West Grove Center

NOISE IMPACT ANALYSIS

CITY OF GARDEN GROVE

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LIST OF ABBREVIATED TERMS

(1)	Reference
ANSI	American National Standards Institute
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
L_{min}	Minimum level measured over the time interval
L_w	Sound Power Level
mph	Miles per hour
OCFA	Orange County Fire Authority
PPV	Peak Particle Velocity
Project	West Grove Center
RMS	Root-mean-square
VdB	Vibration Decibels

EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures, if any, for the proposed West Grove Center development ("Project") located at 12141 Valley View Street in the City of Garden Grove. The Project involves repurposing the former 33,375 sf bowling alley building to accommodate commercial uses and the construction of a new 2,000 sf drive-thru coffee shop in the southeastern portion of the Project site. This study has been prepared to satisfy applicable City of Garden Grove standards and thresholds of significance based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

SUMMARY OF CEQA SIGNIFICANCE FINDINGS

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

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-Site Traffic Noise	7	*Less Than Significant*	-
Operational Noise	9	*Less Than Significant*	-
Construction Noise	10	*Less Than Significant*	-
Construction Vibration		*Less Than Significant*	-

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1 INTRODUCTION

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

1.1 SITE LOCATION

The proposed West Grove Center Project is located at 12141 Valley View Street in the City of Garden Grove as shown on Exhibit 1-A. There are existing commercial uses north of the Project site, including the 251-seat 4 Star Cinemas, which is attached to the northern side of the vacant bowling alley building, and multi-family residential uses to the west. Previously approved redevelopment activities on the parcels to the north of the Project site were recently completed, including a drive-thru restaurant (Jack in the box), and an automatic car wash. There are multi-family residential uses to the southwest of the Project site. A church is located east of the Project site across Valley View Street, commercial uses are located to the northeast, and senior apartments are located to the southeast. Orange County Fire Authority (OCFA) Fire Station 84 is located south of the Project site, south of the alley.

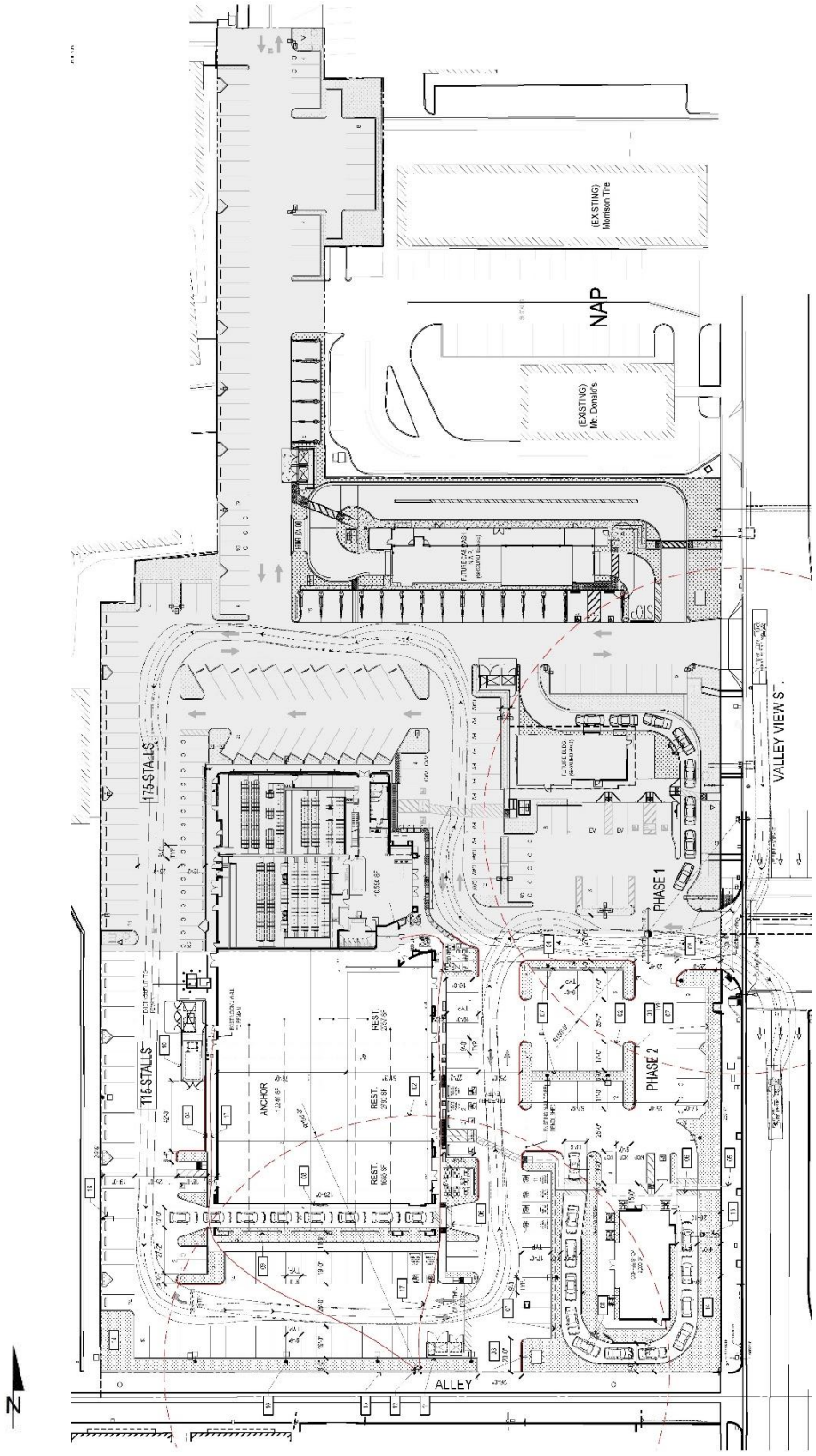
1.2 PROJECT DESCRIPTION

The Project involves repurposing the former 33,375 sf bowling alley building to accommodate commercial uses and the construction of a new 2,000 sf drive-thru coffee shop in the southeastern portion of the Project site. As shown on Exhibit 1-B, the repurposed bowling alley building would accommodate a 12,082-sf anchor tenant, a 1,665-sf restaurant with drive-thru, a 2,792-sf restaurant, and a 2,757-sf restaurant. Exhibit 1-B also depicts the site plan for the commercial development to the north, which was recently redeveloped in accordance with PUD-104-73 Rev. 2018 (approved by the City in 2018).

The Project-related operational noise sources are expected to include: roof-top air conditioning units, drive-thru speakerphone activity, and trash enclosure activity. This noise analysis is intended to describe noise level impacts associated with the expected typical operational activities at the Project site. In addition, this analysis describes the off-site traffic noise level impacts associated with the Project. Based on the *Westgrove Center Project Traffic Study & Parking Analysis* prepared by RK Engineer Group, the Project (Alternative 1) is expected to generate a total of approximately 5,654 daily trips. (2) At the time this noise analysis was prepared, the future tenants of the proposed Project were unknown.

EXHIBIT 1-A: LOCATION MAP

EXHIBIT 1-B: SITE PLAN



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2 FUNDAMENTALS

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

EXHIBIT 2-A: TYPICAL NOISE LEVELS

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

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

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (3) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 100 feet, which can cause serious discomfort. (4) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

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

To describe the time-varying character of environmental noise, the statistical or percentile noise descriptors L_{50}, L_{25}, L_8 and L_2, are commonly used. The percentile noise descriptors are the noise levels equaled or exceeded during 50 percent, 25 percent, 8 percent and 2 percent of a stated time. Sound levels associated with the L_2 and L_8 typically describe transient or short-term events, while levels associated with the L_{50} describe the steady state (or median) noise conditions. While the L_{50} describes the noise levels occurring 50 percent of the time, the L_{eq} accounts for the total energy (average) observed for the entire hour.

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

2.3 SOUND PROPAGATION

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

2.3.1 GEOMETRIC SPREADING

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

as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. (3)

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source. (6)

2.3.3 ATMOSPHERIC EFFECTS

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

2.3.4 SHIELDING

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

2.4 NOISE CONTROL

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

2.5 Noise Barrier Attenuation

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receiver. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (6)

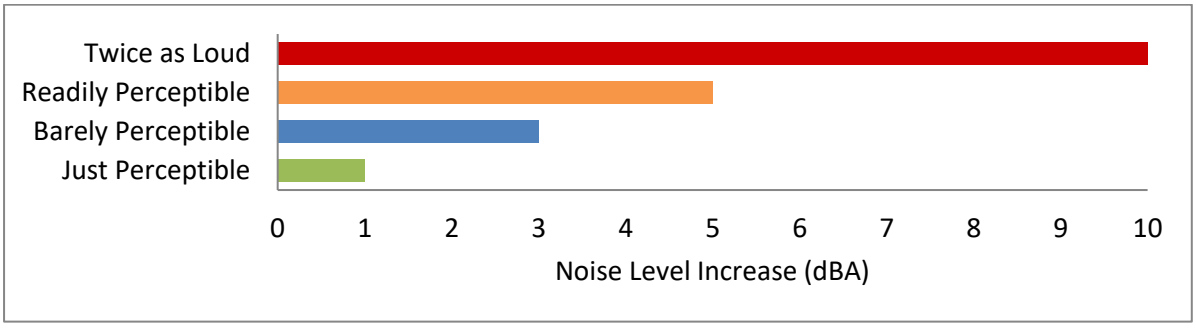
2.6 Land Use Compatibility With Noise

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. (7)

2.7 Community Response to Noise

Community responses to noise vary. A change of 3 dBA is considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. A change of 10 dBA is considered twice as loud. (6) Exhibit 2-B describes the expected responses to changes in noise levels.

Exhibit 2-B: Noise Level Increase Perception



2.8 Vibration

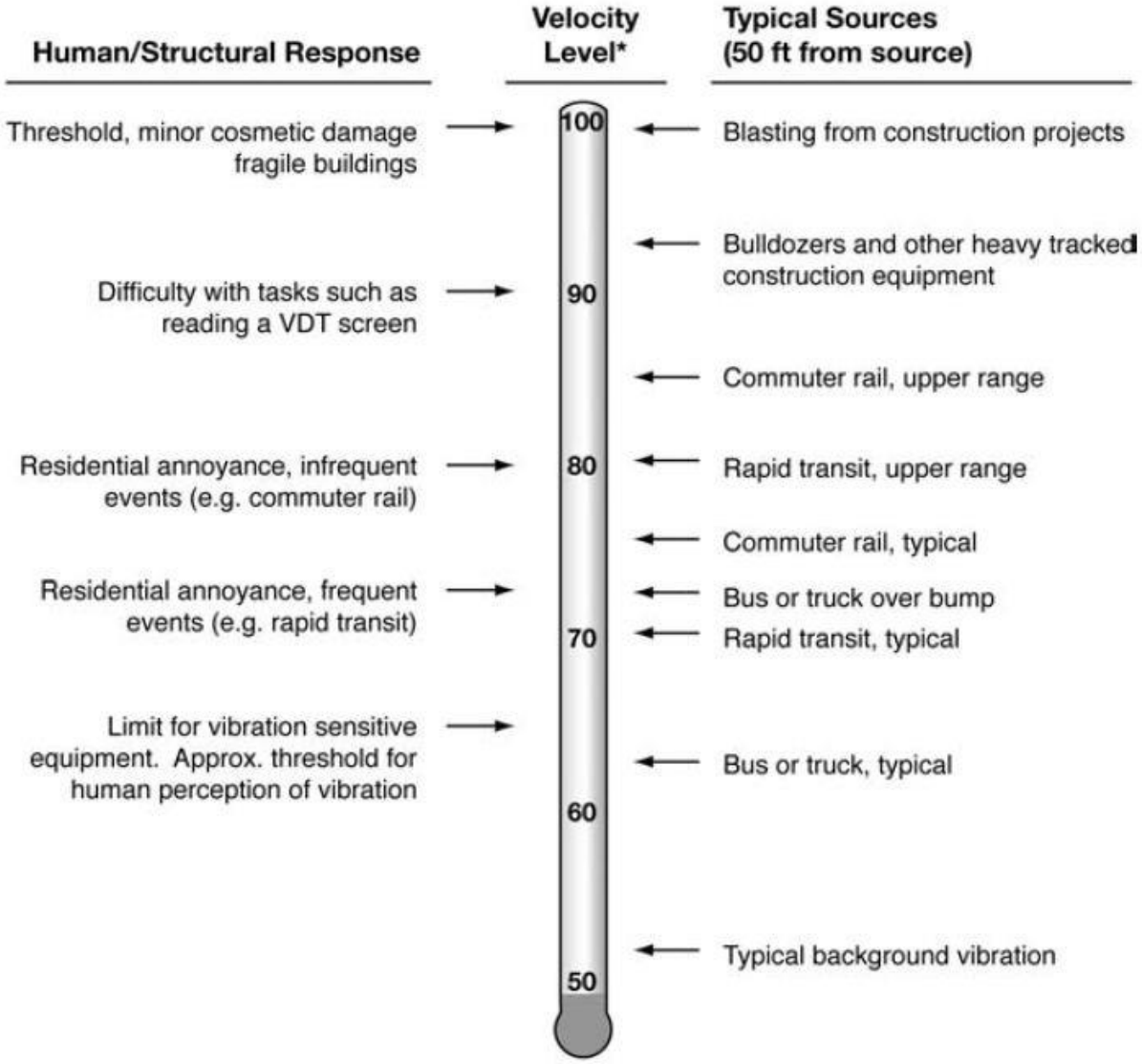
Per the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (9), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such

as explosions. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

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

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

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



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

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

3 REGULATORY SETTING

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

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research (OPR). (10) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

3.2 CITY OF GARDEN GROVE GENERAL PLAN NOISE ELEMENT

The City of Garden Grove General Plan Noise Element *examines noise sources in the City to identify and appraise the potential for noise conflicts and problems, and to identify ways to reduce existing and potential noise impacts*. The noise criteria identified in the City of Garden Grove Noise Element 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 *Noise and Land Use Compatibility Matrix* (Table 7-1) in the City of Garden Grove General Plan provides guidelines to evaluate the acceptability of the transportation-related noise level impacts. The planned Project business commercial land use is considered *normally acceptable* with exterior noise levels between 50-70 dBA CNEL. (5) In addition to the Noise and Land Use Compatibility criteria, the City of Garden Grove General Plan Noise Element has identified the following Project-related noise policies.

N-1.2: *Incorporate a noise assessment study into the environmental review process, when needed for a specific project for the purposes of identifying potential noise impacts and noise abatement procedures.*

N-IMP-1D *Require construction activity to comply with the limits established in the City's Noise Ordinance.*

N-IMP-1E *Require buffers or appropriate mitigation of potential noise sources on noise sensitive areas.*

N-IMP-1F *Require that vehicle access to commercial properties that are located adjacent to residential parcels or other noise sensitive uses be located at the maximum practical distance from these uses.*

N-2.3 *Incorporate noise reduction features for items such as but not limited to parking and loading areas, ingress/egress point, and refuse collection areas, during site planning to mitigate anticipated noise impacts on affected noise sensitive land uses.*

EXHIBIT 3-A: NOISE AND LAND USE COMPATIBILITY MATRIX

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dBA)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential - Low Density, Single-Family, Duplex, Mobile Homes	50 - 60	55 - 70	70-75	75-85
Residential - Multiple Family	50 - 65	60 - 70	70 - 75	70 – 85
Transient Lodging - Motel, Hotels	50 - 65	60 - 70	70 - 80	80 – 85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 - 70	60 - 70	70 - 80	80 – 85
Auditoriums, Concert Halls, Amphitheaters	NA	50 - 70	NA	65 – 85
Sports Arenas, Outdoor Spectator Sports	NA	50 - 75	NA	70 – 85
Playgrounds, Neighborhood Parks	50 - 70	NA	67.5 - 75	72.5 – 85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 - 70	NA	70 - 80	80 – 85
Office Buildings, Business Commercial and Professional	50 - 70	67.5 - 77.5	75 - 85	NA
Industrial, Manufacturing, Utilities, Agriculture	50 - 75	70 - 80	75 - 85	NA

NA: Not Applicable

Source: Office of Planning and Research, California, *General Plan Guidelines*, October 2003.

Normally Acceptable – Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
Conditionally Acceptable – New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
Normally Unacceptable – New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Clearly Unacceptable – New construction or development should generally not be undertaken.

3.3 CITY OF GARDEN GROVE MUNICIPAL CODE

While the City of Garden Grove General Plan Noise Element provides guidelines to assess transportation noise on sensitive land uses, the City Municipal Code Section 8.47 *Noise Control* has established maximum noise levels for operational (stationary) and construction related noise sources. (11)

3.3.1 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the West Grove Center Project, stationary-source (operational) noise such as the expected roof-top air conditioning units, drive-thru speakerphone activity, and trash enclosure activity are

typically evaluated against standards established under a jurisdiction's Municipal Code. The City of Garden Grove Municipal Code, Section 8.47.040 establishes ambient base noise level standards for sensitive land uses. For sensitive uses, the exterior noise level shall not exceed 55 dBA L_{eq} during the daytime hours (7:00 a.m. to 10:00 p.m.) and 50 dBA L_{eq} during the nighttime hours (10:00 p.m. to 7:00 a.m.). (11) In addition, Section 8.47.050(D) of the Municipal Code indicates that the exterior noise level standards shall apply for a cumulative period of 30 minutes in any hour, as well as the standard plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes in any hour, or the standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour, or the standard plus 15 dBA for a cumulative period of more than 1 minute in any hour, or the standard plus 20 dBA for any period of time.

Further, Section 8.47.050(D) indicates that in the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level. The City of Garden Grove operational noise level standards are shown on Table 3-1 and included in Appendix 3.1.

TABLE 3-1: OPERATIONAL NOISE LEVEL STANDARDS

Time Period	Exterior Noise Level Standards (dBA)[1]				
	L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
Daytime (7:00 a.m. to 10:00 p.m.)	55	60	65	70	75
Nighttime (10:00 p.m. to 7:00 a.m.)	50	55	60	65	70

[1] City of Garden Grove Municipal Code Section 8.47.040 Ambient Base Noise Levels for sensitive land uses (Appendix 3.1) with the cumulative adjustments outline in Section 8.47.050(D). The percent noise level is the level exceeded "n" percent of the time during the measurement period. L_{50} is the noise level exceeded 50% of the time.

The percentile noise descriptors are provided to ensure that the duration of the noise source is fully considered. However, due to the relatively constant intensity of the Project operational activities, the L_{50} or average L_{eq} noise level metrics best describe the roof-top air conditioning units, drive-thru speakerphone activity, and trash enclosure activity. In addition, the L_{eq} noise level metric accounts for noise fluctuations over time by averaging the louder and quieter events and giving more weight to the louder events. In addition, due to the mathematical relationship between the median (L_{50}) and the mean (L_{eq}), the L_{eq} will always be larger than or equal to the L_{50}. The more variable the noise becomes, the larger the L_{eq} becomes in comparison to the L_{50}. Therefore, this noise study conservatively relies on the average L_{eq} sound level limits to describe the Project operational noise levels.

3.3.2 CONSTRUCTION NOISE STANDARDS

Section 8.47.060(D) of the City of Garden Grove Municipal Code, provided in Appendix 3.1, indicates that it shall be unlawful for any person…to operate equipment or perform any outside construction or repair work on buildings, structures, or projects, or to operate any pile driver,

power shovel, pneumatic hammer, derrick, power hoist, or any other construction type device between the hours of 10:00 p.m. of one day and 7:00 a.m. of the next day in such a manner that a person of normal sensitiveness, as determined utilizing the criteria established in Section 8.47.050, is caused discomfort or annoyance unless such operations are of an emergency nature. Section 8.47.050 indicates that the ambient base noise level standard for a given land use shall not be exceeded by more than 20 dBA for any period (e.g., L_{max}). For residential uses, Section 8.47.040 identifies an ambient base noise level of 55 dBA during the daytime hours (7:00 a.m. to 10:00 p.m.) when construction activity would take place. Therefore, the base anytime maximum noise level limit is equal to 75 dBA L_{max} for residential uses. The City of Garden Grove Municipal Code is included in Appendix 3.1.

3.4 VIBRATION STANDARDS

Construction activity can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment, such as air compressors, light trucks, hydraulic loaders, etc., generate little or no ground vibration. (9) To analyze vibration impacts originating from the construction of the West Grove Center, vibration-generating activities are appropriately evaluated against standards established under the City's Municipal Code, if such standards exist. However, the City of Garden Grove does not identify specific vibration level limits and instead this analysis relies on the Caltrans *Transportation and Construction Vibration Guidance Manual*, (12 p. 38) Table 19 vibration damage criteria to assess potential temporary construction-related impacts at adjacent receiver locations. While ground vibrations from construction activities do not often reach the levels that can damage structures, fragile buildings must receive special consideration. The construction vibration damage potential criteria include consideration of the building conditions. (4 p. 182) Table 3-2 describes the maximum acceptable transient and continuous vibration building damage potential levels by structure type and condition.

TABLE 3-2: BUILDING DAMAGE VIBRATION CRITERIA

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

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

Most of the buildings near the Project site can be described as older residential structures with a maximum acceptable continuous building damage vibration threshold of 0.3 PPV (in/sec).

3.5 LOS ALAMITOS JOINT FORCES TRAINING BASE

The Project site is located approximately 0.8 miles southeast of the Los Alamitos Joint Forces Training Base (JFTB), Los Alamitos airfield. The base contains two runways and is the only remaining military airfield in Los Angeles and Orange Counties. The majority of the JFTB operations consist of helicopter training with some light twin engine fixed aircraft and occasional operations by transient military and civil support aircraft.

The Orange County Airport Land Use Commission *Airport Environs Land Use Plan for Joint Forces Training Base Los Alamitos* (13) shows the 65 and 60 dBA CNEL noise contour boundaries for the Los Alamitos airfield in relation to the West Grove Center site, which is located outside the 60 dBA CNEL noise contour. Based on the City of Garden Grove *Noise and Land Use Compatibility Matrix* (see Exhibit 3-A), the community noise exposure levels at the Project site are considered *normally acceptable.*

EXHIBIT 3-B: JFTB AIRFIELD NOISE CONTOUR BOUNDARIES

LEGEND:

Site Boundary | 65 dBA CNEL | 60 dBA CNEL

Orange County Airport Land Use Commission Airport Environs Land Use Plan for Joint Forces Training Base Los Alamitos

4 SIGNIFICANCE CRITERIA

The following significance criteria are based on currently adopted guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (10) For the purposes of this report, impacts would be potentially significant if the Project results in or causes:

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

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

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

4.1 NOISE-SENSITIVE RECEIVERS

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

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged. The Federal Interagency Committee on Noise (FICON) (15) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (CNEL) and equivalent continuous noise level (L_{eq}).

As previously stated, the approach used in this noise study recognizes *that there is no single noise increase that renders the noise impact significant*, based on a 2008 California Court of Appeal ruling in Gray v. County of Madera. (14) For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria may be exceeded. Therefore, for this analysis, FICON identifies a *readily perceptible* 5 dBA or greater project-related noise level increase as a significant impact when the noise criteria for a given land use is exceeded. Per the FICON, in areas where the "without Project"

noise levels range from 60 to 65 dBA, a 3 dBA *barely perceptible* noise level increase appears to be appropriate for most people. When the "without Project" noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance.

The FICON guidance provides an established source of criteria to assess the impacts of substantial temporary or permanent increase in ambient noise levels. Based on the FICON criteria, the amount to which a given noise level increase is considered acceptable is reduced when the "without Project" noise levels are already shown to exceed certain land-use specific exterior noise level criteria. The specific levels are based on typical responses to noise level increases of 5 dBA or *readily perceptible*, 3 dBA or *barely perceptible*, and 1.5 dBA depending on the underlying "without Project" noise levels for noise-sensitive uses. These levels of increases and their perceived acceptance are consistent with guidance provided by both the Federal Highway Administration (6 p. 9) and Caltrans (16 p. 2_48).

4.2 SIGNIFICANCE CRITERIA SUMMARY

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

TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Receiving Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site	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	
Operational	Residential	Exterior Noise Level Limit[2]	55 dBA L_{eq}	50 dBA L_{eq}
	Sensitive	if ambient is < 60 dBA L_{eq}[1]	≥ 5 dBA L_{eq} Project increase	
		if ambient is 60 - 65 dBA L_{eq}[1]	≥ 3 dBA L_{eq} Project increase	
		if ambient is > 65 dBA L_{eq}[1]	≥ 1.5 dBA L_{eq} Project increase	
Construction	Sensitive	Unlawful between the hours of 10:00 p.m. of one day and 7:00 a.m. of the next day[3]		
		Exterior Noise Level Limit[4]	75 dBA L_{max}	n/a
		Building Damage Vibration Threshold[5]	0.3 PPV (in/sec)	

[1] FICON, 1992.
[2] City of Garden Grove Municipal Code, Section 8.47.040 ambient base noise level standards for sensitive land uses.
[3] City of Garden Grove Municipal Code Section 8.47.060(D).
[4] City of Garden Grove Municipal Code, Section 8.47.050 maximum noise levels for stationary noise sources.
[5] Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, Tables 19, p. 38.
"Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 7:00 a.m.

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at three 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, November 18, 2020. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

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

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (3) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (9)

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. (9) 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 nearest sensitive receiver locations allows for a comparison of the before and after Project noise levels

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

5.3 NOISE MEASUREMENT RESULTS

The noise measurements presented below focus on the average or equivalent sound levels (L_{eq}). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 5-1 provides the (energy average) noise levels used to describe the daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) 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.

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

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]		CNEL
		Daytime	Nighttime	
L1	Located west of the Project site near existing multi-family residential homes at 12092 Stonegate Lane.	53.5	49.0	56.6
L2	Located east of the Project site by The Church of Jesus Christ of Latter-day Saints at 12160 Valley View Street.	60.9	55.6	63.7
L3	Located south of the Project site near existing multi-family residential	60.5	55.7	63.5

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

The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with nearest surface streets. 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.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

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6 TRAFFIC NOISE METHODS AND PROCEDURES

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

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

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

6.1.1 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 13 off-site study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of Garden Grove General Plan Circulation Element, and the posted vehicle speeds. Consistent with the *Westgrove Center Project Traffic Study & Parking Analysis* prepared by RK Engineer Group (2) the off-site traffic noise analysis includes the following traffic scenarios.

- Existing
- Existing Plus Project (E+P)
- Project Opening Year Without Project (OY)
- Project Opening Year With Project (OY+P)

The average daily traffic (ADT) volumes used for this study are presented on Table 6-1. Table 6-2 provides the time of day (daytime, evening, and nighttime) vehicle splits and Table 6-3 presents the traffic flow distributions (vehicle mix) used for this analysis. The vehicle mix provides the hourly distribution percentages of automobile, medium trucks, and heavy trucks for input into the FHWA noise prediction model.

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Receiving Land Use[1]	Classification[2]	Centerline Distance to Receiving Land Use (Feet)[3]	Vehicle Speed (mph)
1	Valley View St.	n/o Chapman Av.	Sensitive	Major Arterial	60'	45
2	Valley View St.	n/o Belgrave Av.	Sensitive	Major Arterial	60'	45
3	Valley View St.	n/o Lampson Av.	Sensitive	Major Arterial	60'	45
4	Valley View St.	n/o Cerulean Av.	Non-Sensitive	Major Arterial	60'	45
5	Valley View St.	s/o Cerulean Av.	Sensitive	Major Arterial	60'	45
6	Chapman Av.	w/o Valley View St.	Sensitive	Primary Arterial	50'	45
7	Chapman Av.	e/o Valley View St.	Sensitive	Primary Arterial	50'	45
8	Belgrave Av.	w/o Valley View St.	Sensitive	Collector	37'	25
9	Belgrave Av.	e/o Valley View St.	Sensitive	Collector	37'	25
10	Lampson Av.	w/o Valley View St.	Sensitive	Secondary	40'	40
11	Lampson Av.	e/o Valley View St.	Sensitive	Secondary	40'	40
12	Cerulean Av.	w/o Valley View St.	Sensitive	Collector	37'	25
13	Cerulean Av.	e/o Valley View St.	Sensitive	Collector	37'	25

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] Garden Grove General Plan 2030 Master Plan of Streets and Highways
[3] Based upon the right-of-way distances for each roadway classification provided in the General Plan Circulation Element.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes[1]			
			Existing		Opening Year	
			Without Project	With Project	Without Project	With Project
1	Valley View St.	n/o Chapman Av.	48,468	49,598	50,513	51,643
2	Valley View St.	n/o Belgrave Av.	49,620	52,448	51,711	54,539
3	Valley View St.	n/o Lampson Av.	49,920	51,898	52,023	54,001
4	Valley View St.	n/o Cerulean Av.	49,824	50,672	51,903	52,751
5	Valley View St.	s/o Cerulean Av.	52,152	52,434	54,324	54,606
6	Chapman Av.	w/o Valley View St.	10,476	11,324	11,527	12,375
7	Chapman Av.	e/o Valley View St.	14,076	14,924	15,271	16,119
8	Belgrave Av.	w/o Valley View St.	1,644	2,210	1,710	2,276
9	Belgrave Av.	e/o Valley View St.	264	546	275	557
10	Lampson Av.	w/o Valley View St.	14,916	15,482	16,125	16,691
11	Lampson Av.	e/o Valley View St.	12,240	12,806	13,342	13,908
12	Cerulean Av.	w/o Valley View St.	4,824	5,106	5,017	5,299
13	Cerulean Av.	e/o Valley View St.	5,124	5,406	5,329	5,611

[1] Westgrove Center Project Traffic Study & Parking Analysis prepared by RK Engineer Group.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

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

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

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

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

[1] Typical Southern California vehicle mix.

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7 OFF-SITE TRAFFIC NOISE ANALYSIS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed based on the *Westgrove Center Project Traffic Study & Parking Analysis* prepared by RK Engineer Group. (2) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway.

7.1 TRAFFIC NOISE CONTOURS

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

7.2 EXISTING PROJECT TRAFFIC NOISE LEVEL INCREASES

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project Phase 1 has been included in this report for informational purposes and to fully analyze all the existing traffic scenarios identified in the *Westgrove Center Project Traffic Study & Parking Analysis* prepared by RK Engineer Group. (2) Table 7-1 shows the Existing without Project conditions CNEL noise levels. The Existing without Project exterior noise levels range from 46.5 to 74.2 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions range from 49.7 to 74.2 dBA CNEL. Table 7-10 shows that the Project off-site traffic noise level ranges from 0.0 to 3.2 dBA CNEL on the study area roadway segments.

7.3 OPENING YEAR TRAFFIC NOISE LEVEL INCREASES

Table 7-3 presents the Opening Year without Project conditions CNEL noise levels. The Opening Year without Project exterior noise levels range from 46.7 to 74.4 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-4 shows the Opening Year with Project conditions range from 49.8 to 74.4 dBA CNEL. Table 7-6 shows that the Project off-site traffic noise level increases range from 0.0 to 3.1 dBA CNEL.

TABLE 7-1: EXISTING WITHOUT PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Valley View St.	n/o Chapman Av.	Sensitive	73.9	109	235	506
2	Valley View St.	n/o Belgrave Av.	Sensitive	74.0	111	239	514
3	Valley View St.	n/o Lampson Av.	Sensitive	74.0	111	240	516
4	Valley View St.	n/o Cerulean Av.	Non-Sensitive	74.0	111	239	516
5	Valley View St.	s/o Cerulean Av.	Sensitive	74.2	115	247	532
6	Chapman Av.	w/o Valley View St.	Sensitive	67.5	RW	73	158
7	Chapman Av.	e/o Valley View St.	Sensitive	68.8	RW	89	192
8	Belgrave Av.	w/o Valley View St.	Sensitive	54.5	RW	RW	RW
9	Belgrave Av.	e/o Valley View St.	Sensitive	46.5	RW	RW	RW
10	Lampson Av.	w/o Valley View St.	Sensitive	69.1	RW	75	161
11	Lampson Av.	e/o Valley View St.	Sensitive	68.2	RW	66	141
12	Cerulean Av.	w/o Valley View St.	Sensitive	59.2	RW	RW	RW
13	Cerulean Av.	e/o Valley View St.	Sensitive	59.4	RW	RW	RW

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

TABLE 7-2: EXISTING WITH PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Valley View St.	n/o Chapman Av.	Sensitive	74.0	111	239	514
2	Valley View St.	n/o Belgrave Av.	Sensitive	74.2	115	248	534
3	Valley View St.	n/o Lampson Av.	Sensitive	74.2	114	246	530
4	Valley View St.	n/o Cerulean Av.	Non-Sensitive	74.1	112	242	522
5	Valley View St.	s/o Cerulean Av.	Sensitive	74.2	115	248	534
6	Chapman Av.	w/o Valley View St.	Sensitive	67.8	RW	77	166
7	Chapman Av.	e/o Valley View St.	Sensitive	69.0	RW	93	200
8	Belgrave Av.	w/o Valley View St.	Sensitive	55.8	RW	RW	RW
9	Belgrave Av.	e/o Valley View St.	Sensitive	49.7	RW	RW	RW
10	Lampson Av.	w/o Valley View St.	Sensitive	69.2	RW	77	165
11	Lampson Av.	e/o Valley View St.	Sensitive	68.4	RW	68	146
12	Cerulean Av.	w/o Valley View St.	Sensitive	59.4	RW	RW	RW
13	Cerulean Av.	e/o Valley View St.	Sensitive	59.6	RW	RW	RW

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

TABLE 7-3: OPENING YEAR WITHOUT PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Valley View St.	n/o Chapman Av.	Sensitive	74.1	112	242	520
2	Valley View St.	n/o Belgrave Av.	Sensitive	74.2	114	245	529
3	Valley View St.	n/o Lampson Av.	Sensitive	74.2	114	246	531
4	Valley View St.	n/o Cerulean Av.	Non-Sensitive	74.2	114	246	530
5	Valley View St.	s/o Cerulean Av.	Sensitive	74.4	118	254	546
6	Chapman Av.	w/o Valley View St.	Sensitive	67.9	RW	78	168
7	Chapman Av.	e/o Valley View St.	Sensitive	69.1	RW	94	203
8	Belgrave Av.	w/o Valley View St.	Sensitive	54.6	RW	RW	RW
9	Belgrave Av.	e/o Valley View St.	Sensitive	46.7	RW	RW	RW
10	Lampson Av.	w/o Valley View St.	Sensitive	69.4	RW	79	170
11	Lampson Av.	e/o Valley View St.	Sensitive	68.6	RW	69	150
12	Cerulean Av.	w/o Valley View St.	Sensitive	59.3	RW	RW	RW
13	Cerulean Av.	e/o Valley View St.	Sensitive	59.6	RW	RW	RW

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

TABLE 7-4: OPENING YEAR WITH PROJECT CONTOURS

ID	Road	Segment	Receiving Land Use[1]	CNEL at Nearest Receiving Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Valley View St.	n/o Chapman Av.	Sensitive	74.2	114	245	528
2	Valley View St.	n/o Belgrave Av.	Sensitive	74.4	118	254	548
3	Valley View St.	n/o Lampson Av.	Sensitive	74.4	117	253	544
4	Valley View St.	n/o Cerulean Av.	Non-Sensitive	74.3	115	249	536
5	Valley View St.	s/o Cerulean Av.	Sensitive	74.4	118	254	548
6	Chapman Av.	w/o Valley View St.	Sensitive	68.2	RW	82	176
7	Chapman Av.	e/o Valley View St.	Sensitive	69.4	RW	98	210
8	Belgrave Av.	w/o Valley View St.	Sensitive	55.9	RW	RW	RW
9	Belgrave Av.	e/o Valley View St.	Sensitive	49.8	RW	RW	RW
10	Lampson Av.	w/o Valley View St.	Sensitive	69.6	RW	81	174
11	Lampson Av.	e/o Valley View St.	Sensitive	68.8	RW	71	154
12	Cerulean Av.	w/o Valley View St.	Sensitive	59.6	RW	RW	RW
13	Cerulean Av.	e/o Valley View St.	Sensitive	59.8	RW	RW	RW

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

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

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]			Incremental Noise Level Increase Threshold[3]	
				No Project	With Project	Project Addition	Limit[4]	Exceeded?
1	Valley View St.	n/o Chapman Av.	Sensitive	73.9	74.0	0.1	1.5	No
2	Valley View St.	n/o Belgrave Av.	Sensitive	74.0	74.2	0.2	1.5	No
3	Valley View St.	n/o Lampson Av.	Sensitive	74.0	74.2	0.2	1.5	No
4	Valley View St.	n/o Cerulean Av.	Non-Sensitive	74.0	74.1	0.1	1.5	No
5	Valley View St.	s/o Cerulean Av.	Sensitive	74.2	74.2	0.0	1.5	No
6	Chapman Av.	w/o Valley View St.	Sensitive	67.5	67.8	0.3	1.5	No
7	Chapman Av.	e/o Valley View St.	Sensitive	68.8	69.0	0.2	1.5	No
8	Belgrave Av.	w/o Valley View St.	Sensitive	54.5	55.8	1.3	5.0	No
9	Belgrave Av.	e/o Valley View St.	Sensitive	46.5	49.7	3.2	5.0	No
10	Lampson Av.	w/o Valley View St.	Sensitive	69.1	69.2	0.1	1.5	No
11	Lampson Av.	e/o Valley View St.	Sensitive	68.2	68.4	0.2	1.5	No
12	Cerulean Av.	w/o Valley View St.	Sensitive	59.2	59.4	0.2	5.0	No
13	Cerulean Av.	e/o Valley View St.	Sensitive	59.4	59.6	0.2	5.0	No

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[3] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?
[4] When the "no Project" noise level is < 60 dBA CNEL the Project limit is 5 dBA CNEL, when the "no Project" noise level is 60-65 dBA CNEL the Project limit is 3 dBA CNEL, when the "no Project" noise level is > 65 dBA CNEL the Project limit is 1.5 dBA CNEL.

TABLE 7-6: OPENING YEAR WITH PROJECT TRAFFIC NOISE LEVEL INCREASES

ID	Road	Segment	Receiving Land Use[1]	CNEL at Receiving Land Use (dBA)[2]			Incremental Noise Level Increase Threshold[3]	
				No Project	With Project	Project Addition	Limit[4]	Exceeded?
1	Valley View St.	n/o Chapman Av.	Sensitive	74.1	74.2	0.1	1.5	No
2	Valley View St.	n/o Belgrave Av.	Sensitive	74.2	74.4	0.2	1.5	No
3	Valley View St.	n/o Lampson Av.	Sensitive	74.2	74.4	0.2	1.5	No
4	Valley View St.	n/o Cerulean Av.	Non-Sensitive	74.2	74.3	0.1	1.5	No
5	Valley View St.	s/o Cerulean Av.	Sensitive	74.4	74.4	0.0	1.5	No
6	Chapman Av.	w/o Valley View St.	Sensitive	67.9	68.2	0.3	1.5	No
7	Chapman Av.	e/o Valley View St.	Sensitive	69.1	69.4	0.3	1.5	No
8	Belgrave Av.	w/o Valley View St.	Sensitive	54.6	55.9	1.3	5.0	No
9	Belgrave Av.	e/o Valley View St.	Sensitive	46.7	49.8	3.1	5.0	No
10	Lampson Av.	w/o Valley View St.	Sensitive	69.4	69.6	0.2	1.5	No
11	Lampson Av.	e/o Valley View St.	Sensitive	68.6	68.8	0.2	1.5	No
12	Cerulean Av.	w/o Valley View St.	Sensitive	59.3	59.6	0.3	5.0	No
13	Cerulean Av.	e/o Valley View St.	Sensitive	59.6	59.8	0.2	5.0	No

[1] Based on a review of existing aerial imagery. Noise sensitive uses limited to existing residential land uses.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the receiving land use.
[3] Does the Project create an incremental noise level increase exceeding the significance criteria (Table 4-1)?
[4] When the "no Project" noise level is < 60 dBA CNEL the Project limit is 5 dBA CNEL, when the "no Project" noise level is 60-65 dBA CNEL the Project limit is 3 dBA CNEL, when the "no Project" noise level is > 65 dBA CNEL the Project limit is 1.5 dBA CNEL.

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8 RECEIVER LOCATIONS

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

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

R1: Location R1 represents the existing multi-family noise sensitive residence at 12094 Stonegate Lane, approximately 29 feet west of the Project site. R1 is placed at the building façade behind the existing 6-foot-high wall. A 24-hour noise measurement near this location, L1, is used to describe the existing ambient noise environment.

R2: Location R2 represents the existing noise sensitive Church of Jesus Christ of Latter-day Saints at 12160 Valley View Street, approximately 142 feet east of the Project site. Receiver R2 is placed at the building façade. A 24-hour noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents the existing noise sensitive residence at 5921 Bailey Street approximately 34 feet south of the Project site. Since there are no private outdoor living areas (backyards) facing the Project site, receiver R3 is placed at the residential building façade. A 24-hour noise measurement near this location, L3, is used to describe the existing ambient noise environment.

EXHIBIT 8-A: RECEIVER LOCATIONS

9 OPERATIONAL NOISE ANALYSIS

This section analyzes the potential stationary-source operational noise impacts at the nearest receiver locations, identified in Section 8, resulting from the operation of the proposed West Grove Center Project. Exhibit 9-A identifies the noise source locations used to assess the operational noise levels.

9.1 OPERATIONAL NOISE SOURCES

This operational noise analysis is intended to describe noise level impacts associated with the expected typical daytime and nighttime commercial activities at the Project site. The on-site Project-related noise sources are expected to include: roof-top air conditioning units, drive-thru speakerphone activity, and trash enclosure activity.

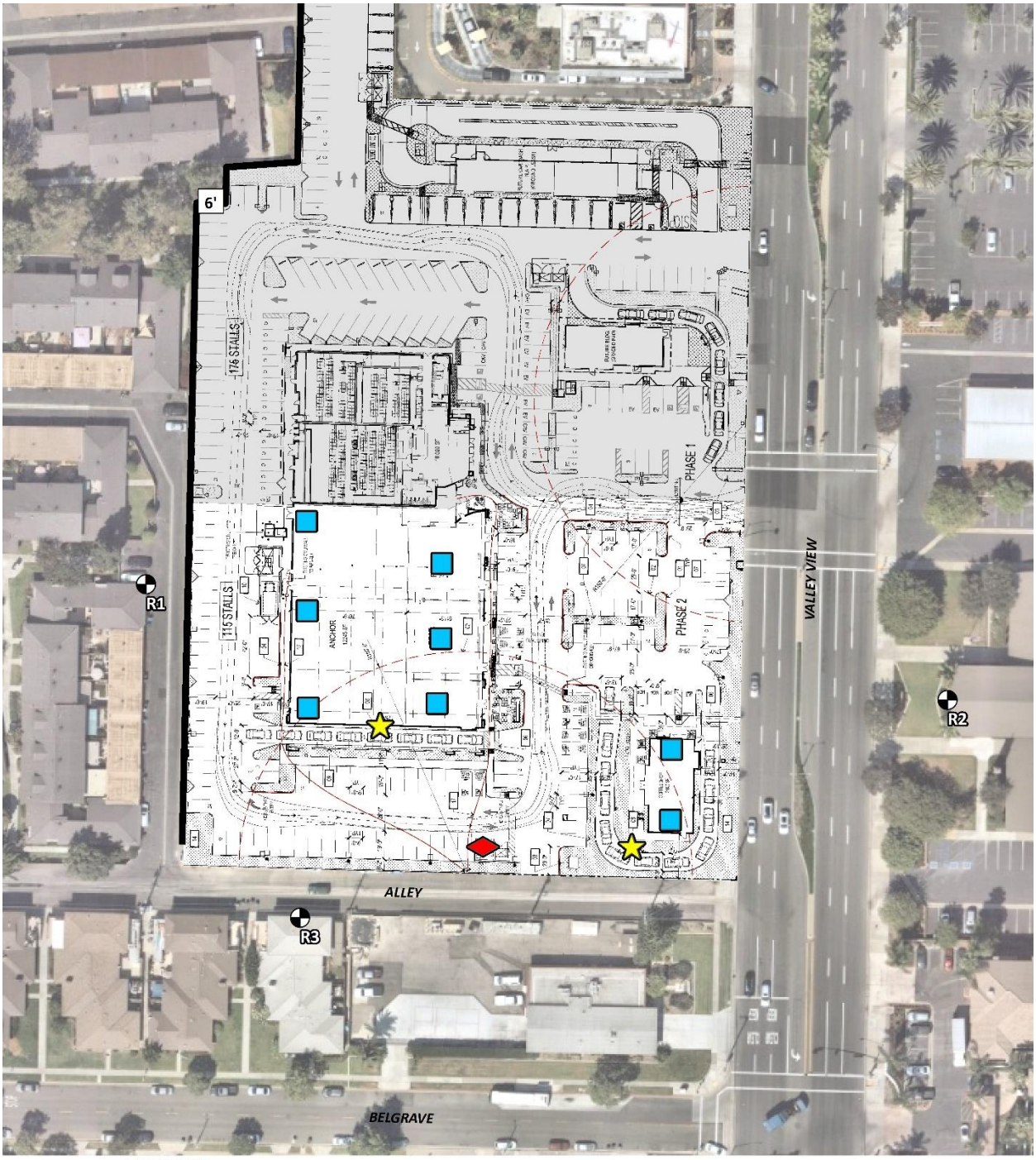
9.2 REFERENCE NOISE LEVELS

To estimate the Project operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. This section provides a detailed description of the reference noise level measurements shown on Table 9-1 used to estimate the Project operational noise impacts. It is important to note that the following projected noise levels assume the worst-case noise environment with the roof-top air conditioning units, drive-thru speakerphone activity, and trash enclosure activity all operating at the same time. These sources of noise activity will likely vary throughout the day.

9.2.1 MEASUREMENT PROCEDURES

The reference noise level measurements presented in this section were collected using a Larson Davis LxT Type 1 precisions sound level meter (serial number 01146). The LxT sound level meter was calibrated using a Larson-Davis calibrator, Model CAL 200, was programmed in "slow" mode to record noise levels in "A" weighted form and was located at approximately five feet above the ground elevation for each measurement. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (17)

EXHIBIT 9-A: OPERATIONAL NOISE SOURCE LOCATIONS



LEGEND:

N

Roof-Top Air Conditioning Unit | New Trash Enclosure | Existing Barrier

Drive-Through Speakerphone | Receiver Locations | 6' Existing Barrier Height (in feet)

TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source[1]	Noise Source Height (Feet)	Min./Hour[2]		Reference Noise Level @50 feet (dBA L_{eq})	Sound Power Level (dBA)[3]
		Day	Night		
Roof-Top Air Conditioning Units	5'	39	28	57.2	88.9
Drive-Thru Activity	3'	60	60	50.0	84.0
Trash Enclosure Activity	5'	10	10	57.3	89.0

[1] As measured by Urban Crossroads, Inc.
[2] Anticipated duration (minutes within the hour) of noise activity during typical hourly conditions expected at the Project site. "Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 8:00 a.m.
[3] Sound power level represents the total amount of acoustical energy (noise level) produced by a sound source independent of distance or surroundings. Sound power levels calculated using the CadnaA noise model at the reference distance to the noise source. Numbers may vary due to size differences between point and area noise sources.

9.2.2 ROOF-TOP AIR CONDITIONING UNITS

To assess the noise levels created by the roof-top air conditioning units, reference noise level measurements were collected from a Lennox SCA120 series 10-ton model packaged air conditioning unit. At the uniform reference distance of 50 feet, the reference noise levels are 57.2 dBA L_{eq}. Based on the typical operating conditions observed over a four-day measurement period, the roof-top air conditioning units are estimated to operate for an average of 39 minutes per hour during the daytime hours, and 28 minutes per hour during the nighttime hours. For this noise analysis, the air conditioning units are expected to be located on the roof of the proposed building. This reference noise level describes the expected roof-top air conditioning units located 5 feet above the roof for the planned air conditioning units at the Project site.

9.2.3 DRIVE-THRU SPEAKERPHONE ACTIVITY

To describe the potential noise level impacts associated with the planned drive-thru speakerphones, this analysis relies on the drive-thru intercom system manufactured by HME. This type of system is commonly used by the quick service restaurant (QSR) industry for drive-thru communications. The HME SPP2 speaker post intercom system produces a maximum noise level of 84 dBA at one foot from the speaker post. The system may also be equipped with an automatic volume control that can automatically reduce the sound levels as the ambient noise level decreases. The reference speakerphone noise level describes continuous drive-thru operations and does not include any periods of inactivity.

9.2.4 TRASH ENCLOSURE ACTIVITY

To describe the noise levels associated with a trash enclosure activity, Urban Crossroads collected a reference noise level measurement at an existing trash enclosure containing two dumpster bins. The trash enclosure noise levels describe metal gates opening and closing, metal scraping against concrete floor sounds, dumpster movement on metal wheels, and trash dropping into the metal dumpster. The reference noise levels describe trash enclosure noise activities when trash is dropped into an empty metal dumpster, as would occur at the Project site. The measured reference noise level at the uniform 50-foot reference distance is 57.3 dBA L_{eq} for the trash

enclosure activity. The reference noise level describes the expected noise source activities associated with the trash enclosures for the Project's proposed building. Typical trash enclosure activities are estimated to occur for 10 minutes per hour.

9.3 CADNAA NOISE PREDICTION MODEL

To fully describe the exterior operational noise levels from the Project, Urban Crossroads, Inc. developed a noise prediction model using the CadnaA (Computer Aided Noise Abatement) computer program. CadnaA can analyze multiple types of noise sources using the spatially accurate Project site plan, georeferenced Nearmap aerial imagery, topography, buildings, and barriers in its calculations to predict outdoor noise levels.

Using the ISO 9613 protocol, CadnaA will calculate the distance from each noise source to the noise receiver locations, using the ground absorption, distance, and barrier/building attenuation inputs to provide a summary of noise level at each receiver and the partial noise level contributions by noise source. Consistent with the ISO 9613 protocol, the CadnaA noise prediction model relies on the reference sound power level (L_w) to describe individual noise sources. While sound pressure levels (e.g. L_{eq}) quantify in decibels the intensity of given sound sources at a reference distance, sound power levels (L_w) are connected to the sound source and are independent of distance. Sound pressure levels vary substantially with distance from the source and diminish because of intervening obstacles and barriers, air absorption, wind, and other factors. Sound power is the acoustical energy emitted by the sound source and is an absolute value that is not affected by the environment. The operational noise level calculations provided in this noise study account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. A default ground attenuation factor of 0.0 was used in the noise analysis to account for hard site conditions. Appendix 9.1 includes the detailed noise model inputs used to estimate the Project operational noise levels presented in this section.

9.4 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed Project operations that include roof-top air conditioning units, drive-thru speakerphone activity, and trash enclosure activity, 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. Tables 9-2 shows the Project operational noise levels during the daytime hours of 7:00 a.m. to 10:00 p.m. The daytime hourly noise levels at the off-site receiver locations are expected to range from 43.3 to 52.5 dBA L_{eq}.

Tables 9-3 shows the Project operational noise levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. The nighttime hourly noise levels at the off-site receiver locations are expected to range from 40.9 to 50.5 dBA L_{eq}. The differences between the daytime and nighttime noise levels are largely related to the duration of noise activity (Table 9-1). Appendix 9.1 includes the detailed noise model inputs, including the existing perimeter walls, used to estimate the Project operational noise levels presented in this section.

TABLE 9-2: DAYTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA Leq)		
	R1	R2	R3
Roof-Top Air Conditioning Units	43.3	48.6	51.0
Drive-Thru Activity	21.0	32.1	45.5
Trash Enclosure Activity	14.3	21.6	41.8
Total (All Noise Sources)	**43.3**	**48.7**	**52.5**

[1] See Exhibit 9-A for the noise source locations. CadnaA noise model calculations are included in Appendix 9.1.

TABLE 9-3: NIGHTTIME PROJECT OPERATIONAL NOISE LEVELS

Noise Source[1]	Operational Noise Levels by Receiver Location (dBA Leq)		
	R1	R2	R3
Roof-Top Air Conditioning Units	40.9	46.2	48.6
Drive-Thru Activity	20.1	31.1	44.5
Trash Enclosure Activity	13.4	20.6	40.9
Total (All Noise Sources)	**40.9**	**46.3**	**50.5**

[1] See Exhibit 9-A for the noise source locations. CadnaA noise model calculations are included in Appendix 9.1.

9.5 PROJECT OPERATIONAL NOISE LEVEL COMPLIANCE

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level thresholds based on the City of Garden Grove exterior noise level standards at nearest noise-sensitive receiver locations. Table 9-4 shows the operational noise levels associated with West Grove Center Project will satisfy the City of Garden Grove daytime and nighttime exterior noise level standards adjusted to reflect the ambient noise levels at all nearest receiver locations. Therefore, the operational noise impacts are considered *less than significant* at the nearest noise-sensitive receiver locations.

TABLE 9-4: OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	Project Operational Noise Levels (dBA Leq)[2]		Noise Level Standards (dBA Leq)[3]		Noise Level Standards Exceeded?[4]	
	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
R1	43.3	40.9	54	49	No	No
R2	48.7	46.3	61	56	No	No
R3	52.5	50.5	61	56	No	No

[1] See Exhibit 8-A for the receiver locations.
[2] Proposed Project operational noise levels as shown on Tables 9-2 and 9-3.
[3] Exterior noise level standards adjusted to reflect the ambient noise levels (see Table 5-1) per the City of Garden Grove Municipal Code Per Section 8.47.050(D).
[4] Do the estimated Project operational noise source activities exceed the noise level standards?
"Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 7:00 a.m.

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

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

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describes the Project noise level increases to the existing ambient noise environment. Noise levels that would be experienced at receiver locations when Project-source noise is added to the daytime and nighttime ambient conditions are presented on Tables 9-5 and 9-6, respectively. As indicated on Tables 9-5 and 9-6, the Project will generate a operational noise level increase of 0.3 to 1.2 dBA L_{eq} at the nearest receiver locations. Project-related operational noise level increases will satisfy the operational noise level increase significance criteria presented in Table 4-1, and the increases at the sensitive receiver locations will be *less than significant.*

TABLE 9-5: DAYTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Noise Sensitive Land Use?	Increase Criteria[7]	Increase Criteria Exceeded?
R1	43.3	L1	53.5	53.9	0.4	Yes	5.0	No
R2	48.7	L2	60.9	61.2	0.3	Yes	3.0	No
R3	52.5	L3	60.5	61.1	0.6	Yes	3.0	No

[1] See Exhibit 8-A for the receiver locations.
[2] Total Project daytime operational noise levels as shown on Table 9-2.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance increase criteria as shown on Table 4-1.

TABLE 9-6: NIGHTTIME PROJECT OPERATIONAL NOISE LEVEL INCREASES

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Noise Sensitive Land Use?	Increase Criteria[7]	Increase Criteria Exceeded?
R1	40.9	L1	49.0	49.6	0.6	Yes	5.0	No
R2	46.3	L2	55.6	56.1	0.5	Yes	5.0	No
R3	50.5	L3	55.7	56.9	1.2	Yes	5.0	No

[1] See Exhibit 8-A for the receiver locations.
[2] Total Project nighttime 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 increase criteria as shown on Table 4-1.

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10 CONSTRUCTION ANALYSIS

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 nearest sensitive receiver locations previously described in Section 8.

To prevent high levels of construction noise from impacting noise-sensitive land uses, City of Garden Grove Municipal Code Section 8.47.060(D) restricts construction activities between the hours of 10:00 p.m. of one day and 7:00 a.m. of the next day.

10.1 CONSTRUCTION NOISE LEVELS

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

- Building Demolition
- Building Construction
- Paving Replacement
- 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.

10.2 TYPICAL CONSTRUCTION REFERENCE NOISE LEVELS

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearest sensitive receiver locations were completed. To assess the construction noise levels, the Project construction noise analysis relies on the highest noise level impacts when the equipment with the highest reference noise level is operating at the closest point from the edge of construction activity area for each stage of construction to each of the nearest receiver locations. Appendix 10.1 includes the detailed CadnaA construction noise model inputs.

EXHIBIT 10-A: TYPICAL CONSTRUCTION NOISE SOURCE LOCATIONS

TABLE 10-1: CONSTRUCTION REFERENCE NOISE LEVELS

Construction Stage	Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{max})	Highest Reference Noise Level (dBA L_{max})
Building Demolition	Scraper, Water Truck, & Dozer Activity	83.3	83.3
	Demolition Activity	81.6	
	Water Truck Pass-By & Backup Alarm	77.9	
Building Construction	Foundation Trenching	70.5	78.8
	Framing	72.3	
	Concrete Mixer Backup Alarms & Air Brakes	78.8	
Paving Replacement	Concrete Mixer Truck Movements	73.1	73.1
	Concrete Paver Activities	71.3	
	Concrete Mixer Pour & Paving Activities	71.9	
Architectural Coating	Air Compressors	67.0	67.0
	Generator	67.0	
	Crane	65.2	

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.

10.3 TYPICAL CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts at the nearest sensitive receiver locations were completed. The Project construction noise analysis relies on the highest noise level impacts for each stage of construction at each of the nearest receiver locations. As shown on Table 10-2, the construction noise levels are expected to range from 46.5 to 71.1 dBA L_{max}, and the highest construction levels are expected to range from 58.3 to 71.1 dBA L_{max} at the nearest receiver locations. Appendix 10.1 includes the detailed CadnaA construction noise model inputs.

TABLE 10-2: TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Noise Levels by Stage (dBA L_{max})				
	Building Demolition	Building Construction	Paving Replacement	Architectural Coating	Highest Levels[2]
R1	58.0	58.3	57.9	46.5	58.3
R2	64.8	63.4	65.6	51.6	65.6
R3	68.9	67.7	71.1	55.9	71.1

[1] Noise receiver locations are shown on Exhibit 8-A.

[2] Construction noise level calculations based on distance from the project construction activity area for each stage of construction to the nearest receiver locations. CadnaA construction noise model inputs are included in Appendix 10.1.

10.4 TYPICAL CONSTRUCTION NOISE LEVEL COMPLIANCE

To evaluate whether the Project will generate potentially significant short-term noise levels at nearest receiver locations, the City of Garden Grove has identified a construction-related daytime noise level threshold of 75 dBA L_{max} to assess the daytime construction noise level impacts. The construction noise analysis shows that the nearest receiver locations will be below the daytime 75 dBA L_{max} significance threshold during Project construction activities as shown on Table 10-3. Therefore, the noise impacts due to Project construction noise is considered *less than significant* at all receiver locations.

TABLE 10-3: TYPICAL CONSTRUCTION NOISE LEVEL COMPLIANCE

Receiver Location[1]	Use	Construction Noise Levels (dBA L_{max})		
		Highest Construction Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	Residential	58.3	75	No
R2	Church	65.6	75	No
R3	Residential	71.1	75	No

[1] Noise receiver locations are shown on Exhibit 8-A.
[2] Highest construction noise level calculations based on distance from the construction activity area by construction stage the nearest receiver locations as shown on Table 10-2.
[3] City of Garden Grove Municipal Code, Section 8.47.050 maximum noise levels for stationary noise sources.
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

10.5 CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Ground vibration levels associated with various types of construction equipment are summarized on Table 10-4. It should be noted that pile driving is not required for the Project. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential for building damage using the following vibration assessment methods defined by the FTA. To describe the vibration impacts the FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

Table 10-5 presents the expected Project related typical construction activity vibration levels at each of the receiver locations. At distances ranging from 29 to 142 feet from Project construction activity, the transient construction vibration velocity levels are estimated to range from 0.007 to 0.071 PPV in/sec, as shown on Table 10-5. Based on maximum acceptable continuous vibration threshold of 0.3 PPV (in/sec) for older residential structures, the typical Project construction vibration levels will satisfy the building damage thresholds at all the nearest receiver locations. Therefore, the vibration impacts due to the typical Project construction activities are considered *less than significant*.

TABLE 10-4: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

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

Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual

TABLE 10-5: CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver[1]	Distance to Const. Activity (Feet)[2]	Receiver PPV Levels (in/sec)[3]					Building Damage Threshold PPV (in/sec)[4]	Threshold Exceeded?[5]
		Small Bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer	Peak Vibration		
R1	29'	0.002	0.028	0.061	0.071	0.071	0.3	No
R2	142'	0.000	0.003	0.006	0.007	0.007	0.3	No
R3	34'	0.002	0.022	0.048	0.056	0.056	0.3	No

[1] Receiver locations are shown on Exhibit 8-A.
[2] Distance from the building construction activity to each of the nearest receiver locations.
[3] Based on the Vibration Source Levels of Construction Equipment included on Table 10-4.
[4] Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, Tables 19, p. 38.
[5] Does the peak vibration exceed the County of San Bernardino maximum acceptable vibration threshold?

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11 REFERENCES

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

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12 CERTIFICATIONS

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed West Grove Center Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 584-3148.

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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 GARDEN GROVE MUNICIPAL CODE

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Chapter 8.47 NOISE CONTROL

Note

* **Prior ordinance history**: Ord. Nos. 1949, 1950, and 2258.

8.47.020 Definitions

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

"Actual measured ambient noise level" shall mean that noise level existing in the general area of the noise problem, excluding the noise generated by the noise source being evaluated.

"Ambient base noise level" shall mean the maximum loudness level normally found to be acceptable for given land uses and that serves as the basis for determining loudness noise violations pursuant to the provisions of Section 8.48.040 of this chapter.

"Ambient noise level" shall mean the all-encompassing background noise associated with a given environment, being usually a composite of sounds from many sources near and far.

"Commercial use" shall mean any enterprise whose principal endeavor is the sale of goods and/or services.

"Decibel (dB)" shall mean a unit that denotes the ratio between two quantities that are proportional to power: the number of decibels corresponding to the ratio of two amounts of power is 10 times the logarithm to the base 10 of this ratio. The commonly used unit for measuring sound pressure levels.

"Emergency" means operations made necessary to restore property to a safe condition following a public calamity, or work required to protect persons or property from an imminent exposure to danger or work by private or public utilities when restoring utility service.

"Industrial use" means any facility or operations involved in the manufacturing, repairing, testing, processing, warehousing, wholesaling, researching, and treatment of products.

"Institutional use" means an establishment maintained and operated by a society, church, corporation, individual, foundation, or public agency for the purpose of providing religious, charitable, social, educational, fraternal, or similar services.

"Noise" means any sound that exceeds the appropriate actual or presumed ambient noise level, that annoys or tends to disturb humans, or that causes or tends to cause an adverse psychological or physiological effect on humans of normal sensitiveness.

"Office-professional use" means any enterprise engaged in providing business or professional services.

"Residential use" means any structure utilized principally for human habitation, excluding hotels, motels, and recreational vehicle parks.

"Sound amplifying equipment" means any device for the amplification of the human voice, music, or any other sound and does not include standard automobile radios when used and heard only by the occupants of the vehicle in which the automobile radio is installed or devices on authorized emergency vehicles or horns or other warning devices on any vehicle used only for traffic safety purposes.

"Sound level in decibels (dB)" means the sound measured utilizing the A-weighting scale and the slow needle response by a sound level meter.

"Sound level meter" means an instrument meeting American National Standard Institutes Standard S1.4-1971 for Type 1 or Type 2 sound level meters or an equivalent standard. (2802 § 1, 2011; 2660 § 2, 2005)

8.47.030 Noise Level Measurement

All noise level measurements made pursuant to the provisions of this chapter shall be performed using a sound level meter as defined in Section 8.47.020, using a fast needle response, utilizing the dB(A) scale. (2802 § 1, 2011; 2660 § 2, 2005)

8.47.040 Ambient Base Noise Levels

The ambient base noise levels contained in the following chart shall be utilized as the basis for determining noise levels in excess of those allowed by this chapter unless the actual measured ambient noise level occurring at the same time as the noise under review is being investigated exceeds the ambient base noise level contained in the chart. When the actual measured ambient noise level exceeds the ambient base noise level, the actual measured ambient noise level shall be utilized as the basis for determining whether or not the subject noise exceeds the level allowed by this section. In situations where two adjoining properties exist within two different use designations, the most restrictive ambient base noise level will apply. This section permits any noise level that does not exceed either the ambient base noise level or the actual measured ambient noise level by 5 dB(A), as measured at the property line of the noise generation property.

USE CATEGORIES	USE DESIGNATIONS	AMBIENT BASE NOISE LEVELS	TIME OF DAY
Sensitive	Residential Use	55 dB(A)	7:00 a.m.—10:00 p.m.
		50 dB(A)	10:00 p.m.—7:00 a.m.
Conditionally Sensitive	Institutional Use	65 dB(A)	Any Time
	Office-Professional Use	65 dB(A)	Any Time
	Hotels & Motels	65 dB(A)	Any Time
Non-Sensitive	Commercial Uses	70 dB(A)	Any Time
	Commercial/ Industrial Uses within 150 feet of Residential	65 dB(A)	7:00 a.m.—10:00 p.m.
		50 dB(A)	10:00 p.m.—7:00 a.m.
	Industrial Use	70 dB(A)	Any Time

(2802 § 1, 2011; 2660 § 2, 2005)

8.47.050 General Noise Regulation

A. NOISE DISTURBANCE CRITERIA. It shall be unlawful for any person to willfully make, continue, or cause to be made or continued, any loud, unnecessary, or unusual noise that disturbs the peace or quiet of any neighborhood, or that causes discomfort or annoyance to any person of normal sensitiveness.

B. The criteria that shall be utilized in determining whether a violation of the provisions of this section exists shall include, but not be limited to, the following:

1. The level of the noise.
2. The frequency of occurrence of the noise.
3. Whether the nature of the noise is usual or unusual.
4. The level and intensity of the background noise, if any.
5. The proximity of the noise to residential sleeping facilities.
6. The nature and zoning of the area within which the noise emanates.
7. The density of the inhabitation of the area within which the noise is received.
8. The time of day or night the noise occurs.
9. The duration of the noise.

C. DURATION OF NOISE. The following criteria shall be used whenever the noise level exceeds:

1. The noise standard for a cumulative period of more than 30 minutes in any hour;
2. The noise standard plus five dB(A) for a cumulative period of more than 15 minutes in any hour;
3. The noise standard plus 10 dB(A) for a cumulative period of more than five minutes in any hour;
4. The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour; or
5. The noise standard plus 20 dB(A) for any period of time.

D. In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level. (2802 § 1, 2011; 2660 § 2, 2005)

8.47.060 Special Noise Sources

A. RADIOS, TELEVISION SETS, AND SIMILAR DEVICES.

1. USE RESTRICTED. It shall be unlawful for any person within any residential area of the City to use or operate any radio receiving set, musical instrument, stereo equipment, television set, or other machine or device for the producing or reproducing of sound between the hours of 10:00 p.m. of one day and 7:00 a.m. of the following day in such a manner as to disturb the peace, quiet, and comfort of any person of normal sensitiveness residing in the area, as determined utilizing the criteria established in Section 8.47.050(A).

2. PRIMA FACIE VIOLATION. Any noise level exceeding the ambient base level at the property line of any property (or, if a condominium or apartment house, within any adjoining apartment) by more than five decibels shall be deemed to be prima facie evidence of a violation of the provisions of this section.

B. MUSICAL INSTRUMENTS—USE RESTRICTED. It shall be unlawful for any person to use any drum or other instrument or device of any kind for the purpose of attracting attention by the creation of noise within the City. This section shall not apply to any person who is a participant in a duly licensed parade or who has been otherwise duly authorized to engage in such conduct.

C. MACHINERY, EQUIPMENT, FANS, AND AIR CONDITIONING. It shall be unlawful for any person to operate any machinery, equipment, pump, fan, air conditioning apparatus, or similar mechanical device in any manner so as to create any noise that would cause the noise level at the property line of any property to exceed either the ambient base noise level or the actual measured ambient noise level by more than five decibels.

D. CONSTRUCTION OF BUILDINGS AND PROJECTS. It shall be unlawful for any person within a residential area, or within a radius of 500 feet therefrom, to operate equipment or perform any outside construction or repair work on buildings, structures, or projects, or to operate any pile driver, power shovel, pneumatic hammer, derrick, power hoist, or any other construction type device between the hours of 10:00 p.m. of one day and 7:00 a.m. of the next day in such a manner that a person of normal sensitiveness, as determined utilizing the criteria established in Section 8.47.050(B), is caused discomfort or annoyance unless such operations are of an emergency nature.

E. VEHICLE REPAIRS. It shall be unlawful for any person within any residential area of the City to repair, rebuild, or test any motor vehicle in such a manner that a person of normal sensitiveness residing in the area is caused discomfort or annoyance, as determined utilizing the criteria established in Section 8.47.050, unless such operations are of an emergency nature.

F. MOTOR DRIVEN VEHICLES. It shall be unlawful for any person to operate any motor driven vehicle within the City in such a manner that a person of normal sensitiveness residing in the area is caused discomfort or annoyance, as determined utilizing the criteria established in Section 8.47.050(B), unless such operations are of an emergency nature; provided, however, any such vehicle that is operated upon any public highway, street, or right-of-way shall be excluded from the provisions of this section.

G. AMPLIFIED SOUND.

1. PURPOSE. While recognizing the constitutional rights of freedom of speech and assembly, the City nevertheless feels obligated to reasonably regulate the use of sound amplifying equipment in order to protect the rights of the citizens of the City to privacy and freedom from excessively loud and unnecessary noise.

2. REGISTRATION. It shall be unlawful for any person, other than personnel of law enforcement or governmental agencies, to install, use, or operate within the City a loudspeaker or sound amplifying equipment mounted upon any vehicle for the purposes of warnings, giving instructions, directions, talks, addresses, lectures, or transmitting music to any persons or assemblages of persons without first filing a registration statement at least seven days prior to the date on which the sound amplifying equipment is intended to be used and obtaining approval from the Zoning Administrator.

3. APPROVAL. The Zoning Administrator shall return to the applicant an approved copy of the registration statement unless he or she finds that:

a. The conditions of the motor vehicle movement are such that use of the equipment would constitute a detriment to traffic safety; or

b. The conditions of pedestrian movement are such that use of the equipment would constitute a detriment to traffic safety.

4. DISAPPROVAL. In the event the registration statement is disapproved, the Zoning Administrator shall endorse upon the statement the reason for disapproval and return it to the applicant.

5. APPEALS. Any decision by the Zoning Administrator may be appealed to the City Council within seven days of action of the Zoning Administrator by filing a notice of appeal with the City Clerk.

H. WASTE HAULERS/COMMERCIAL SWEEPERS AND LEAF BLOWERS. It shall be unlawful for any person within any commercial, industrial, or office complex area of the City to operate any refuse compacting, processing or collection vehicle, parking lot sweeper or leaf blower within 150 feet of residential property between the hours of 10:00 p.m. of one day and 7:00 a.m. of the following day.

I. LOADING/UNLOADING. It shall be unlawful for any person in any commercial or industrial area of the City that abuts or is located adjacent to any residential property between the hours of 10:00 p.m. of one day and 7:00 a.m. of the following day to load or unload any vehicle, or operate any dollies, carts, forklifts, or other wheeled equipment that causes any noise that disturbs the peace or quiet of the residential neighborhood. (2802 § 1, 2011; 2660 § 2, 2005)

8.47.070 Exemptions

A. EMERGENCY ACTIVITIES. The provisions of this chapter shall not preclude the operation, maintenance, and repair of equipment, apparatus, or facilities of essential public services, including those of governmental agencies and public utilities providing those activities are of an emergency nature or are necessary to maintain the health, safety, and welfare of the citizenry.

B. COMMUNITY ACTIVITIES. Community events, as described in Section 8.08.060 of the Municipal Code, outdoor gatherings, school bands, dances, shows, and athletic events are hereby exempted from the provisions of this chapter provided such activities are conducted pursuant to a duly authorized license or permit.

C. STATE AND FEDERAL PREEMPTIONS. Motor vehicle and aircraft operations and any other activity whose regulation has been preempted by state or federal law is hereby exempted from the provisions of this chapter. (2802 § 1, 2011; 2660 § 2, 2005)

8.47.080 Abatement

The City Manager or his or her designee and his or her duly authorized representatives are hereby directed to enforce the provisions of this chapter by requiring that the alleged offender correct violations and achieve compliance with the provisions of this chapter within a reasonable period of time.

A. The City Manager or his or her designee shall have the power and duty to enforce the following noise control provisions of this Code: Section 8.47.050, Section 8.47.060(A)(2), (C), (H), and (I).

B. The Police Department shall have the power and duty to enforce the following noise control provisions of this Code: Section 8.47.060 (A)(1), (B), (E), (F), (G)(1) and (2).

C. The Building Official shall have the power and duty to enforce the following noise control provisions of this Code: Section 8.47.060(D). (2802 § 1, 2011; 2660 § 2, 2005)

APPENDIX 5.1:

STUDY AREA PHOTOS

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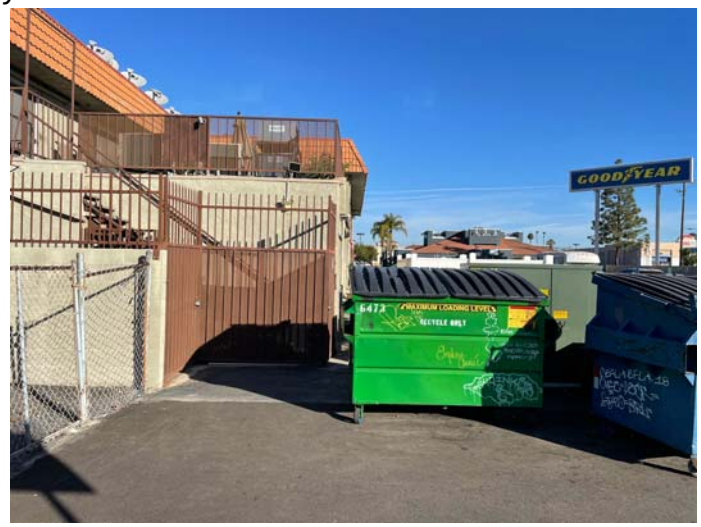
JN: 12717 Study Area Photos

L1_E
33, 47' 16.630000", 118, 1' 46.480000"



L1_N
33, 47' 16.630000", 118, 1' 46.480000"

L1_S
33, 47' 16.630000", 118, 1' 46.480000"

L1_W
33, 47' 16.630000", 118, 1' 46.810000"

L2_E
33, 47' 8.800000", 118, 1' 41.430000"

L2_N
33, 47' 8.800000", 118, 1' 41.430000"

JN: 12717 Study Area Photos

L2_S
33, 47' 8.800000", 118, 1' 41.430000"

L2_W
33, 47' 8.800000", 118, 1' 41.430000"

L3_E
33, 47' 8.730000", 118, 1' 46.180000"

L3_N
33, 47' 8.730000", 118, 1' 46.180000"

L3_S
33, 47' 8.720000", 118, 1' 46.180000"

L3_W
33, 47' 8.720000", 118, 1' 46.180000"

JN: 12717 Study Area Photos

L4_E
33, 47' 13.730000", 118, 1' 46.950000"

L4_N
33, 47' 13.680000", 118, 1' 46.980000"

L4_S
33, 47' 13.740000", 118, 1' 46.980000"

L4_W
33, 47' 13.740000", 118, 1' 47.010000"

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APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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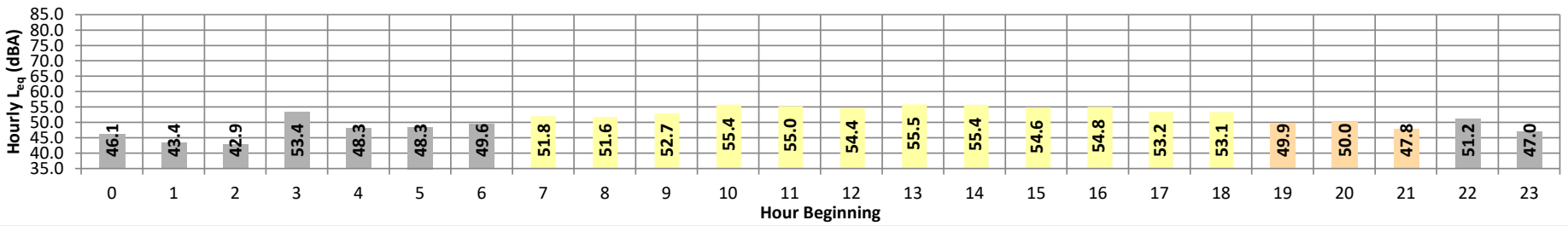
24-Hour Noise Level Measurement Summary

Date: Wednesday, November 18, 2020 *Location:* L1 - Located west of the Project site near existing multi-family residential homes at 12092 Stonegate Lane. *Meter:* Piccolo II *JN:* 12717

Project: West Grove Center Valley *Analyst:* P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	46.1	52.7	42.8	52.2	51.7	50.4	49.5	46.4	44.6	43.2	43.0	42.9	46.1	10.0	56.1
	1	43.4	49.6	41.3	49.2	48.6	47.0	45.9	43.5	42.4	41.6	41.5	41.3	43.4	10.0	53.4
	2	42.9	47.9	41.2	47.3	46.7	45.3	44.7	43.1	42.4	41.5	41.4	41.2	42.9	10.0	52.9
	3	53.4	59.8	51.3	58.9	58.3	56.1	55.4	53.5	52.5	51.7	51.5	51.3	53.4	10.0	63.4
	4	48.3	52.0	46.7	51.7	51.2	50.4	49.8	48.7	47.9	47.0	46.9	46.7	48.3	10.0	58.3
	5	48.3	57.1	43.4	56.4	55.5	53.3	51.8	48.4	46.5	44.2	43.9	43.6	48.3	10.0	58.3
	6	49.6	57.9	44.1	57.4	56.7	54.4	53.0	50.0	47.7	44.8	44.6	44.2	49.6	10.0	59.6
Day	7	51.8	57.2	47.6	56.9	56.5	55.4	54.8	52.6	50.7	48.5	48.0	47.7	51.8	0.0	51.8
	8	51.6	56.2	48.6	55.7	55.3	54.4	53.8	52.2	51.0	49.3	49.0	48.7	51.6	0.0	51.6
	9	52.7	57.9	50.0	57.5	56.9	55.5	54.7	53.2	52.2	50.6	50.3	50.1	52.7	0.0	52.7
	10	55.4	61.7	51.2	61.1	60.5	59.1	58.4	56.3	54.2	52.0	51.7	51.3	55.4	0.0	55.4
	11	55.0	60.2	52.3	59.7	59.2	57.8	57.1	55.4	54.4	52.9	52.7	52.4	55.0	0.0	55.0
	12	54.4	58.7	51.9	58.3	57.9	57.0	56.5	55.0	53.9	52.5	52.2	52.0	54.4	0.0	54.4
	13	55.5	60.7	52.5	60.1	59.6	58.7	58.1	56.1	54.7	53.2	52.9	52.6	55.5	0.0	55.5
	14	55.4	61.4	51.9	60.7	60.2	59.2	58.4	55.9	54.3	52.5	52.3	52.0	55.4	0.0	55.4
	15	54.6	60.2	51.4	59.8	59.4	58.1	57.2	55.1	53.7	52.1	51.8	51.5	54.6	0.0	54.6
	16	54.8	61.9	51.6	61.2	60.4	58.4	57.2	55.0	53.8	52.3	52.0	51.7	54.8	0.0	54.8
	17	53.2	58.7	50.0	58.2	57.7	56.4	55.7	53.7	52.5	50.7	50.4	50.1	53.2	0.0	53.2
	18	53.1	58.7	49.4	58.3	57.9	56.9	56.1	54.0	51.9	50.0	49.8	49.5	53.1	0.0	53.1
Evening	19	49.9	57.2	45.6	56.8	56.2	54.6	53.4	50.2	48.4	46.3	46.0	45.7	49.9	5.0	54.9
	20	50.0	58.4	45.3	57.8	57.1	55.2	53.7	50.1	47.8	46.0	45.8	45.4	50.0	5.0	55.0
	21	47.8	54.5	44.1	53.9	53.3	51.8	50.9	48.4	46.3	44.6	44.5	44.2	47.8	5.0	52.8
Night	22	51.2	62.0	49.7	61.2	60.0	58.2	56.8	52.5	51.3	50.1	50.0	49.8	51.2	10.0	61.2
	23	47.0	56.1	41.9	55.6	54.8	53.0	51.2	46.7	43.9	42.3	42.1	42.0	47.0	10.0	57.0

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	51.6	56.2	47.6	55.7	55.3	54.4	53.8	52.2	50.7	48.5	48.0	47.7
	Max	55.5	61.9	52.5	61.2	60.5	59.2	58.4	56.3	54.7	53.2	52.9	52.6
Energy Average		54.2	Average:		59.0	58.5	57.2	56.5	54.6	53.1	51.4	51.1	50.8
Evening	Min	47.8	54.5	44.1	53.9	53.3	51.8	50.9	48.4	46.3	44.6	44.5	44.2
	Max	50.0	58.4	45.6	57.8	57.1	55.2	53.7	50.2	48.4	46.3	46.0	45.7
Energy Average		49.3	Average:		56.2	55.5	53.9	52.7	49.5	47.5	45.7	45.4	45.1
Night	Min	42.9	47.9	41.2	47.3	46.7	45.3	44.7	43.1	42.4	41.5	41.4	41.2
	Max	53.4	62.0	51.3	61.2	60.0	58.2	56.8	53.5	52.5	51.7	51.5	51.3
Energy Average		49.0	Average:		54.4	53.7	52.0	50.9	48.1	46.6	45.2	45.0	44.8

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
52.3	53.5	49.0

24-Hour CNEL (dBA)
56.6

24-Hour Noise Level Measurement Summary

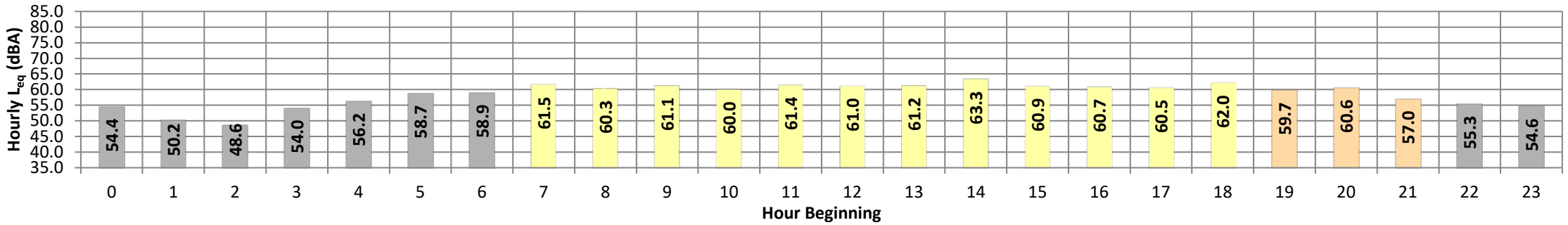
Date: Wednesday, November 18, 2020
Project: West Grove Center Valley

Location: L2 - Located east of the Project site by The Church of Jesus Christ of Latter-day Saints at 12160 Valley View Street.

Meter: Piccolo II

JN: 12717
Analyst: P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	54.4	66.5	42.7	65.9	65.0	62.1	59.6	51.5	46.8	43.6	43.2	42.8	54.4	10.0	64.4
	1	50.2	59.6	41.5	59.2	58.7	57.0	55.7	49.7	45.3	42.0	41.8	41.6	50.2	10.0	60.2
	2	48.6	57.8	40.8	57.5	56.9	55.4	54.1	48.2	43.8	41.2	41.0	40.9	48.6	10.0	58.6
	3	54.0	63.9	45.9	63.5	62.9	61.5	59.5	52.2	48.7	46.5	46.3	46.0	54.0	10.0	64.0
	4	56.2	63.8	51.9	63.4	62.8	61.2	60.2	56.5	54.0	52.2	52.1	52.0	56.2	10.0	66.2
	5	58.7	67.7	47.8	67.3	66.7	65.3	64.2	58.9	54.6	49.4	48.6	48.0	58.7	10.0	68.7
	6	58.9	67.2	46.5	66.8	66.2	64.6	63.7	59.8	56.3	48.8	47.4	46.7	58.9	10.0	68.9
Day	7	61.5	70.2	51.8	69.6	69.0	67.1	65.9	61.7	59.0	54.4	53.3	52.1	61.5	0.0	61.5
	8	60.3	67.4	52.3	66.9	66.4	65.0	64.0	61.3	58.9	54.3	53.3	52.5	60.3	0.0	60.3
	9	61.1	71.5	51.2	71.0	70.1	67.1	65.1	61.0	57.9	53.1	52.2	51.4	61.1	0.0	61.1
	10	60.0	67.1	51.9	66.7	66.1	64.7	63.8	61.1	58.2	53.6	52.8	52.1	60.0	0.0	60.0
	11	61.4	70.8	53.4	70.3	69.6	67.0	65.0	61.3	59.0	55.1	54.3	53.6	61.4	0.0	61.4
	12	61.0	70.8	53.0	70.1	69.0	66.2	64.7	61.1	58.6	54.6	53.9	53.2	61.0	0.0	61.0
	13	61.2	70.4	53.9	69.8	69.1	66.5	65.0	61.2	59.0	55.4	54.7	54.0	61.2	0.0	61.2
	14	63.3	72.6	55.1	72.1	71.2	68.6	66.8	63.3	61.1	57.1	56.2	55.3	63.3	0.0	63.3
	15	60.9	68.3	53.5	67.9	67.4	66.0	65.0	61.7	59.0	55.0	54.3	53.6	60.9	0.0	60.9
	16	60.7	68.4	53.4	68.0	67.5	66.1	64.6	61.2	58.8	55.0	54.2	53.6	60.7	0.0	60.7
	17	60.5	68.0	53.1	67.5	66.9	65.1	64.0	61.4	59.1	54.9	54.1	53.3	60.5	0.0	60.5
	18	62.0	70.9	52.7	70.4	69.8	68.2	66.9	62.0	59.0	54.5	53.5	52.9	62.0	0.0	62.0
Evening	19	59.7	68.6	49.7	68.1	67.4	65.4	64.1	60.3	56.9	51.7	50.6	49.8	59.7	5.0	64.7
	20	60.6	71.4	48.3	70.8	69.7	67.3	65.3	60.5	55.8	50.1	49.2	48.4	60.6	5.0	65.6
	21	57.0	65.3	46.0	64.9	64.3	62.8	61.5	57.8	54.2	48.2	47.0	46.2	57.0	5.0	62.0
Night	22	55.3	64.6	44.0	64.2	63.5	61.6	59.9	55.8	51.8	45.7	44.9	44.2	55.3	10.0	65.3
	23	54.6	64.8	41.6	64.4	63.6	61.6	59.7	54.1	49.7	43.1	42.3	41.8	54.6	10.0	64.6

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	60.0	67.1	51.2	66.7	66.1	64.7	63.8	61.0	57.9	53.1	52.2	51.4
	Max	63.3	72.6	55.1	72.1	71.2	68.6	66.9	63.3	61.1	57.1	56.2	55.3
Energy Average		61.2	Average:		69.2	68.5	66.5	65.1	61.5	59.0	54.7	53.9	53.1
Evening	Min	57.0	65.3	46.0	64.9	64.3	62.8	61.5	57.8	54.2	48.2	47.0	46.2
	Max	60.6	71.4	49.7	70.8	69.7	67.3	65.3	60.5	56.9	51.7	50.6	49.8
Energy Average		59.3	Average:		67.9	67.1	65.2	63.6	59.5	55.6	50.0	48.9	48.2
Night	Min	48.6	57.8	40.8	57.5	56.9	55.4	54.1	48.2	43.8	41.2	41.0	40.9
	Max	58.9	67.7	51.9	67.3	66.7	65.3	64.2	59.8	56.3	52.2	52.1	52.0
Energy Average		55.6	Average:		63.6	62.9	61.1	59.6	54.1	50.1	45.8	45.3	44.9

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
59.6	60.9	55.6

24-Hour CNEL (dBA)
63.7

24-Hour Noise Level Measurement Summary

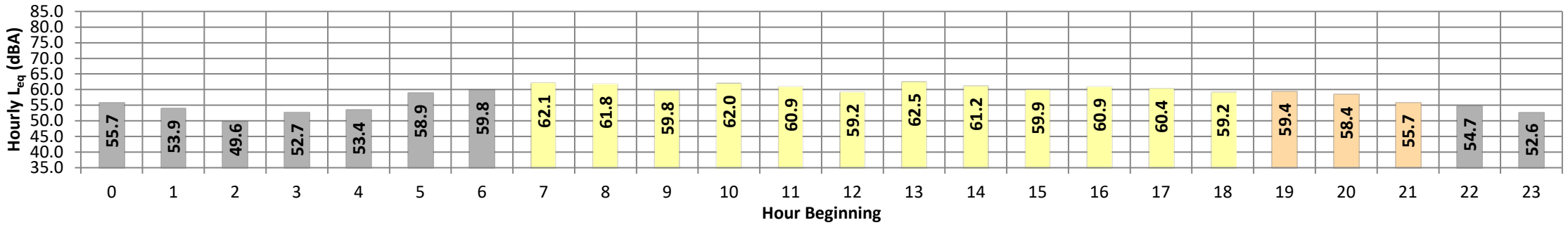
Date: Wednesday, November 18, 2020
Project: West Grove Center Valley

Location: L3 - Located south of the Project site near existing multi-family residential homes at 5921 Belgrave Avenue.

Meter: Piccolo II

JN: 12717
Analyst: P. Mara

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	55.7	67.7	43.0	67.2	66.5	63.8	61.3	52.2	47.1	43.7	43.4	43.1	55.7	10.0	65.7
	1	53.9	66.7	41.4	66.2	65.3	61.9	58.4	49.8	45.5	41.9	41.7	41.5	53.9	10.0	63.9
	2	49.6	61.0	40.0	60.7	59.9	57.2	55.0	46.8	42.9	40.6	40.4	40.2	49.6	10.0	59.6
	3	52.7	64.0	40.3	63.4	63.1	60.9	58.3	49.5	44.5	41.2	40.8	40.4	52.7	10.0	62.7
	4	53.4	63.7	41.6	63.0	62.2	59.6	58.3	53.4	49.2	43.0	42.2	41.7	53.4	10.0	63.4
	5	58.9	68.6	46.9	68.0	67.3	65.5	64.1	59.2	54.4	48.2	47.6	47.1	58.9	10.0	68.9
	6	59.8	69.5	47.8	69.0	68.3	66.1	64.6	60.0	56.3	49.7	48.7	48.0	59.8	10.0	69.8
Day	7	62.1	70.1	52.7	69.7	69.2	67.6	66.4	62.9	60.0	54.7	53.8	53.0	62.1	0.0	62.1
	8	61.8	71.5	52.7	70.8	69.9	67.1	65.1	62.1	59.6	54.8	53.8	52.9	61.8	0.0	61.8
	9	59.8	69.1	50.7	68.8	68.2	65.7	63.6	59.8	57.2	52.4	51.7	50.9	59.8	0.0	59.8
	10	62.0	71.4	53.0	70.8	69.8	67.5	65.8	62.5	59.5	54.7	53.8	53.2	62.0	0.0	62.0
	11	60.9	70.8	52.8	70.4	69.6	66.9	64.9	60.5	58.1	54.4	53.7	52.9	60.9	0.0	60.9
	12	59.2	68.3	52.5	67.9	67.2	64.9	62.9	59.0	56.8	53.7	53.2	52.7	59.2	0.0	59.2
	13	62.5	78.7	56.9	77.9	76.3	74.9	73.8	69.6	65.9	58.6	57.8	57.1	62.5	0.0	62.5
	14	61.2	71.0	54.7	70.4	69.6	67.3	65.6	60.6	58.0	55.5	55.1	54.8	61.2	0.0	61.2
	15	59.9	68.3	54.7	67.8	67.0	64.9	63.4	60.0	58.3	55.6	55.2	54.8	59.9	0.0	59.9
	16	60.9	71.7	54.5	71.1	70.0	66.7	64.3	60.2	58.1	55.4	55.0	54.7	60.9	0.0	60.9
	17	60.4	69.8	52.1	69.2	68.5	66.8	64.6	60.2	57.3	53.5	52.8	52.2	60.4	0.0	60.4
	18	59.2	67.3	51.2	66.8	66.3	64.9	63.8	59.7	56.4	52.8	52.0	51.4	59.2	0.0	59.2
Evening	19	59.4	69.0	49.6	68.6	68.0	65.9	64.1	59.1	55.9	51.2	50.4	49.8	59.4	5.0	64.4
	20	58.4	68.7	48.0	68.1	67.7	66.1	63.2	57.0	53.7	49.6	48.9	48.3	58.4	5.0	63.4
	21	55.7	66.2	46.0	65.7	64.9	62.1	60.0	55.0	52.1	47.4	46.7	46.1	55.7	5.0	60.7
Night	22	54.7	65.3	43.0	64.9	64.5	62.2	59.8	53.5	49.6	44.5	43.7	43.2	54.7	10.0	64.7
	23	52.6	62.4	41.1	61.9	61.4	60.2	58.2	51.9	48.1	42.4	41.7	41.2	52.6	10.0	62.6

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	59.2	67.3	50.7	66.8	66.3	64.9	62.9	59.0	56.4	52.4	51.7	50.9
	Max	62.5	78.7	56.9	77.9	76.3	74.9	73.8	69.6	65.9	58.6	57.8	57.1
Energy Average		61.0	Average:		70.1	69.3	67.1	65.4	61.4	58.8	54.7	54.0	53.4
Evening	Min	55.7	66.2	46.0	65.7	64.9	62.1	60.0	55.0	52.1	47.4	46.7	46.1
	Max	59.4	69.0	49.6	68.6	68.0	66.1	64.1	59.1	55.9	51.2	50.4	49.8
Energy Average		58.1	Average:		67.5	66.9	64.7	62.4	57.1	53.9	49.4	48.7	48.1
Night	Min	49.6	61.0	40.0	60.7	59.9	57.2	55.0	46.8	42.9	40.6	40.4	40.2
	Max	59.8	69.5	47.8	69.0	68.3	66.1	64.6	60.0	56.3	49.7	48.7	48.0
Energy Average		55.7	Average:		64.9	64.3	62.0	59.8	52.9	48.6	43.9	43.3	42.9

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
59.3	60.5	55.7

24-Hour CNEL (dBA)
63.5

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APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE LEVEL CALCULATIONS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Valley View St.
Road Segment: n/o Chapman Av.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	48,468	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	4,847	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	78	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	4.90	0.46	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-12.33	0.49	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-16.29	0.48	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.6	70.7	69.0	62.9	71.5	72.1
Medium Trucks:	66.4	64.9	58.5	57.0	65.4	65.7
Heavy Trucks:	67.2	65.8	56.8	58.0	66.4	66.5
Vehicle Noise:	74.5	72.7	69.6	64.9	73.4	73.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	102	219	472	1,017
CNEL:	109	235	506	1,091

Sunday, January 17, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Valley View St.
Road Segment: n/o Lampson Av.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,920	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	4,992	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	78	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	5.03	0.46	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-12.21	0.49	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-16.16	0.48	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.8	70.9	69.1	63.0	71.7	72.3
Medium Trucks:	66.5	65.0	58.7	57.1	65.6	65.8
Heavy Trucks:	67.4	66.0	56.9	58.2	66.5	66.6
Vehicle Noise:	74.6	72.9	69.7	65.0	73.6	74.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	104	223	481	1,037
CNEL:	111	240	516	1,113

Sunday, January 17, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Valley View St.
Road Segment: n/o Belgrave Av.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,620	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	4,962	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	78	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	5.01	0.46	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-12.23	0.49	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-16.19	0.48	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.7	70.8	69.1	63.0	71.6	72.2
Medium Trucks:	66.5	65.0	58.6	57.1	65.5	65.8
Heavy Trucks:	67.3	65.9	56.9	58.1	66.5	66.6
Vehicle Noise:	74.6	72.8	69.7	65.0	73.5	74.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	103	223	480	1,033
CNEL:	111	239	514	1,108

Sunday, January 17, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Valley View St.
Road Segment: n/o Cerulean Av.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,824	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	4,982	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	78	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	5.02	0.46	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-12.21	0.49	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-16.17	0.48	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.7	70.8	69.1	63.0	71.6	72.3
Medium Trucks:	66.5	65.0	58.7	57.1	65.6	65.8
Heavy Trucks:	67.4	65.9	56.9	58.2	66.5	66.6
Vehicle Noise:	74.6	72.8	69.7	65.0	73.6	74.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	104	223	481	1,036
CNEL:	111	239	516	1,111

Sunday, January 17, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Valley View St.
Road Segment: s/o Cerulean Av.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	52,152 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	5,215 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	5.22	0.46	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-12.02	0.49	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-15.97	0.48	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.9	71.0	69.3	63.2	71.8	72.4
Medium Trucks:	66.7	65.2	58.8	57.3	65.8	66.0
Heavy Trucks:	67.6	66.1	57.1	58.4	66.7	66.8
Vehicle Noise:	74.8	73.0	69.9	65.2	73.8	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	107	230	496	1,068
CNEL:	115	247	532	1,146

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Chapman Av.
Road Segment: e/o Valley View St.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,076 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,408 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.47	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-17.70	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-21.66	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.5	65.6	63.8	57.8	66.4	67.0
Medium Trucks:	61.3	59.8	53.4	51.9	60.3	60.6
Heavy Trucks:	62.1	60.7	51.7	52.9	61.3	61.4
Vehicle Noise:	69.3	67.6	64.4	59.8	68.3	68.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	39	83	179	386
CNEL:	41	89	192	414

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Chapman Av.
Road Segment: w/o Valley View St.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,476 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,048 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.75	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-18.99	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-22.94	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.2	64.3	62.6	56.5	65.1	65.7
Medium Trucks:	60.0	58.5	52.1	50.6	59.0	59.3
Heavy Trucks:	60.8	59.4	50.4	51.6	60.0	60.1
Vehicle Noise:	68.1	66.3	63.2	58.5	67.0	67.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	32	68	147	317
CNEL:	34	73	158	340

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Belgrave Av.
Road Segment: w/o Valley View St.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,644 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	164 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:	37.0 feet
Centerline Dist. to Observer:	37.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.851
Medium Trucks:	36.610
Heavy Trucks:	36.634

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-7.24	1.88	-1.20	*-4.56*	0.000	0.000
Medium Trucks:	70.80	-24.48	1.93	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	77.97	-28.43	1.92	-1.20	*-5.61*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	52.2	50.3	48.5	42.5	51.1	51.7
Medium Trucks:	47.0	45.5	39.2	37.6	46.1	46.3
Heavy Trucks:	50.3	48.8	39.8	41.1	49.4	49.5
Vehicle Noise:	55.1	53.4	49.5	45.6	54.1	54.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	3	7	15	32
CNEL:	3	7	16	34

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Belgrave Av.
Road Segment: e/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	264 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	26 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:	37.0 feet
Centerline Dist. to Observer:	37.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.851
Medium Trucks:	36.610
Heavy Trucks:	36.634

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-15.18	1.88	-1.20	*-4.56*	0.000	0.000
Medium Trucks:	70.80	-32.42	1.93	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	77.97	-36.38	1.92	-1.20	*-5.61*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	44.2	42.3	40.6	34.5	43.1	43.7
Medium Trucks:	39.1	37.6	31.2	29.7	38.1	38.4
Heavy Trucks:	42.3	40.9	31.9	33.1	41.5	41.6
Vehicle Noise:	47.1	45.5	41.5	37.6	46.1	46.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	1	2	4	10
CNEL:	1	2	5	10

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Lampson Av.
Road Segment: e/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,240 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,224 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.069
Medium Trucks:	35.823
Heavy Trucks:	35.847

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-0.56	2.02	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-17.80	2.07	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-21.76	2.06	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.8	64.9	63.1	57.1	65.7	66.3
Medium Trucks:	60.8	59.3	52.9	51.4	59.8	60.1
Heavy Trucks:	62.1	60.7	51.6	52.9	61.2	61.4
Vehicle Noise:	68.8	67.1	63.8	59.2	67.8	68.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	28	61	132	284
CNEL:	30	66	141	304

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Lampson Av.
Road Segment: w/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,916 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,492 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.069
Medium Trucks:	35.823
Heavy Trucks:	35.847

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	0.30	2.02	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-16.94	2.07	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-20.90	2.06	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.6	65.7	64.0	57.9	66.5	67.1
Medium Trucks:	61.6	60.1	53.8	52.2	60.7	60.9
Heavy Trucks:	63.0	61.5	52.5	53.8	62.1	62.2
Vehicle Noise:	69.7	67.9	64.6	60.1	68.6	69.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	32	70	151	324
CNEL:	35	75	161	347

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Cerulean Av.
Road Segment: w/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,824 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	482 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:	37.0 feet
Centerline Dist. to Observer:	37.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.851
Medium Trucks:	36.610
Heavy Trucks:	36.634

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-2.56	1.88	-1.20	*-4.56*	0.000	0.000
Medium Trucks:	70.80	-19.80	1.93	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	77.97	-23.76	1.92	-1.20	*-5.61*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	56.9	55.0	53.2	47.1	55.8	56.4
Medium Trucks:	51.7	50.2	43.9	42.3	50.8	51.0
Heavy Trucks:	54.9	53.5	44.5	45.7	54.1	54.2
Vehicle Noise:	59.8	58.1	54.2	50.3	58.8	59.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	7	14	31	66
CNEL:	7	15	32	70

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing
Road Name: Cerulean Av.
Road Segment: e/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,124 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	512 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:	37.0 feet
Centerline Dist. to Observer:	37.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.851
Medium Trucks:	36.610
Heavy Trucks:	36.634

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	58.73	-2.30	1.88	-1.20	-4.56	0.000	0.000
Medium Trucks:	70.80	-19.54	1.93	-1.20	-4.87	0.000	0.000
Heavy Trucks:	77.97	-23.50	1.92	-1.20	-5.61	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.1	55.2	53.5	47.4	56.0	56.6
Medium Trucks:	52.0	50.5	44.1	42.6	51.0	51.3
Heavy Trucks:	55.2	53.8	44.7	46.0	54.3	54.5
Vehicle Noise:	60.0	58.3	54.4	50.5	59.0	59.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	7	15	32	69
CNEL:	7	16	34	73

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + P
Road Name: Valley View St.
Road Segment: n/o Belgrave Av.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	52,448 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	5,245 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	5.25	0.46	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-11.99	0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.95	0.48	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.0	71.1	69.3	63.2	71.9	72.5
Medium Trucks:	66.7	65.2	58.9	57.3	65.8	66.0
Heavy Trucks:	67.6	66.2	57.1	58.4	66.7	66.9
Vehicle Noise:	74.8	73.1	69.9	65.2	73.8	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	107	231	498	1,072
CNEL:	115	248	534	1,150

Sunday, January 17, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + P
Road Name: Valley View St.
Road Segment: n/o Chapman Av.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,598 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	4,960 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	5.00	0.46	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-12.23	0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-16.19	0.48	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.7	70.8	69.1	63.0	71.6	72.2
Medium Trucks:	66.5	65.0	58.6	57.1	65.5	65.8
Heavy Trucks:	67.3	65.9	56.9	58.1	66.5	66.6
Vehicle Noise:	74.6	72.8	69.7	65.0	73.5	74.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	103	223	479	1,033
CNEL:	111	239	514	1,108

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + P
Road Name: Valley View St.
Road Segment: n/o Lampson Av.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	51,898 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	5,190 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	5.20	0.46	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-12.04	0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.99	0.48	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.9	71.0	69.3	63.2	71.8	72.4
Medium Trucks:	66.7	65.2	58.8	57.3	65.7	66.0
Heavy Trucks:	67.5	66.1	57.1	58.3	66.7	66.8
Vehicle Noise:	74.8	73.0	69.9	65.2	73.7	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	106	229	494	1,064
CNEL:	114	246	530	1,142

Sunday, January 17, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + P
Road Name: Valley View St.
Road Segment: n/o Cerulean Av.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	50,672 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	5,067 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	5.10	0.46	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-12.14	0.49	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-16.10	0.48	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.8	70.9	69.2	63.1	71.7	72.3
Medium Trucks:	66.6	65.1	58.7	57.2	65.6	65.9
Heavy Trucks:	67.4	66.0	57.0	58.2	66.6	66.7
Vehicle Noise:	74.7	72.9	69.8	65.1	73.6	74.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	105	226	486	1,048
CNEL:	112	242	522	1,124

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + P
Road Name: Chapman Av.
Road Segment: w/o Valley View St.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,324 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,132 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.41	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-18.65	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-22.61	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.6	64.7	62.9	56.8	65.5	66.1
Medium Trucks:	60.3	58.8	52.5	50.9	59.4	59.6
Heavy Trucks:	61.2	59.8	50.7	52.0	60.3	60.5
Vehicle Noise:	68.4	66.7	63.5	58.8	67.4	67.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	33	72	155	334
CNEL:	36	77	166	358

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + P
Road Name: Valley View St.
Road Segment: s/o Cerulean Av.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	52,434 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	5,243 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	5.25	0.46	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-11.99	0.49	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-15.95	0.48	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	73.0	71.1	69.3	63.2	71.9	72.5
Medium Trucks:	66.7	65.2	58.9	57.3	65.8	66.0
Heavy Trucks:	67.6	66.2	57.1	58.4	66.7	66.9
Vehicle Noise:	74.8	73.1	69.9	65.2	73.8	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	107	231	497	1,072
CNEL:	115	248	534	1,150

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + P
Road Name: Chapman Av.
Road Segment: e/o Valley View St.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,924 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,492 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.21	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-17.45	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-21.41	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.8	65.9	64.1	58.0	66.7	67.3
Medium Trucks:	61.5	60.0	53.7	52.1	60.6	60.8
Heavy Trucks:	62.4	61.0	51.9	53.2	61.5	61.7
Vehicle Noise:	69.6	67.9	64.7	60.0	68.6	69.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	40	87	186	402
CNEL:	43	93	200	431

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + P
Road Name: Belgrave Av.
Road Segment: w/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,210 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	221 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:	37.0 feet
Centerline Dist. to Observer:	37.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.851
Medium Trucks:	36.610
Heavy Trucks:	36.634

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	58.73	-5.95	1.88	-1.20	-4.56	0.000	0.000
Medium Trucks:	70.80	-23.19	1.93	-1.20	-4.87	0.000	0.000
Heavy Trucks:	77.97	-27.15	1.92	-1.20	-5.61	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	53.5	51.6	49.8	43.7	52.4	53.0
Medium Trucks:	48.3	46.8	40.5	38.9	47.4	47.6
Heavy Trucks:	51.5	50.1	41.1	42.3	50.7	50.8
Vehicle Noise:	56.4	54.7	50.8	46.9	55.4	55.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	4	8	18	39
CNEL:	4	9	19	42

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + P
Road Name: Lampson Av.
Road Segment: w/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,482 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,548 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.069
Medium Trucks:	35.823
Heavy Trucks:	35.847

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	0.46	2.02	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-16.78	2.07	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-20.74	2.06	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.8	65.9	64.1	58.1	66.7	67.3
Medium Trucks:	61.8	60.3	53.9	52.4	60.9	61.1
Heavy Trucks:	63.1	61.7	52.7	53.9	62.3	62.4
Vehicle Noise:	69.8	68.1	64.8	60.3	68.8	69.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	33	72	154	332
CNEL:	36	77	165	356

Sunday, January 17, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + P
Road Name: Belgrave Av.
Road Segment: e/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	546 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	55 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:	37.0 feet
Centerline Dist. to Observer:	37.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.851
Medium Trucks:	36.610
Heavy Trucks:	36.634

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	58.73	-12.03	1.88	-1.20	-4.56	0.000	0.000
Medium Trucks:	70.80	-29.26	1.93	-1.20	-4.87	0.000	0.000
Heavy Trucks:	77.97	-33.22	1.92	-1.20	-5.61	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	47.4	45.5	43.7	37.7	46.3	46.9
Medium Trucks:	42.3	40.8	34.4	32.8	41.3	41.5
Heavy Trucks:	45.5	44.1	35.0	36.3	44.6	44.7
Vehicle Noise:	50.3	48.6	44.7	40.8	49.3	49.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	2	3	7	15
CNEL:	2	4	8	16

Sunday, January 17, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + P
Road Name: Lampson Av.
Road Segment: e/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,806 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,281 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.069
Medium Trucks:	35.823
Heavy Trucks:	35.847

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-0.37	2.02	-1.20	-4.59	0.000	0.000
Medium Trucks:	77.72	-17.60	2.07	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-21.56	2.06	-1.20	-5.56	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.0	65.1	63.3	57.3	65.9	66.5
Medium Trucks:	61.0	59.5	53.1	51.6	60.0	60.3
Heavy Trucks:	62.3	60.9	51.8	53.1	61.4	61.6
Vehicle Noise:	69.0	67.3	64.0	59.4	68.0	68.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	29	63	136	293
CNEL:	31	68	146	314

Sunday, January 17, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + P
Road Name: Cerulean Av.
Road Segment: w/o Valley View St.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,106 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	511 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:	37.0 feet
Centerline Dist. to Observer:	37.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.851
Medium Trucks:	36.610
Heavy Trucks:	36.634

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-2.32	1.88	-1.20	*-4.56*	0.000	0.000
Medium Trucks:	70.80	-19.56	1.93	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	77.97	-23.51	1.92	-1.20	*-5.61*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	57.1	55.2	53.4	47.4	56.0	56.6
Medium Trucks:	52.0	50.5	44.1	42.6	51.0	51.2
Heavy Trucks:	55.2	53.8	44.7	46.0	54.3	54.5
Vehicle Noise:	60.0	58.3	54.4	50.5	59.0	59.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	7	15	32	68
CNEL:	7	16	34	73

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY
Road Name: Valley View St.
Road Segment: n/o Chapman Av.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	50,513 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	5,051 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	5.08	0.46	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-12.16	0.49	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-16.11	0.48	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.8	70.9	69.1	63.1	71.7	72.3
Medium Trucks:	66.6	65.1	58.7	57.2	65.6	65.9
Heavy Trucks:	67.4	66.0	57.0	58.2	66.6	66.7
Vehicle Noise:	74.6	72.9	69.7	65.1	73.6	74.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	105	225	485	1,045
CNEL:	112	242	520	1,121

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + P
Road Name: Cerulean Av.
Road Segment: e/o Valley View St.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,406 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	541 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:	37.0 feet
Centerline Dist. to Observer:	37.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.851
Medium Trucks:	36.610
Heavy Trucks:	36.634

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-2.07	1.88	-1.20	*-4.56*	0.000	0.000
Medium Trucks:	70.80	-19.31	1.93	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	77.97	-23.26	1.92	-1.20	*-5.61*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	57.3	55.5	53.7	47.6	56.3	56.9
Medium Trucks:	52.2	50.7	44.3	42.8	51.3	51.5
Heavy Trucks:	55.4	54.0	45.0	46.2	54.6	54.7
Vehicle Noise:	60.2	58.6	54.7	50.8	59.3	59.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	7	15	33	71
CNEL:	8	16	35	75

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY
Road Name: Valley View St.
Road Segment: n/o Belgrave Av.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	51,711 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	5,171 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	5.18	0.46	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-12.05	0.49	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-16.01	0.48	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.9	71.0	69.2	63.2	71.8	72.4
Medium Trucks:	66.7	65.2	58.8	57.3	65.7	66.0
Heavy Trucks:	67.5	66.1	57.1	58.3	66.7	66.8
Vehicle Noise:	74.7	73.0	69.9	65.2	73.7	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	106	229	493	1,062
CNEL:	114	245	529	1,139

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY
Road Name: Valley View St.
Road Segment: n/o Lampson Av.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	52,023	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	5,202	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	78	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	5.21	0.46	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-12.03	0.49	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-15.98	0.48	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.9	71.0	69.3	63.2	71.8	72.4
Medium Trucks:	66.7	65.2	58.8	57.3	65.8	66.0
Heavy Trucks:	67.6	66.1	57.1	58.3	66.7	66.8
Vehicle Noise:	74.8	73.0	69.9	65.2	73.7	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	107	230	495	1,066
CNEL:	114	246	531	1,144

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY
Road Name: Valley View St.
Road Segment: s/o Cerulean Av.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	54,324	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	5,432	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	78	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	5.40	0.46	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-11.84	0.49	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-15.80	0.48	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	73.1	71.2	69.5	63.4	72.0	72.6
Medium Trucks:	66.9	65.4	59.0	57.5	65.9	66.2
Heavy Trucks:	67.7	66.3	57.3	58.5	66.9	67.0
Vehicle Noise:	75.0	73.2	70.1	65.4	73.9	74.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	110	236	509	1,097
CNEL:	118	254	546	1,177

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY
Road Name: Valley View St.
Road Segment: n/o Cerulean Av.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	51,903	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	5,190	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	78	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	5.20	0.46	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-12.04	0.49	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-15.99	0.48	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.9	71.0	69.3	63.2	71.8	72.4
Medium Trucks:	66.7	65.2	58.8	57.3	65.7	66.0
Heavy Trucks:	67.5	66.1	57.1	58.3	66.7	66.8
Vehicle Noise:	74.8	73.0	69.9	65.2	73.7	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	106	229	494	1,065
CNEL:	114	246	530	1,142

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY
Road Name: Chapman Av.
Road Segment: w/o Valley View St.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,527	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	1,153	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.33	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-18.57	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-22.53	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.6	64.7	63.0	56.9	65.5	66.1
Medium Trucks:	60.4	58.9	52.5	51.0	59.5	59.7
Heavy Trucks:	61.3	59.8	50.8	52.1	60.4	60.5
Vehicle Noise:	68.5	66.7	63.6	58.9	67.5	67.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	34	73	157	338
CNEL:	36	78	168	363

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY
Road Name: Chapman Av.
Road Segment: e/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,271 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,527 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.11	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-17.35	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-21.31	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.9	66.0	64.2	58.1	66.8	67.4
Medium Trucks:	61.6	60.1	53.8	52.2	60.7	60.9
Heavy Trucks:	62.5	61.1	52.0	53.3	61.6	61.8
Vehicle Noise:	69.7	68.0	64.8	60.1	68.7	69.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	41	88	189	408
CNEL:	44	94	203	437

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY
Road Name: Belgrave Av.
Road Segment: e/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	275 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	27 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:	37.0 feet
Centerline Dist. to Observer:	37.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.851
Medium Trucks:	36.610
Heavy Trucks:	36.634

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-15.01	1.88	-1.20	*-4.56*	0.000	0.000
Medium Trucks:	70.80	-32.25	1.93	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	77.97	-36.21	1.92	-1.20	*-5.61*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	44.4	42.5	40.7	34.7	43.3	43.9
Medium Trucks:	39.3	37.8	31.4	29.9	38.3	38.6
Heavy Trucks:	42.5	41.1	32.0	33.3	41.6	41.8
Vehicle Noise:	47.3	45.6	41.7	37.8	46.3	46.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	1	2	5	10
CNEL:	1	2	5	10

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY
Road Name: Belgrave Av.
Road Segment: w/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1,710 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	171 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:	37.0 feet
Centerline Dist. to Observer:	37.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.851
Medium Trucks:	36.610
Heavy Trucks:	36.634

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-7.07	1.88	-1.20	*-4.56*	0.000	0.000
Medium Trucks:	70.80	-24.31	1.93	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	77.97	-28.26	1.92	-1.20	*-5.61*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	52.4	50.5	48.7	42.6	51.3	51.9
Medium Trucks:	47.2	45.7	39.3	37.8	46.3	46.5
Heavy Trucks:	50.4	49.0	40.0	41.2	49.6	49.7
Vehicle Noise:	55.2	53.6	49.7	45.8	54.3	54.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	3	7	15	33
CNEL:	4	8	16	35

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY
Road Name: Lampson Av.
Road Segment: w/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,125 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,612 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.069
Medium Trucks:	35.823
Heavy Trucks:	35.847

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	0.64	2.02	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-16.60	2.07	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-20.56	2.06	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.0	66.1	64.3	58.3	66.9	67.5
Medium Trucks:	62.0	60.5	54.1	52.6	61.0	61.3
Heavy Trucks:	63.3	61.9	52.8	54.1	62.4	62.6
Vehicle Noise:	70.0	68.3	65.0	60.4	69.0	69.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	34	74	159	342
CNEL:	37	79	170	366

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY
Road Name: Lampson Av.
Road Segment: e/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,342 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	1,334 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.069
Medium Trucks:	35.823
Heavy Trucks:	35.847

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-0.19	2.02	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-17.43	2.07	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-21.38	2.06	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.1	65.2	63.5	57.4	66.1	66.7
Medium Trucks:	61.2	59.7	53.3	51.7	60.2	60.4
Heavy Trucks:	62.5	61.1	52.0	53.3	61.6	61.8
Vehicle Noise:	69.2	67.4	64.2	59.6	68.1	68.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	30	65	140	301
CNEL:	32	69	150	322

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY
Road Name: Cerulean Av.
Road Segment: e/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,329 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	533 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:	37.0 feet
Centerline Dist. to Observer:	37.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.851
Medium Trucks:	36.610
Heavy Trucks:	36.634

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-2.13	1.88	-1.20	*-4.56*	0.000	0.000
Medium Trucks:	70.80	-19.37	1.93	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	77.97	-23.33	1.92	-1.20	*-5.61*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	57.3	55.4	53.6	47.6	56.2	56.8
Medium Trucks:	52.2	50.6	44.3	42.7	51.2	51.4
Heavy Trucks:	55.4	53.9	44.9	46.2	54.5	54.6
Vehicle Noise:	60.2	58.5	54.6	50.7	59.2	59.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	7	15	33	70
CNEL:	7	16	35	75

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY
Road Name: Cerulean Av.
Road Segment: w/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,017 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	502 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:	37.0 feet
Centerline Dist. to Observer:	37.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.851
Medium Trucks:	36.610
Heavy Trucks:	36.634

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-2.39	1.88	-1.20	*-4.56*	0.000	0.000
Medium Trucks:	70.80	-19.63	1.93	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	77.97	-23.59	1.92	-1.20	*-5.61*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	57.0	55.1	53.4	47.3	55.9	56.5
Medium Trucks:	51.9	50.4	44.0	42.5	50.9	51.2
Heavy Trucks:	55.1	53.7	44.7	45.9	54.3	54.4
Vehicle Noise:	59.9	58.3	54.3	50.4	58.9	59.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	7	15	31	68
CNEL:	7	15	33	72

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY + P
Road Name: Valley View St.
Road Segment: n/o Chapman Av.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	51,643 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	5,164 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	5.18	0.46	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-12.06	0.49	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-16.02	0.48	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.9	71.0	69.2	63.2	71.8	72.4
Medium Trucks:	66.7	65.2	58.8	57.3	65.7	66.0
Heavy Trucks:	67.5	66.1	57.1	58.3	66.7	66.8
Vehicle Noise:	74.7	73.0	69.8	65.2	73.7	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	106	229	492	1,061
CNEL:	114	245	528	1,138

Sunday, January 17, 2021

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY + P
Road Name: Valley View St.
Road Segment: n/o Belgrave Av.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	54,539 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	5,454 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	5.42	0.46	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-11.82	0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.78	0.48	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.1	71.2	69.5	63.4	72.0	72.6
Medium Trucks:	66.9	65.4	59.0	57.5	66.0	66.2
Heavy Trucks:	67.8	66.3	57.3	58.5	66.9	67.0
Vehicle Noise:	75.0	73.2	70.1	65.4	74.0	74.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	110	237	511	1,100
CNEL:	118	254	548	1,180

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY + P
Road Name: Valley View St.
Road Segment: n/o Cerulean Av.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	52,751 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	5,275 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	5.27	0.46	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-11.97	0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.92	0.48	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.0	71.1	69.3	63.3	71.9	72.5
Medium Trucks:	66.8	65.3	58.9	57.4	65.8	66.0
Heavy Trucks:	67.6	66.2	57.2	58.4	66.8	66.9
Vehicle Noise:	74.8	73.1	69.9	65.3	73.8	74.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	108	232	499	1,076
CNEL:	115	249	536	1,154

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY + P
Road Name: Valley View St.
Road Segment: n/o Lampson Av.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	54,001 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	5,400 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	5.37	0.46	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-11.87	0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.82	0.48	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.1	71.2	69.4	63.4	72.0	72.6
Medium Trucks:	66.9	65.4	59.0	57.5	65.9	66.1
Heavy Trucks:	67.7	66.3	57.3	58.5	66.9	67.0
Vehicle Noise:	74.9	73.2	70.0	65.4	73.9	74.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	109	235	507	1,093
CNEL:	117	253	544	1,172

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY + P
Road Name: Valley View St.
Road Segment: s/o Cerulean Av.

Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	54,606 vehicles
Peak Hour Percentage:	10.00%
Peak Hour Volume:	5,461 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	5.42	0.46	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-11.82	0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.77	0.48	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.1	71.2	69.5	63.4	72.0	72.6
Medium Trucks:	66.9	65.4	59.0	57.5	66.0	66.2
Heavy Trucks:	67.8	66.3	57.3	58.6	66.9	67.0
Vehicle Noise:	75.0	73.2	70.1	65.4	74.0	74.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	110	237	511	1,101
CNEL:	118	254	548	1,181

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY + P
Road Name: Chapman Av.
Road Segment: w/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,375	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	1,238	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.03	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-18.26	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-22.22	0.73	-1.20	*-5.43*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.9	65.0	63.3	57.2	65.8	66.5
Medium Trucks:	60.7	59.2	52.9	51.3	59.8	60.0
Heavy Trucks:	61.6	60.1	51.1	52.4	60.7	60.8
Vehicle Noise:	68.8	67.0	63.9	59.2	67.8	68.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	35	76	165	354
CNEL:	38	82	176	380

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY + P
Road Name: Belgrave Av.
Road Segment: w/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,276	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	228	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:	37.0 feet
Centerline Dist. to Observer:	37.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.851
Medium Trucks:	36.610
Heavy Trucks:	36.634

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-5.83	1.88	-1.20	*-4.56*	0.000	0.000
Medium Trucks:	70.80	-23.07	1.93	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	77.97	-27.02	1.92	-1.20	*-5.61*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	53.6	51.7	49.9	43.9	52.5	53.1
Medium Trucks:	48.5	46.9	40.6	39.0	47.5	47.7
Heavy Trucks:	51.7	50.3	41.2	42.5	50.8	50.9
Vehicle Noise:	56.5	54.8	50.9	47.0	55.5	55.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	4	9	19	40
CNEL:	4	9	20	42

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY + P
Road Name: Chapman Av.
Road Segment: e/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,119	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	1,612	vehicles
Vehicle Speed:	45	mph
Near/Far Lane Distance:	48	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.12	0.71	-1.20	*-4.65*	0.000	0.000
Medium Trucks:	79.45	-17.12	0.74	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-21.07	0.73	-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:	68.1	66.2	64.4	58.4	67.0	67.6
Medium Trucks:	61.9	60.4	54.0	52.5	60.9	61.1
Heavy Trucks:	62.7	61.3	52.3	53.5	61.9	62.0
Vehicle Noise:	69.9	68.2	65.0	60.4	68.9	69.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	42	91	196	423
CNEL:	45	98	210	453

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY + P
Road Name: Belgrave Av.
Road Segment: e/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	557	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	56	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:	37.0 feet
Centerline Dist. to Observer:	37.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.851
Medium Trucks:	36.610
Heavy Trucks:	36.634

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-11.94	1.88	-1.20	*-4.56*	0.000	0.000
Medium Trucks:	70.80	-29.18	1.93	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	77.97	-33.14	1.92	-1.20	*-5.61*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	47.5	45.6	43.8	37.8	46.4	47.0
Medium Trucks:	42.3	40.8	34.5	32.9	41.4	41.6
Heavy Trucks:	45.6	44.1	35.1	36.4	44.7	44.8
Vehicle Noise:	50.4	48.7	44.8	40.9	49.4	49.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	2	3	7	16
CNEL:	2	4	8	17

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY + P
Road Name: Lampson Av.
Road Segment: w/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,691	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	1,669	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	36	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.069
Medium Trucks:	35.823
Heavy Trucks:	35.847

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	0.79	2.02	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-16.45	2.07	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-20.41	2.06	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.1	66.2	64.5	58.4	67.0	67.6
Medium Trucks:	62.1	60.6	54.3	52.7	61.2	61.4
Heavy Trucks:	63.4	62.0	53.0	54.2	62.6	62.7
Vehicle Noise:	70.1	68.4	65.1	60.6	69.1	69.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	35	75	162	350
CNEL:	37	81	174	374

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY + P
Road Name: Cerulean Av.
Road Segment: w/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,299	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	530	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:	37.0	feet
Centerline Dist. to Observer:	37.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.851
Medium Trucks:	36.610
Heavy Trucks:	36.634

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-2.16	1.88	-1.20	*-4.56*	0.000	0.000
Medium Trucks:	70.80	-19.39	1.93	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	77.97	-23.35	1.92	-1.20	*-5.61*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	57.3	55.4	53.6	47.5	56.2	56.8
Medium Trucks:	52.1	50.6	44.3	42.7	51.2	51.4
Heavy Trucks:	55.3	53.9	44.9	46.1	54.5	54.6
Vehicle Noise:	60.2	58.5	54.6	50.7	59.2	59.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	7	15	33	70
CNEL:	7	16	35	74

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY + P
Road Name: Lampson Av.
Road Segment: e/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,908	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	1,391	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	36	feet

Site Data

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

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.069
Medium Trucks:	35.823
Heavy Trucks:	35.847

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-0.01	2.02	-1.20	*-4.59*	0.000	0.000
Medium Trucks:	77.72	-17.25	2.07	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	82.99	-21.20	2.06	-1.20	*-5.56*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.3	65.4	63.7	57.6	66.2	66.8
Medium Trucks:	61.3	59.8	53.5	51.9	60.4	60.6
Heavy Trucks:	62.7	61.2	52.2	53.4	61.8	61.9
Vehicle Noise:	69.4	67.6	64.3	59.8	68.3	68.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	31	67	144	310
CNEL:	33	71	154	331

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY + P
Road Name: Cerulean Av.
Road Segment: e/o Valley View St.
Project Name: West Grove Center
Job Number: 12717

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,611	vehicles
Peak Hour Percentage:	10.00%	
Peak Hour Volume:	561	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:	37.0	feet
Centerline Dist. to Observer:	37.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

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

Vehicle Mix

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

Noise Source Elevations (in feet)

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

Lane Equivalent Distance (in feet)

Autos:	36.851
Medium Trucks:	36.610
Heavy Trucks:	36.634

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	58.73	-1.91	1.88	-1.20	*-4.56*	0.000	0.000
Medium Trucks:	70.80	-19.15	1.93	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	77.97	-23.10	1.92	-1.20	*-5.61*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	57.5	55.6	53.8	47.8	56.4	57.0
Medium Trucks:	52.4	50.9	44.5	43.0	51.4	51.7
Heavy Trucks:	55.6	54.2	45.1	46.4	54.7	54.9
Vehicle Noise:	60.4	58.7	54.8	50.9	59.4	59.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	7	16	34	73
CNEL:	8	17	36	77

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APPENDIX 9.1:

CADNAA OPERATIONAL NOISE MODEL

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12717 - West Grove Center

CadnaA Noise Prediction Model: 12717.cna
Date: 16.01.21
Analyst: B. Lawson

Calculation Configuration

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

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	39.9	37.5	44.2	55.0	50.0	0.0				5.00	a	6020934.88	2234936.86	5.00
RECEIVERS		R2	48.7	46.3	52.9	55.0	50.0	0.0				5.00	a	6021385.11	2234288.49	5.00
RECEIVERS		R3	52.3	50.4	56.9	55.0	50.0	0.0				5.00	a	6020940.23	2234138.75	5.00
RECEIVERS		R4	43.3	40.9	47.6	55.0	50.0	0.0				5.00	a	6020914.32	2234685.37	5.00

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			K0	Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night				X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(dB)	(ft)		(ft)	(ft)	(ft)
POINTSOURCE		AC01	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	0.0	5.00	g	6021194.66	2234205.90	26.00
POINTSOURCE		AC02	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	0.0	5.00	g	6021195.41	2234254.62	26.00
POINTSOURCE		AC03	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	0.0	5.00	g	6020945.79	2234283.11	27.00
POINTSOURCE		AC04	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	0.0	5.00	g	6021037.62	2234382.44	27.00
POINTSOURCE		AC05	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	0.0	5.00	g	6021036.87	2234330.71	27.00
POINTSOURCE		AC06	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	0.0	5.00	g	6021034.24	2234286.11	27.00
POINTSOURCE		AC07	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	0.0	5.00	g	6020945.04	2234349.83	27.00
POINTSOURCE		AC08	88.9	88.9	88.9	Lw	88.9		585.00	0.00	252.00	0.0	5.00	g	6020944.66	2234411.30	27.00
POINTSOURCE		DT01	83.2	83.2	83.2	Lw	83.2		900.00	0.00	540.00	0.0	5.00	a	6021168.05	2234187.53	5.00
POINTSOURCE		DT02	83.2	83.2	83.2	Lw	83.2		900.00	0.00	540.00	0.0	5.00	a	6020995.26	2234270.74	5.00
POINTSOURCE		TRASH01	89.0	89.0	89.0	Lw	89		150.00	0.00	90.00	0.0	5.00	a	6021065.73	2234187.53	5.00

Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height				Coordinates			
			left	right		horz.	vert.	Begin		End		x	y	z	Ground
					(ft)	(ft)	(ft)	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
BARRIEREXISTING		0						6.00	a			6020934.68	2234945.19	6.00	0.00
												6020944.62	2234945.21	6.00	0.00
												6020938.48	2234658.08	6.00	0.00
												6020889.56	2234654.64	6.00	0.00
												6020889.02	2234629.65	6.00	0.00
												6020869.03	2234630.08	6.00	0.00
												6020859.09	2234189.10	6.00	0.00

Building(s)

Name	M.	ID	RB	Residents	Absorption	Height		Coordinates			
						Begin		x	y	z	Ground
						(ft)		(ft)	(ft)	(ft)	(ft)
BUILDING		BUILDING00001	x	0		22.00	a	6020933.49	2234424.13	22.00	0.00
								6021033.12	2234422.63	22.00	0.00
								6021069.67	2234419.62	22.00	0.00
								6021066.67	2234269.42	22.00	0.00
								6020931.49	2234272.43	22.00	0.00
BUILDING		BUILDING00002	x	0		21.00	a	6021179.82	2234261.41	21.00	0.00
								6021211.86	2234260.91	21.00	0.00
								6021209.86	2234195.83	21.00	0.00
								6021179.32	2234198.33	21.00	0.00

APPENDIX 10.1:

CADNAA CONSTRUCTION NOISE MODEL

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12717 - West Grove Center

CadnaA Noise Prediction Model: 12717_Construction.cna
Date: 16.01.21
Analyst: B. Lawson

Calculation Configuration

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

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
RECEIVERS		R1	56.8	56.8	63.5	80.0	0.0	0.0				5.00	a	6020934.88	2234936.86	5.00
RECEIVERS		R2	67.8	67.8	74.5	80.0	0.0	0.0				5.00	a	6021385.11	2234288.49	5.00
RECEIVERS		R3	73.3	73.3	80.0	80.0	0.0	0.0				5.00	a	6020940.23	2234138.75	5.00
RECEIVERS		R4	60.1	60.1	66.8	80.0	0.0	0.0				5.00	a	6020914.32	2234685.37	5.00

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li			Operating Time			Height
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	(ft)
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	
CONSTRUCTION		CONSTRUCTION	114.8	114.8	114.8	75.3	75.3	75.3	Lw''	75.3					8

Name	Height			Coordinates			
	Begin		End	x	y	z	Ground
	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
CONSTRUCTION	8.00	a		6020859.70	2234174.62	8.00	0.00
				6020864.82	2234424.32	8.00	0.00
				6021245.36	2234416.10	8.00	0.00
				6021240.43	2234164.03	8.00	0.00

Barrier(s)

Name	M.	ID	Absorption		Z-Ext.	Cantilever		Height				Coordinates			
			left	right		horz.	vert.	Begin		End		x	y	z	Ground
					(ft)	(ft)	(ft)	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
BARRIEREXISTING		0						6.00	a			6020934.68	2234945.19	6.00	0.00
												6020944.62	2234945.21	6.00	0.00
												6020938.48	2234658.08	6.00	0.00
												6020889.56	2234654.64	6.00	0.00
												6020889.02	2234629.65	6.00	0.00
												6020869.03	2234630.08	6.00	0.00
												6020859.09	2234189.10	6.00	0.00