Monday, April 17, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAC 2018 | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o Waterman Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,900	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,690	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.57	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.92	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.04	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.9	70.3	65.6	62.3	70.9	71.2
Medium Trucks:	71.2	69.6	63.9	62.3	70.5	70.8
Heavy Trucks:	72.5	70.1	67.1	66.4	73.4	73.7
Vehicle Noise:	76.7	74.8	70.5	68.9	76.6	76.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	137	295	636	1,371
CNEL:	143	308	664	1,431

Monday, April 17, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC 2018 | Project Name: Gateway South
Road Name: Washington Av. | Job Number: 10189
Road Segment: s/o Orange Show Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,073	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	107	vehicles
Vehicle Speed:	25	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	30.0	feet
Centerline Dist. to Observer:	30.0	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:	82.9%	7.1%	10.0%	67.43%
Medium Trucks:	82.8%	5.6%	11.7%	10.38%
Heavy Trucks:	69.3%	8.7%	22.0%	22.19%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	58.73	-10.69	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	70.80	-18.82	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	77.97	-15.52	3.32	-1.20	-5.77	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	48.5	43.9	40.6	49.1	49.4
Medium Trucks:	54.1	52.5	46.8	45.2	53.4	53.7
Heavy Trucks:	64.6	62.2	59.2	58.5	65.5	65.8
Vehicle Noise:	65.1	62.8	59.6	58.7	65.9	66.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	16	34	74	159
CNEL:	17	36	77	166

Monday, April 17, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC 2018 | Project Name: Gateway South
Road Name: Waterman Av. | Job Number: 10189
Road Segment: s/o Orange Show Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,610	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,161	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.58%
Medium Trucks:	82.8%	5.6%	11.7%	6.28%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.27	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.32	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.33	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.6	71.0	66.3	63.0	71.6	71.9
Medium Trucks:	71.8	70.2	64.5	62.9	71.1	71.4
Heavy Trucks:	73.2	70.8	67.8	67.1	74.1	74.4
Vehicle Noise:	77.3	75.4	71.2	69.6	77.3	77.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	152	328	707	1,522
CNEL:	159	342	738	1,589

Monday, April 17, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC 2018 | Project Name: Gateway South
Road Name: Waterman Av. | Job Number: 10189
Road Segment: s/o Dumas St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,310	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,931	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.59%
Medium Trucks:	82.8%	5.6%	11.7%	6.27%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.95	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.65	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.65	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.2	70.6	66.0	62.7	71.2	71.6
Medium Trucks:	71.5	69.9	64.2	62.6	70.8	71.0
Heavy Trucks:	72.9	70.5	67.5	66.7	73.8	74.1
Vehicle Noise:	77.0	75.1	70.9	69.2	76.9	77.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	145	312	672	1,447
CNEL:	151	326	701	1,511

Monday, April 17, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC 2018 | Project Name: Gateway South
Road Name: Waterman Av. | Job Number: 10189
Road Segment: s/o Park Center Dr.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,608	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,561	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.58%
Medium Trucks:	82.8%	5.6%	11.7%	6.52%
Heavy Trucks:	69.3%	8.7%	22.0%	3.90%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.74	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-8.63	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-10.87	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.0	71.4	66.8	63.5	72.0	72.4
Medium Trucks:	72.5	70.9	65.2	63.6	71.8	72.1
Heavy Trucks:	74.6	72.3	69.3	68.5	75.6	75.8
Vehicle Noise:	78.3	76.3	72.2	70.7	78.3	78.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	178	384	827	1,781
CNEL:	186	401	863	1,859

Monday, April 17, 2017

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC 2018 | Project Name: Gateway South
Road Name: Waterman Av. | Job Number: 10189
Road Segment: n/o Hospitality Ln.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,608	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,061	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.44%
Medium Trucks:	82.8%	5.6%	11.7%	6.54%
Heavy Trucks:	69.3%	8.7%	22.0%	4.02%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.08	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.28	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.39	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.4	70.8	66.1	62.8	71.4	71.7
Medium Trucks:	71.9	70.2	64.5	63.0	71.2	71.4
Heavy Trucks:	74.1	71.7	68.7	68.0	75.1	75.3
Vehicle Noise:	77.7	75.7	71.6	70.1	77.7	78.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	163	351	756	1,629
CNEL:	170	366	789	1,700

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC 2018 | Project Name: Gateway South
Road Name: Waterman Av. | Job Number: 10189
Road Segment: s/o Hospitality Ln.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,128	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,613	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.96%
Medium Trucks:	82.8%	5.6%	11.7%	6.47%
Heavy Trucks:	69.3%	8.7%	22.0%	3.56%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.89	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-7.54	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-10.14	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.2	72.6	67.9	64.6	73.2	73.5
Medium Trucks:	73.6	72.0	66.3	64.7	72.9	73.2
Heavy Trucks:	75.4	73.0	70.0	69.2	76.3	76.6
Vehicle Noise:	79.2	77.3	73.1	71.5	79.2	79.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	205	442	952	2,050
CNEL:	214	461	993	2,140

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC 2018 | Project Name: Gateway South
Road Name: Auto Center Rd. | Job Number: 10189
Road Segment: e/o I-215 Fwy.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,205	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	4,621	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.95%
Medium Trucks:	82.8%	5.6%	11.7%	6.45%
Heavy Trucks:	69.3%	8.7%	22.0%	3.60%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	4.86	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-6.58	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-9.12	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.5	69.9	65.2	61.9	70.5	70.8
Medium Trucks:	71.3	69.7	64.0	62.4	70.6	70.8
Heavy Trucks:	74.0	71.6	68.6	67.9	74.9	75.2
Vehicle Noise:	77.2	75.2	71.2	69.7	77.3	77.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	153	331	712	1,534
CNEL:	160	345	743	1,601

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC 2018 | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o E St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,161	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,816	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.86%
Medium Trucks:	82.8%	5.6%	11.7%	6.45%
Heavy Trucks:	69.3%	8.7%	22.0%	3.69%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.06	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-8.38	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-10.81	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.4	71.8	67.1	63.8	72.3	72.7
Medium Trucks:	72.8	71.1	65.4	63.9	72.1	72.3
Heavy Trucks:	74.7	72.3	69.3	68.6	75.6	75.9
Vehicle Noise:	78.5	76.5	72.4	70.8	78.4	78.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	183	394	848	1,828
CNEL:	191	411	886	1,908

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC 2018 | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o Arrowhead Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,983	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,998	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.70%
Medium Trucks:	82.8%	5.6%	11.7%	6.46%
Heavy Trucks:	69.3%	8.7%	22.0%	3.84%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.00	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.43	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.68	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.3	70.7	66.1	62.8	71.3	71.6
Medium Trucks:	71.7	70.1	64.4	62.8	71.0	71.3
Heavy Trucks:	73.8	71.4	68.4	67.7	74.8	75.0
Vehicle Noise:	77.5	75.6	71.4	69.9	77.5	77.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	158	340	732	1,578
CNEL:	165	355	764	1,647

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC 2018 | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o Washington Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,311	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,931	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.53%
Medium Trucks:	82.8%	5.6%	11.7%	6.31%
Heavy Trucks:	69.3%	8.7%	22.0%	3.16%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.94	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.62	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.63	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.2	70.6	66.0	62.7	71.2	71.6
Medium Trucks:	71.5	69.9	64.2	62.6	70.8	71.1
Heavy Trucks:	72.9	70.5	67.5	66.8	73.8	74.1
Vehicle Noise:	77.0	75.1	70.9	69.3	76.9	77.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	145	313	674	1,452
CNEL:	152	327	704	1,516

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: EAPC 2018 | Project Name: Gateway South
Road Name: Orange Show Rd. | Job Number: 10189
Road Segment: e/o Waterman Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,066	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	2,707	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.51%
Medium Trucks:	82.8%	5.6%	11.7%	6.38%
Heavy Trucks:	69.3%	8.7%	22.0%	3.12%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.60	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.92	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-13.04	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.9	70.3	65.7	62.3	70.9	71.2
Medium Trucks:	71.2	69.6	63.9	62.3	70.5	70.8
Heavy Trucks:	72.5	70.1	67.1	66.4	73.4	73.7
Vehicle Noise:	76.7	74.8	70.5	68.9	76.6	76.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	137	296	637	1,373
CNEL:	143	309	665	1,433

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 Without Project | Project Name: Gateway South
Road Name: Washington Av. | Job Number: 10189
Road Segment: s/o Orange Show Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,700	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	170	vehicles
Vehicle Speed:	25	mph
Near/Far Lane Distance:	12	feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	58.73	-7.42	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	70.80	-18.91	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	77.97	-22.02	3.32	-1.20	-5.77	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:	53.4	51.8	47.1	43.8	52.4	52.7
Medium Trucks:	54.0	52.4	46.7	45.1	53.3	53.6
Heavy Trucks:	58.1	55.7	52.7	52.0	59.0	59.3
Vehicle Noise:	60.5	58.4	54.5	53.3	60.7	61.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	7	16	34	72
CNEL:	8	16	35	75

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 Without Project | Project Name: Gateway South
Road Name: Waterman Av. | Job Number: 10189
Road Segment: s/o Orange Show Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,800	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,180	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	60	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.29	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.20	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.31	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.6	71.0	66.4	63.0	71.6	71.9
Medium Trucks:	71.9	70.3	64.6	63.1	71.3	71.5
Heavy Trucks:	73.2	70.8	67.8	67.1	74.1	74.4
Vehicle Noise:	77.4	75.5	71.2	69.6	77.3	77.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	153	330	711	1,533
CNEL:	160	345	743	1,600

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 Without Project
Road Name: Waterman Av.
Road Segment: s/o Dumas St.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,800 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,380 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.56	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-8.93	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.04	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.9	71.3	66.6	63.3	71.8	72.2
Medium Trucks:	72.2	70.6	64.9	63.3	71.5	71.8
Heavy Trucks:	73.5	71.1	68.1	67.3	74.4	74.7
Vehicle Noise:	77.6	75.8	71.5	69.9	77.6	77.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	160	344	741	1,596
CNEL:	167	359	774	1,667

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 Without Project
Road Name: Waterman Av.
Road Segment: s/o Park Center Dr.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	41,600 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,160 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.46	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-8.03	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.14	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.8	72.2	67.5	64.2	72.7	73.1
Medium Trucks:	73.1	71.5	65.8	64.2	72.4	72.7
Heavy Trucks:	74.4	72.0	69.0	68.2	75.3	75.6
Vehicle Noise:	78.5	76.7	72.4	70.8	78.5	78.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	183	395	851	1,833
CNEL:	191	412	888	1,914

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 Without Project
Road Name: Waterman Av.
Road Segment: n/o Hospitality Ln.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,570 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.80	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-8.69	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.81	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.1	71.5	66.9	63.5	72.1	72.4
Medium Trucks:	72.4	70.8	65.1	63.6	71.8	72.0
Heavy Trucks:	73.7	71.3	68.3	67.6	74.6	74.9
Vehicle Noise:	77.9	76.0	71.7	70.1	77.8	78.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	166	357	768	1,655
CNEL:	173	372	802	1,728

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 Without Project
Road Name: Waterman Av.
Road Segment: s/o Hospitality Ln.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	54,700 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,470 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	4.65	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-6.84	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-9.95	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.0	73.3	68.7	65.4	73.9	74.3
Medium Trucks:	74.3	72.7	67.0	65.4	73.6	73.9
Heavy Trucks:	75.6	73.2	70.2	69.4	76.5	76.8
Vehicle Noise:	79.7	77.8	73.6	72.0	79.7	79.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	220	474	1,021	2,200
CNEL:	230	495	1,066	2,297

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 Without Project
Road Name: Auto Center Rd.
Road Segment: e/o I-215 Fwy.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	39,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,910 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	4.16	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-7.33	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-10.44	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	69.2	64.5	61.2	69.8	70.1
Medium Trucks:	70.5	68.9	63.2	61.6	69.8	70.1
Heavy Trucks:	72.7	70.3	67.3	66.6	73.6	73.9
Vehicle Noise:	76.2	74.3	70.1	68.6	76.2	76.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	130	281	605	1,304
CNEL:	136	293	631	1,360

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 Without Project
Road Name: Orange Show Rd.
Road Segment: e/o E St.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,020 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.07	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.42	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.53	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.4	70.8	66.1	62.8	71.4	71.7
Medium Trucks:	71.7	70.1	64.4	62.8	71.0	71.3
Heavy Trucks:	73.0	70.6	67.6	66.9	73.9	74.2
Vehicle Noise:	77.2	75.3	71.0	69.4	77.1	77.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	148	319	687	1,481
CNEL:	155	333	718	1,546

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 Without Project
Road Name: Orange Show Rd.
Road Segment: e/o Arrowhead Av.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,300 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,130 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.55	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.94	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-14.05	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.9	69.3	64.6	61.3	69.8	70.2
Medium Trucks:	70.2	68.6	62.9	61.3	69.5	69.8
Heavy Trucks:	71.5	69.1	66.1	65.3	72.4	72.7
Vehicle Noise:	75.6	73.8	69.5	67.9	75.6	75.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	117	253	545	1,173
CNEL:	122	264	569	1,225

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 Without Project
Road Name: Orange Show Rd.
Road Segment: e/o Washington Av.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,100 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,410 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.60	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-8.89	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.01	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.9	71.3	66.7	63.3	71.9	72.2
Medium Trucks:	72.2	70.6	64.9	63.4	71.6	71.8
Heavy Trucks:	73.5	71.1	68.1	67.4	74.4	74.7
Vehicle Noise:	77.7	75.8	71.5	69.9	77.6	77.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	161	346	745	1,606
CNEL:	168	361	778	1,676

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 Without Project
Road Name: Orange Show Rd.
Road Segment: e/o Waterman Av.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,090 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.45%
Medium Trucks:	82.8%	5.6%	11.7%	6.42%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.47	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-11.02	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-14.13	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	69.2	64.5	61.2	69.8	70.1
Medium Trucks:	70.1	68.5	62.8	61.2	69.4	69.7
Heavy Trucks:	71.4	69.0	66.0	65.3	72.3	72.6
Vehicle Noise:	75.6	73.7	69.4	67.8	75.5	75.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	116	250	538	1,159
CNEL:	121	261	561	1,210

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 With Project
Road Name: Washington Av.
Road Segment: s/o Orange Show Rd.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,973 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	197 vehicles
Vehicle Speed:	25 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 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:	82.9%	7.1%	10.0%	77.93%
Medium Trucks:	82.8%	5.6%	11.7%	8.57%
Heavy Trucks:	69.3%	8.7%	22.0%	13.50%

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:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	58.73	-7.42	3.26	-1.20	-4.49	0.000	0.000
Medium Trucks:	70.80	-17.00	3.33	-1.20	-4.86	0.000	0.000
Heavy Trucks:	77.97	-15.03	3.32	-1.20	-5.77	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:	53.4	51.8	47.1	43.8	52.4	52.7
Medium Trucks:	55.9	54.3	48.6	47.0	55.2	55.5
Heavy Trucks:	65.1	62.7	59.7	58.9	66.0	66.3
Vehicle Noise:	65.8	63.6	60.2	59.3	66.5	66.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	18	38	82	176
CNEL:	18	39	85	183

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 With Project
Road Name: Waterman Av.
Road Segment: s/o Orange Show Rd.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	32,610 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,261 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.58%
Medium Trucks:	82.8%	5.6%	11.7%	6.28%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.41	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.18	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.19	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.7	71.1	66.5	63.2	71.7	72.0
Medium Trucks:	72.0	70.3	64.6	63.1	71.3	71.5
Heavy Trucks:	73.3	70.9	67.9	67.2	74.3	74.5
Vehicle Noise:	77.5	75.6	71.3	69.7	77.4	77.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	155	335	721	1,554
CNEL:	162	350	753	1,623

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 With Project
Road Name: Waterman Av.
Road Segment: s/o Dumas St.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,610 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,461 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.57%
Medium Trucks:	82.8%	5.6%	11.7%	6.29%
Heavy Trucks:	69.3%	8.7%	22.0%	3.14%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.67	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-8.92	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.93	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.0	71.4	66.7	63.4	72.0	72.3
Medium Trucks:	72.2	70.6	64.9	63.3	71.5	71.8
Heavy Trucks:	73.6	71.2	68.2	67.5	74.5	74.8
Vehicle Noise:	77.7	75.8	71.6	70.0	77.6	77.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	162	348	751	1,617
CNEL:	169	364	784	1,689

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 With Project
Road Name: Waterman Av.
Road Segment: s/o Park Center Dr.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	42,308 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,231 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.72%
Medium Trucks:	82.8%	5.6%	11.7%	6.51%
Heavy Trucks:	69.3%	8.7%	22.0%	3.78%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.50	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-7.90	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-10.26	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.8	72.2	67.6	64.2	72.8	73.1
Medium Trucks:	73.2	71.6	65.9	64.4	72.6	72.8
Heavy Trucks:	75.2	72.9	69.9	69.1	76.2	76.5
Vehicle Noise:	79.0	77.0	72.9	71.3	79.0	79.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	198	426	917	1,976
CNEL:	206	444	957	2,062

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 With Project
Road Name: Waterman Av.
Road Segment: n/o Hospitality Ln.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,408 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,641 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.60%
Medium Trucks:	82.8%	5.6%	11.7%	6.52%
Heavy Trucks:	69.3%	8.7%	22.0%	3.88%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.84	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-8.54	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-10.80	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.1	71.5	66.9	63.6	72.1	72.5
Medium Trucks:	72.6	71.0	65.3	63.7	71.9	72.2
Heavy Trucks:	74.7	72.3	69.3	68.6	75.7	75.9
Vehicle Noise:	78.4	76.4	72.3	70.7	78.4	78.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	180	389	838	1,805
CNEL:	188	406	874	1,884

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 With Project
Road Name: Waterman Av.
Road Segment: s/o Hospitality Ln.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	55,228 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,523 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.04%
Medium Trucks:	82.8%	5.6%	11.7%	6.47%
Heavy Trucks:	69.3%	8.7%	22.0%	3.49%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	4.67	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-6.77	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-9.44	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.0	73.4	68.7	65.4	74.0	74.3
Medium Trucks:	74.4	72.8	67.1	65.5	73.7	73.9
Heavy Trucks:	76.1	73.7	70.7	69.9	77.0	77.3
Vehicle Noise:	80.0	78.1	73.8	72.3	79.9	80.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	230	495	1,066	2,296
CNEL:	240	516	1,112	2,396

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 With Project
Road Name: Auto Center Rd.
Road Segment: e/o I-215 Fwy.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	39,905 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,991 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.87%
Medium Trucks:	82.8%	5.6%	11.7%	6.46%
Heavy Trucks:	69.3%	8.7%	22.0%	3.67%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	4.22	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	77.72	-7.21	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-9.67	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	69.2	64.6	61.3	69.8	70.2
Medium Trucks:	70.6	69.0	63.3	61.8	70.0	70.2
Heavy Trucks:	73.5	71.1	68.1	67.3	74.4	74.7
Vehicle Noise:	76.6	74.6	70.6	69.2	76.7	77.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	140	302	651	1,403
CNEL:	146	315	679	1,463

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 With Project
Road Name: Orange Show Rd.
Road Segment: e/o E St.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,061 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,106 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.72%
Medium Trucks:	82.8%	5.6%	11.7%	6.46%
Heavy Trucks:	69.3%	8.7%	22.0%	3.82%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.16	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-9.27	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.56	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.5	70.9	66.2	62.9	71.4	71.8
Medium Trucks:	71.9	70.3	64.5	63.0	71.2	71.4
Heavy Trucks:	74.0	71.6	68.6	67.8	74.9	75.2
Vehicle Noise:	77.6	75.7	71.5	70.0	77.6	77.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	161	347	748	1,612
CNEL:	168	363	781	1,683

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 With Project
Road Name: Orange Show Rd.
Road Segment: e/o Arrowhead Av.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,183 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,218 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	89.44%
Medium Trucks:	82.8%	5.6%	11.7%	6.47%
Heavy Trucks:	69.3%	8.7%	22.0%	4.09%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.68	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-10.73	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-12.72	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.0	69.4	64.7	61.4	70.0	70.3
Medium Trucks:	70.4	68.8	63.1	61.5	69.7	70.0
Heavy Trucks:	72.8	70.4	67.4	66.7	73.7	74.0
Vehicle Noise:	76.3	74.4	70.2	68.7	76.3	76.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	132	284	613	1,320
CNEL:	138	297	639	1,378

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 With Project
Road Name: Orange Show Rd.
Road Segment: e/o Washington Av.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,711 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,471 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.51%
Medium Trucks:	82.8%	5.6%	11.7%	6.33%
Heavy Trucks:	69.3%	8.7%	22.0%	3.16%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.68	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-8.88	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-11.90	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.0	71.4	66.7	63.4	72.0	72.3
Medium Trucks:	72.3	70.6	64.9	63.4	71.6	71.8
Heavy Trucks:	73.6	71.2	68.2	67.5	74.6	74.8
Vehicle Noise:	77.8	75.9	71.6	70.0	77.7	78.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	162	350	754	1,625
CNEL:	170	366	787	1,697

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Year 2040 With Project
Road Name: Orange Show Rd.
Road Segment: e/o Waterman Av.
Project Name: Gateway South
Job Number: 10189

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,066 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,107 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	60 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	82.9%	7.1%	10.0%	90.52%
Medium Trucks:	82.8%	5.6%	11.7%	6.37%
Heavy Trucks:	69.3%	8.7%	22.0%	3.11%

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:	40.311
Medium Trucks:	40.091
Heavy Trucks:	40.113

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.51	1.30	-1.20	-4.65	0.000	0.000
Medium Trucks:	81.00	-11.02	1.34	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-14.13	1.33	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	69.2	64.6	61.3	69.8	70.1
Medium Trucks:	70.1	68.5	62.8	61.2	69.4	69.7
Heavy Trucks:	71.4	69.0	66.0	65.3	72.3	72.6
Vehicle Noise:	75.6	73.7	69.4	67.8	75.5	75.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	116	250	539	1,160
CNEL:	121	261	562	1,212

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APPENDIX 9.1:

REFERENCE DISTRIBUTION/WAREHOUSE NOISE SOURCE PHOTOS

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Reference Measurement: Motivational Fulfillment
6810 Bickmore Avenue, Chino

Motivational Fulfillment_01

Motivational Fulfillment_02

Motivational Fulfillment_03

Source_1-1

Source_1-2

Source_1-3

Reference Measurement: Motivational Fulfillment
6810 Bickmore Avenue, Chino

Source_1-4

Source_2-1

Source_2-2

Source_2-3

Source_2-4

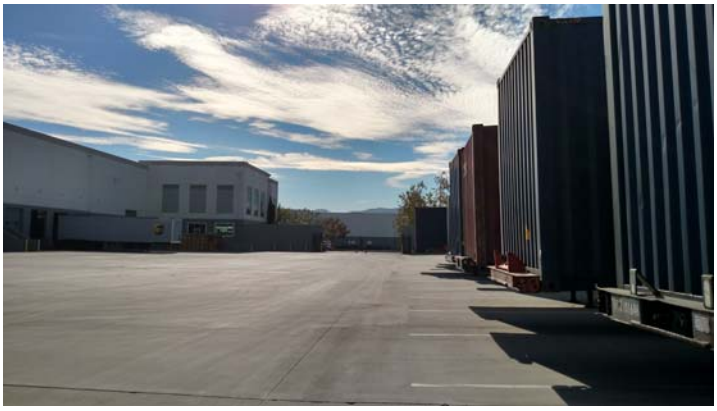
Source_2-5

Reference Measurement: Motivational Fulfillment
6810 Bickmore Avenue, Chino

Source_2-6

Source_2-7

Source_2-8



Source_2-9

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APPENDIX 9.2:

OPERATIONAL STATIONARY-SOURCE NOISE CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL

4/17/2017

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

Project Name: Gateway South
Job Number: 10189
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,014.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,014.0 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	1,014.0	-30.6	-30.6	-30.6	-30.6	-30.6	-30.6
Shielding (Barrier Attenuation)	1,014.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		36.6	-30.6	-30.6	-30.6	-30.6	-30.6
60 Minute Hourly Adjustment		**36.6**	**-30.6**	**-30.6**	**-30.6**	**-30.6**	**-30.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

4/17/2017

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

Project Name: Gateway South
Job Number: 10189
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,710.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,710.0 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	1,710.0	-50.7	-50.7	-50.7	-50.7	-50.7	-50.7
Shielding (Barrier Attenuation)	1,710.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		26.5	-50.7	-50.7	-50.7	-50.7	-50.7
39 Minute Hourly Adjustment		**24.6**	**-52.6**	**-52.6**	**-52.6**	**-52.6**	**-52.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 4/17/2017

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

Project Name: Gateway South
Job Number: 10189
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	528.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	528.0	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	528.0	-24.9	-24.9	-24.9	-24.9	-24.9	-24.9
Shielding (Barrier Attenuation)	528.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		42.3	-24.9	-24.9	-24.9	-24.9	-24.9
60 Minute Hourly Adjustment		**42.3**	**-24.9**	**-24.9**	**-24.9**	**-24.9**	**-24.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 4/17/2017

Observer Location: **R2**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Gateway South
Job Number: 10189
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,230.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,230.0	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	1,230.0	-47.8	-47.8	-47.8	-47.8	-47.8	-47.8
Shielding (Barrier Attenuation)	1,230.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		29.4	-47.8	-47.8	-47.8	-47.8	-47.8
39 Minute Hourly Adjustment		**27.5**	**-49.7**	**-49.7**	**-49.7**	**-49.7**	**-49.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

4/17/2017

Observer Location: **R3**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Gateway South
Job Number: 10189
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	351.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	351.0 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	351.0	-21.4	-21.4	-21.4	-21.4	-21.4	-21.4
Shielding (Barrier Attenuation)	351.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		45.8	-21.4	-21.4	-21.4	-21.4	-21.4
60 Minute Hourly Adjustment		**45.8**	**-21.4**	**-21.4**	**-21.4**	**-21.4**	**-21.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

4/17/2017

Observer Location: **R3**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Gateway South
Job Number: 10189
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	982.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	982.0 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	982.0	-45.9	-45.9	-45.9	-45.9	-45.9	-45.9
Shielding (Barrier Attenuation)	982.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		31.3	-45.9	-45.9	-45.9	-45.9	-45.9
39 Minute Hourly Adjustment		**29.4**	**-47.8**	**-47.8**	**-47.8**	**-47.8**	**-47.8**

STATIONARY SOURCE NOISE PREDICTION MODEL

4/17/2017

Observer Location: **R4**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Gateway South
Job Number: 10189
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	755.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	755.0 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	755.0	-28.0	-28.0	-28.0	-28.0	-28.0	-28.0
Shielding (Barrier Attenuation)	755.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		39.2	-28.0	-28.0	-28.0	-28.0	-28.0
60 Minute Hourly Adjustment		**39.2**	**-28.0**	**-28.0**	**-28.0**	**-28.0**	**-28.0**

STATIONARY SOURCE NOISE PREDICTION MODEL

4/17/2017

Observer Location: **R4**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Gateway South
Job Number: 10189
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	901.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	901.0 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	901.0	-45.1	-45.1	-45.1	-45.1	-45.1	-45.1
Shielding (Barrier Attenuation)	901.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		32.1	-45.1	-45.1	-45.1	-45.1	-45.1
39 Minute Hourly Adjustment		**30.2**	**-47.0**	**-47.0**	**-47.0**	**-47.0**	**-47.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 4/17/2017

Observer Location: **R5** *Project Name:* Gateway South
Source: Unloading/Docking Activity *Job Number:* 10189
Condition: Operational *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	714.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	714.0 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	714.0	-27.5	-27.5	-27.5	-27.5	-27.5	-27.5
Shielding (Barrier Attenuation)	714.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		39.7	-27.5	-27.5	-27.5	-27.5	-27.5
60 Minute Hourly Adjustment		**39.7**	**-27.5**	**-27.5**	**-27.5**	**-27.5**	**-27.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 4/17/2017

Observer Location: **R5** *Project Name:* Gateway South
Source: Roof-Top Air Conditioning Unit *Job Number:* 10189
Condition: Operational *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	652.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	652.0 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	652.0	-42.3	-42.3	-42.3	-42.3	-42.3	-42.3
Shielding (Barrier Attenuation)	652.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		34.9	-42.3	-42.3	-42.3	-42.3	-42.3
39 Minute Hourly Adjustment		**33.0**	**-44.2**	**-44.2**	**-44.2**	**-44.2**	**-44.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

4/17/2017

Observer Location: **R6**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Gateway South
Job Number: 10189
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	273.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	273.0 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	273.0	-19.2	-19.2	-19.2	-19.2	-19.2	-19.2
Shielding (Barrier Attenuation)	273.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		48.0	-19.2	-19.2	-19.2	-19.2	-19.2
60 Minute Hourly Adjustment		**48.0**	**-19.2**	**-19.2**	**-19.2**	**-19.2**	**-19.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

4/17/2017

Observer Location: **R6**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Gateway South
Job Number: 10189
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	501.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	501.0 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	501.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0
Shielding (Barrier Attenuation)	501.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		37.2	-40.0	-40.0	-40.0	-40.0	-40.0
39 Minute Hourly Adjustment		**35.3**	**-41.9**	**-41.9**	**-41.9**	**-41.9**	**-41.9**

STATIONARY SOURCE NOISE PREDICTION MODEL

4/17/2017

Observer Location: **R7**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: Gateway South
Job Number: 10189
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	929.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	929.0 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	929.0	-29.8	-29.8	-29.8	-29.8	-29.8	-29.8
Shielding (Barrier Attenuation)	929.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		37.4	-29.8	-29.8	-29.8	-29.8	-29.8
60 Minute Hourly Adjustment		**37.4**	**-29.8**	**-29.8**	**-29.8**	**-29.8**	**-29.8**

STATIONARY SOURCE NOISE PREDICTION MODEL

4/17/2017

Observer Location: **R7**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: Gateway South
Job Number: 10189
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,137.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,137.0 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	1,137.0	-47.1	-47.1	-47.1	-47.1	-47.1	-47.1
Shielding (Barrier Attenuation)	1,137.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		30.1	-47.1	-47.1	-47.1	-47.1	-47.1
39 Minute Hourly Adjustment		**28.2**	**-49.0**	**-49.0**	**-49.0**	**-49.0**	**-49.0**

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