# Pepper 210 Commerce Center

## Noise and Vibration Analysis

### County of San Bernardino

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# LIST OF ABBREVIATED TERMS

| | |
|---|---|
| (1) | Reference |
| ANSI | American National Standards Institute |
| Calveno | California Vehicle Noise |
| CEQA | California Environmental Quality Act |
| CNEL | Community Noise Equivalent Level |
| dBA | A-weighted decibels |
| EPA | Environmental Protection Agency |
| FHWA | Federal Highway Administration |
| FTA | Federal Transit Administration |
| INCE | Institute of Noise Control Engineering |
| $L_{eq}$ | Equivalent continuous (average) sound level |
| $L_{max}$ | Maximum level measured over the time interval |
| mph | Miles per hour |
| PPV | Peak Particle Velocity |
| Project | Pepper 210 Commerce Center |
| REMEL | Reference Energy Mean Emission Level |
| RMS | Root-mean-square |
| VdB | Vibration Decibels |

# EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures for the proposed Pepper 210 Commerce Center development ("Project"). The Project site is located at 20080 N. Highland Avenue in the County of San Bernardino. The proposed Project is to consist of the development of 1,867,660 square feet of High-Cube Fulfillment Center Warehouse. At the time this noise analysis was prepared, the future tenants of the proposed Project were unknown, and therefore, this noise study includes a conservative analysis of the proposed Project uses. This noise study has been prepared to satisfy applicable County of San Bernardino noise standards and significance criteria based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

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

**TABLE ES-1: SUMMARY OF 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* | - |
| Nighttime Concrete Pour Noise | | *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 Pepper 210 Commerce 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 transportation related CNEL traffic noise 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 Project is located at 20080 N. Highland Avenue in the County of San Bernardino, as shown on Exhibit 1-A.

## 1.2 PROJECT DESCRIPTION

A preliminary site plan for the proposed Project is shown on Exhibit 1-B. The proposed Project is to consist of the development of 1,867,660 square feet of High-Cube Fulfillment Center Warehouse use with an opening year of 2029. The Project also includes a total of 626 trailer parking spaces that will be ancillary use and utilized by the future tenant of the building and not an independent off-site operator. It should be noted, 620,000 square feet of the total High-Cube Fulfillment Center square footage is associated with pick mod mezzanine space and the building footprint is 1,232,660 square feet. There is a proposed 2,100 square foot yard office associated with the trailer yard.

At the time this noise analysis was prepared, the future tenants of the proposed Project were unknown, and therefore, this noise study includes a conservative analysis of the proposed Project uses. The on-site Project-related noise sources are expected to include: loading dock activity, roof-top air conditioning units, parking lot vehicle activities, trash enclosure activity, and truck movements. This noise analysis is intended to describe the noise level impacts associated with the expected typical operational activities at the Project site.

## EXHIBIT 1-A: LOCATION MAP

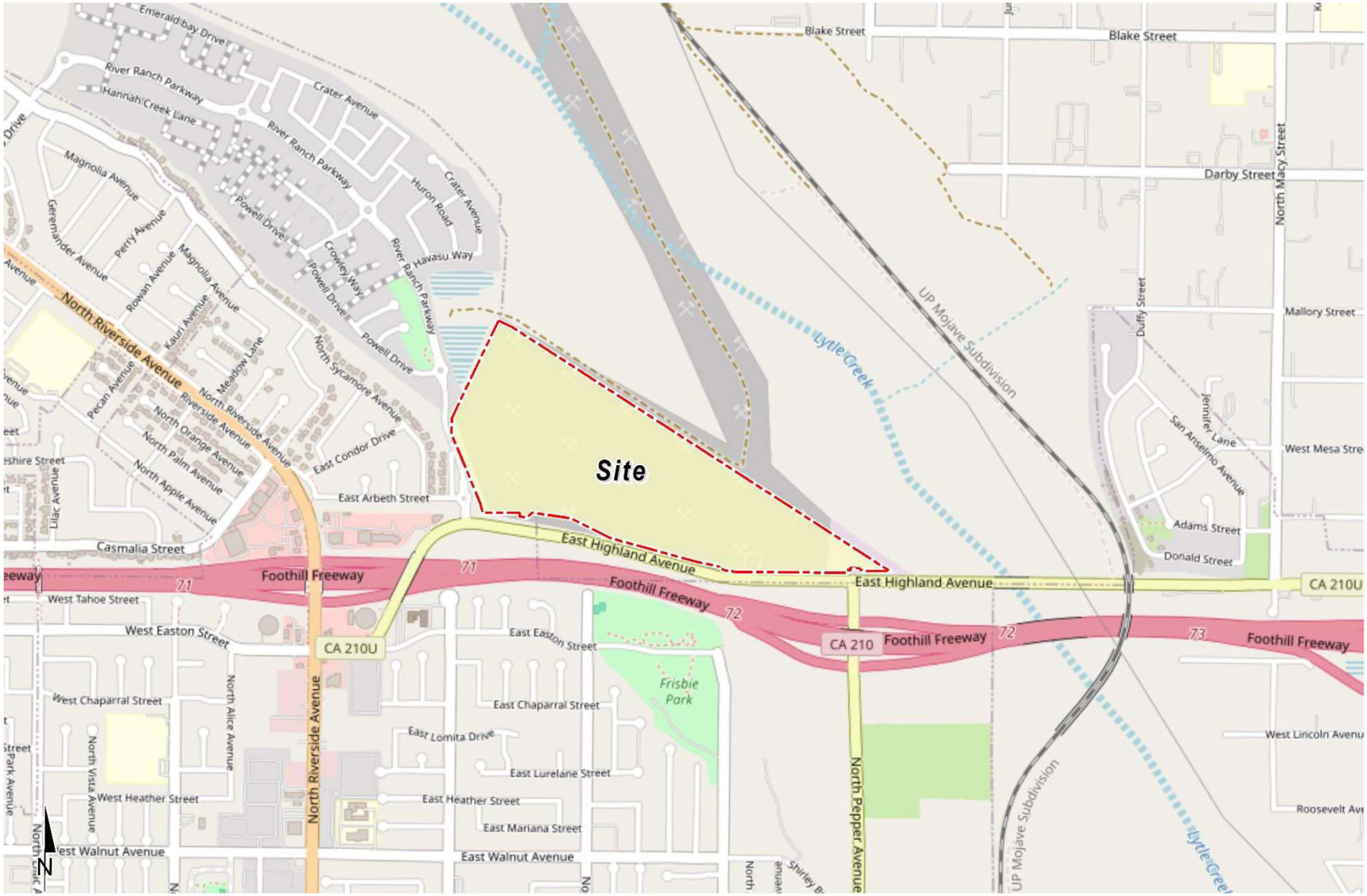
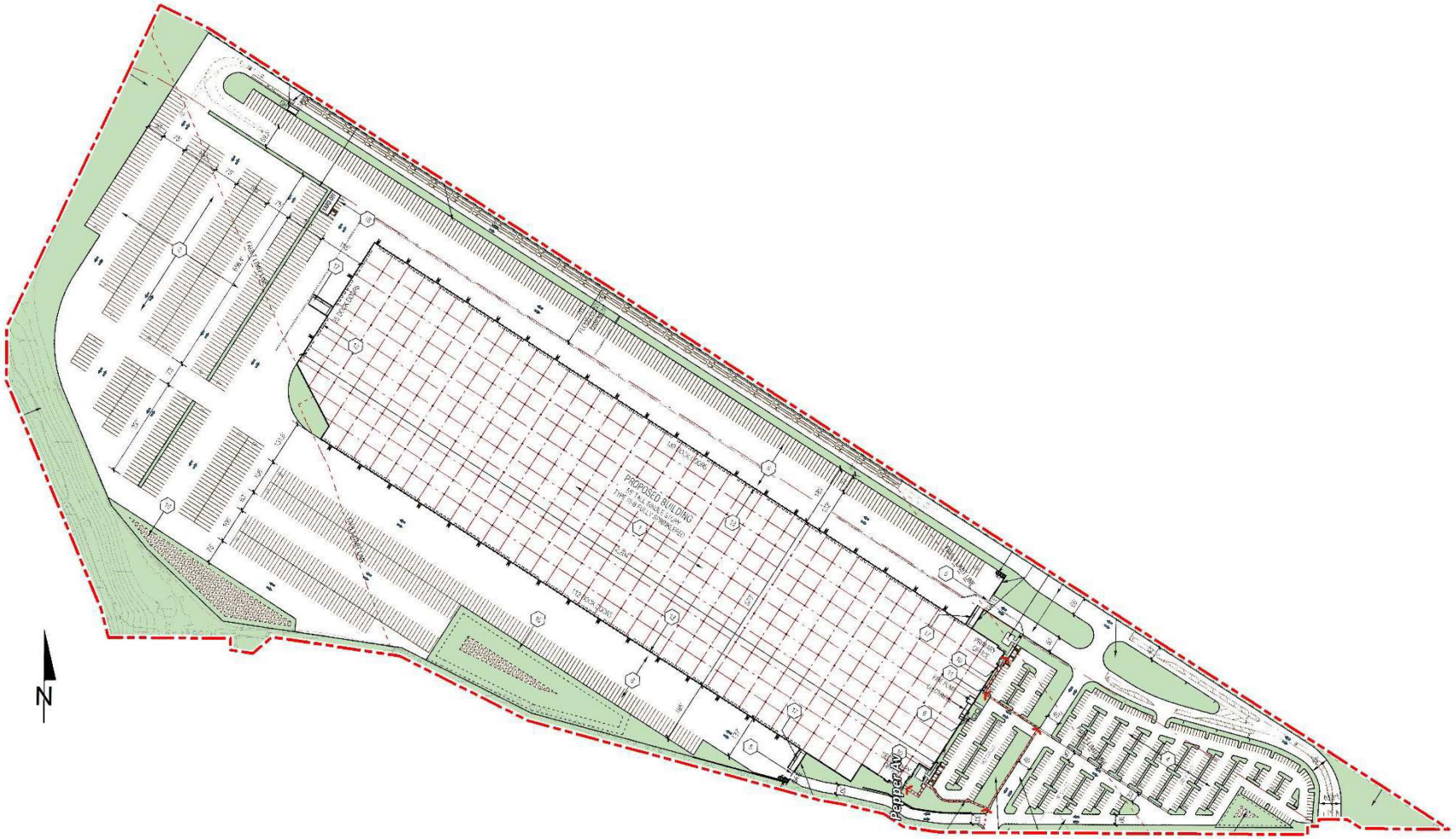


**EXHIBIT 1-B: PRELIMINARY SITE PLAN**



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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. (2) 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 1,000 feet, which can cause serious discomfort. (3) 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 metric is the equivalent level ($L_{eq}$). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level ($L_{eq}$) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the "average" noise levels within the environment.

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

## 2.3 SOUND PROPAGATION

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

### 2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. (2)

### 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. (4)

### 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. (2)

### 2.3.4 SHIELDING

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

## 2.4 NOISE CONTROL

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

## 2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by 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 block the line-of-sight path of sound from the noise source.

## 2.6 LAND USE COMPATIBILITY WITH NOISE

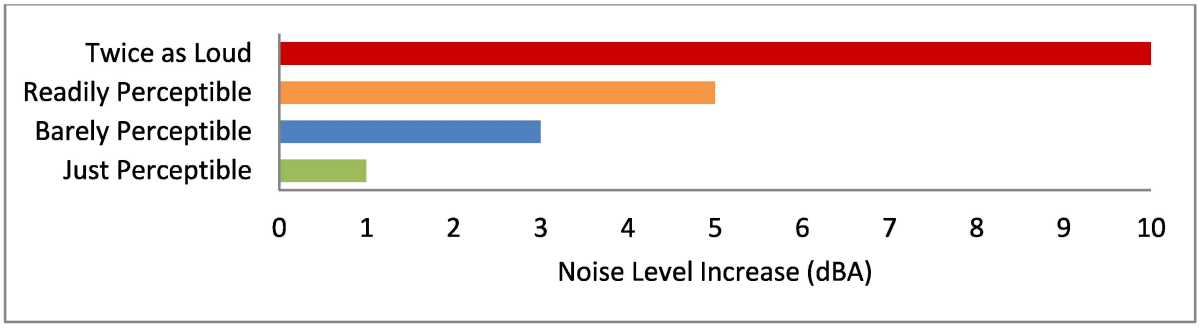
Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development,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

## 2.7 COMMUNITY RESPONSE TO NOISE

Approximately sixteen percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints may occur. Twenty to thirty percent of the population will not complain even in very severe noise environments. (7 pp. 8-6) Thus, a variety of reactions can be expected from people exposed to any given noise environment.

Surveys have shown that community response to noise varies from no reaction to vigorous action for newly introduced noises averaging from 10 dB below existing to 25 dB above existing. (8) According to research originally published in the Noise Effects Handbook (7), the percentage of high annoyance ranges from approximately 0 percent at 45 dB or less, 10 percent are highly annoyed around 60 dB, and increases rapidly to approximately 70 percent being highly annoyed at approximately 85 dB or greater. Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. A change of 3 dBA is considered barely perceptible, and changes of 5 dBA are considered readily perceptible. (4)

**EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION**



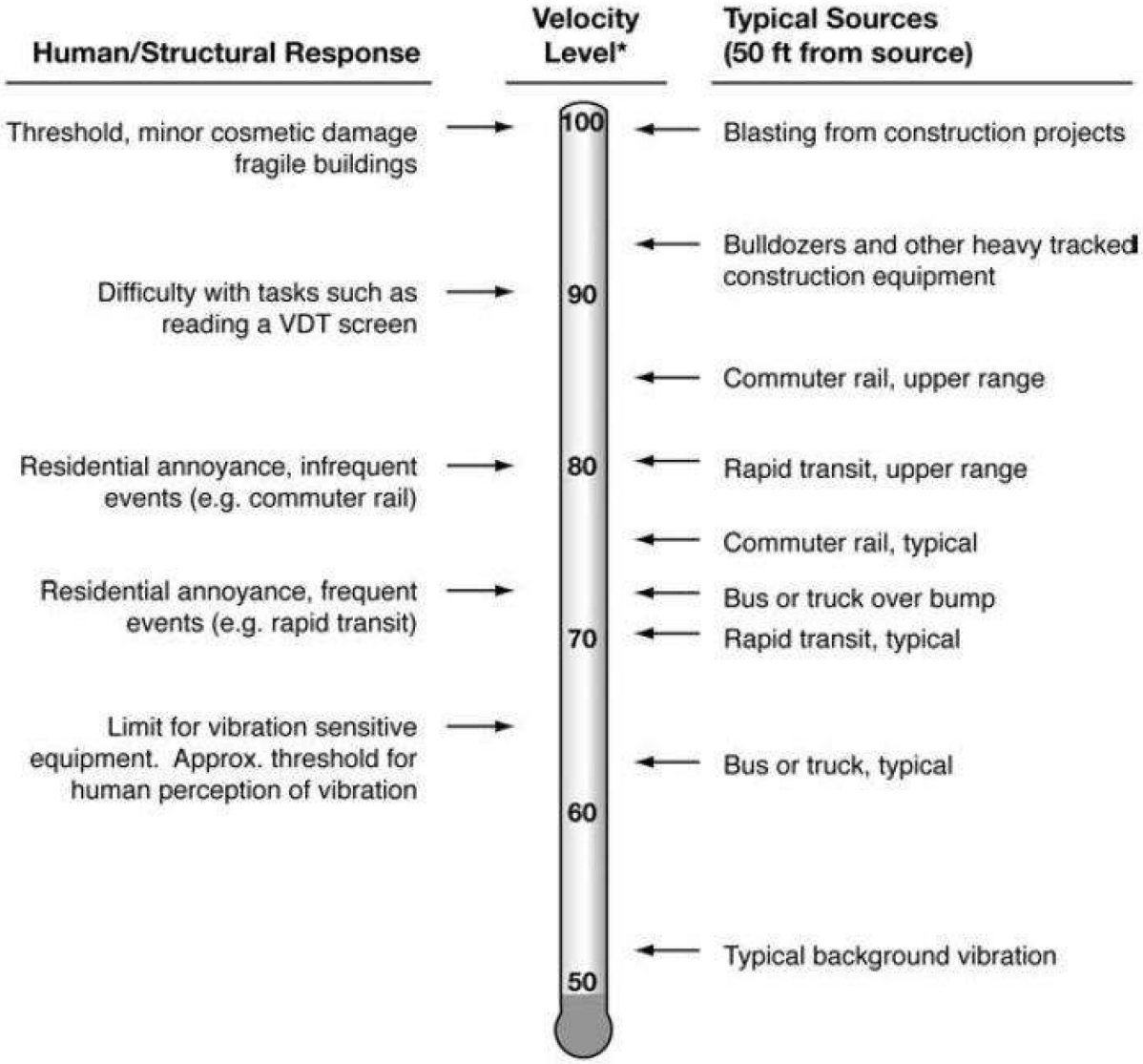
## 2.8 VIBRATION

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

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

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

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




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

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

# 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) OPR identifies suggested land use noise compatibility levels as part of its General Plan Guidelines as shown on Exhibit 3-A. These suggested guidelines provide planners with a tool to gauge the compatibility of land uses relative to existing and future noise levels. The guidelines identify normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable noise levels for various land uses.

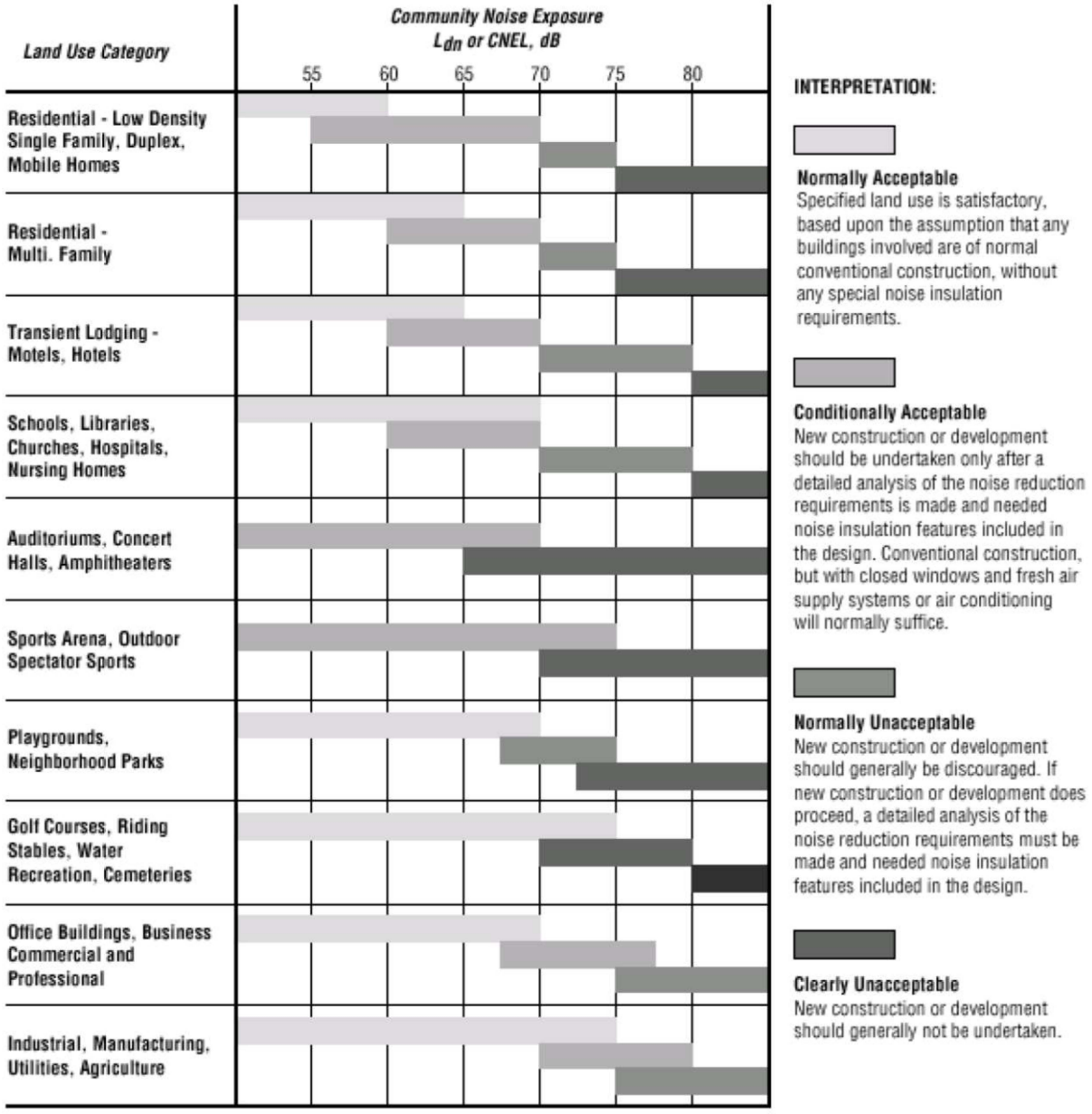
The land use compatibility guidelines are intended to be an advisory resource when considering changes in land use and policies, such as zoning modifications. The Project industrial land use is considered *normally acceptable* unmitigated exterior noise levels of less than 75 dBA CNEL. In addition, the State through the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

## 3.2 COUNTY OF SAN BERNARDINO COUNTYWIDE PLAN HAZARDS ELEMENT

The County of San Bernardino is committed to protecting life, property, and commerce from impacts associated with natural hazards, human-generated hazards, and increased risk due to climate change. The County also works to ensure that residents in unincorporated disadvantaged communities have a reduced risk of exposure to pollution and have equitable access to public facilities and services. Effectively reducing these risks requires the County and its partners to evaluate public safety threats, proactively plan and protect against potential hazards, and establish systems that will make the county and its people safer and more self- reliant. (11) To address noise sources found in the County of San Bernardino, the following policies have been identified in the Countywide Plan Hazards Element:

- **Policy HZ-2.6**: Coordination with transportation authorities. We collaborate with airport owners, FAA, Caltrans, SBCTA, SCAG, neighboring jurisdictions, and other transportation providers in the preparation and maintenance of, and updates to transportation-related plans and projects to minimize noise impacts and provide appropriate mitigation measures.

**EXHIBIT 3-A: LAND USE NOISE COMPATIBILITY CRITERIA**




*Source: OPR General Plan Guidelines, Appendix D: Noise Element Guidelines, Figure 2.*

- **Policy HZ-2.7**: Truck delivery areas. We encourage truck delivery areas to be located away from residential properties and require associated noise impacts to be mitigated.
- **Policy HZ-2.8**: Proximity to noise generating uses. We limit or restrict new noise sensitive land uses in proximity to existing conforming noise generating uses and planned industrial areas.
- **Policy HZ-2.9**: Control sound at the source. We prioritize noise mitigation measures that control sound at the source before buffers, sound walls, and other perimeter measures.

- **Policy HZ-2.10:** Agricultural operations. We require new development adjacent to existing conforming agricultural operations to provide adequate buffers to reduce the exposure of new development to operational noise, odor, and the storage or application of pesticides or other hazardous materials.
- **Policy HZ-3.19**: Community education. We make educational materials available to the public in unincorporated environmental justice focus areas so that they clearly understand the potential for adverse pollution, noise, odor, vibration, and lighting and glare, and the effects of toxic materials to promote civil engagement. We require that such educational materials be developed in accordance with Plain Language Guidelines.

## 3.3 COUNTY OF SAN BERNARDINO DEVELOPMENT CODE

While the County of San Bernardino Countywide Plan Hazards Element provides guidelines and criteria to assess transportation noise on sensitive land uses, the County Code, Title 8 Development Code contains the noise level limits for mobile, stationary, and construction-related noise sources. (12)

### 3.3.1 TRANSPORTATION NOISE STANDARDS

Section 83.01.080[d], Table 83-3, contains the County of San Bernardino's mobile noise source-related standards, shown on Exhibit 3-B. Exterior transportation (mobile) noise level standards for residential land uses in the Project study area are shown to be 60 dBA CNEL, while non-noise-sensitive land uses, such as office uses, require exterior noise levels of 65 dBA CNEL per the County's Table 83-3 mobile noise source standards.

### 3.3.2 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location such as the Pepper 210 Commerce Center Project, stationary-source (operational) noise such as the expected loading dock activity, roof-top air conditioning units, parking lot vehicle activities, trash enclosure activity, and truck movements are typically evaluated against standards established under a jurisdiction's Municipal Code. The County of San Bernardino County Code, Title 8 Development Code, Section 83.01.080[c] establishes the noise level standards for stationary noise sources. Since the Project's land use will potentially impact adjacent noise-sensitive uses in the Project study area, this noise study relies on the more conservative residential noise level standards to describe potential operational noise impacts.

For residential properties, the exterior noise level shall not exceed 55 dBA Leq during the daytime hours (7:00 a.m. to 10:00 p.m.) and 45 dBA Leq during the nighttime hours (10:00 p.m. to 7:00 a.m.) for both the whole hour, and for not more than 30 minutes in any hour. The exterior noise level (11) 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.

**EXHIBIT 3-B: COUNTY OF SAN BERNARDINO MOBILE NOISE LEVEL STANDARDS**

| *Noise Standards for Adjacent Mobile Noise Sources* | | | |
|---|---|---|---|
| *Land Use* | | *Ldn (or CNEL) dB(A)* | |
| *Categories* | *Uses* | *Interior (1)* | *Exterior (2)* |
| Residential | Single and multi-family, duplex, mobile homes | 45 | 60(3) |
| Commercial | Hotel, motel, transient housing | 45 | 60(3) |
| | Commercial retail, bank, restaurant | 50 | N/A |
| | Office building, research and development, professional offices | 45 | 65 |
| | Amphitheater, concert hall, auditorium, movie theater | 45 | N/A |
| Institutional/Public | Hospital, nursing home, school classroom, religious institution, library | 45 | 65 |
| Open Space | Park | N/A | 65 |

Notes:

(1) The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors.

(2) The outdoor environment shall be limited to:

- Hospital/office building patios
- Hotel and motel recreation areas
- Mobile home parks
- Multi-family private patios or balconies
- Park picnic areas
- Private yard of single-family dwellings
- School playgrounds

(3) An exterior noise level of up to 65 dB(A) (or CNEL) shall be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dB(A) (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level shall necessitate the use of air conditioning or mechanical ventilation.

CNEL = (Community Noise Equivalent Level). The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night from 10:00 p.m. to 7:00 a.m.

*Source: County of San Bernardino County Code, Title 8 Development Code, Table 83-3.*

Further, Section 83.01.080[e] indicates that if the existing ambient noise level already exceeds any of the exterior noise level limit categories, then the standard shall be adjusted to reflect the ambient conditions. The County of San Bernardino 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.) | 45 | 50 | 55 | 60 | 65 |

[1] County of San Bernardino Development Code, Title 8, Section 83.01.080 (Appendix 3.1). 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 loading dock activity, roof-

top air conditioning units, parking lot vehicle activities, trash enclosure activity, and truck movements. 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.

## 3.4 CONSTRUCTION NOISE STANDARDS

Section 83.01.080[g][3] of the County of San Bernardino Development Code, provided in Appendix 3.1, indicates that construction activity is considered exempt from the noise level standards between the hours of 7:00 a.m. to 7:00 p.m. except on Sundays and Federal holidays. (12) However, neither the County of San Bernardino Countywide Plan or Development Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what CEQA constitutes a *substantial temporary or periodic noise increase*. Therefore, a numerical construction threshold based on Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* is used for analysis of daytime construction impacts, as discussed below.

According to the FTA, local noise ordinances are typically not very useful in evaluating construction noise. They usually relate to nuisance and hours of allowed activity, and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the impact of a construction project. Project construction noise criteria should account for the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. Due to the lack of standardized construction noise thresholds, the FTA provides guidelines that can be considered reasonable criteria for construction noise assessment. The FTA considers a daytime exterior construction noise level of 80 dBA $L_{eq}$ as a reasonable threshold for noise sensitive residential land use. (8 p. 179)

## 3.5 CONSTRUCTION VIBRATION STANDARDS

The County of San Bernardino Development Code, Section 83.01.090[a] states that vibration shall be no *greater than or equal to two-tenths inches per second measured at or beyond the lot line*. (12) Therefore, to determine if the vibration levels due to the operation and construction of the Project, the peak particle velocity (PPV) vibration level standard of 0.2 inches per second is used.

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# 4 SIGNIFICANCE CRITERIA

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

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

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

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

## 4.1 NOISE LEVEL INCREASES (THRESHOLD A)

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 baseline 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 a noise impact significant.* (14) 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 level exceeds the previously existing ambient noise level, the less acceptable the new noise level will typically be judged.

### 4.1.1 NOISE-SENSITIVE RECEIVERS

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 a noise impact significant*, based on a 2008 California Court of Appeal ruling on Gray v. County of Madera. (14) For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria may be exceeded. Therefore, for this analysis, a *readily perceptible* 5 dBA or greater project-related noise level increase is considered a significant impact when the without project noise levels are below 60 dBA. 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 baseline 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 (baseline) 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 at noise sensitive receiver locations are consistent with guidance provided by both the Federal Highway Administration (4 p. 9) and Caltrans (16 p. 2_48).

### 4.1.2 NON-NOISE-SENSITIVE RECEIVERS

The OPR land use/noise compatibility standards were used to establish the satisfactory noise levels of significance for non-noise-sensitive land uses in the Project study area. As previously shown on Exhibit 3-A, the *normally acceptable* exterior noise level for non-noise-sensitive land use is 70 dBA CNEL. To determine if Project-related traffic noise level increases are significant at off-site non-noise-sensitive land uses, a *barely perceptible* 3 dBA criteria is used. When the without Project noise levels are greater than the *normally acceptable* 70 dBA CNEL land use compatibility criteria, a *barely perceptible* 3 dBA or greater noise level increase is considered a significant impact since the noise level criteria is already exceeded. The noise level increases used to determine significant impacts for non-noise-sensitive land uses is generally consistent with the FICON noise level increase thresholds for noise-sensitive land uses but instead rely on the OPR land use/noise compatibility standards *normally acceptable* 70 dBA CNEL exterior noise level criteria.

## 4.2 VIBRATION (THRESHOLD B)

As described in Section 3.5, the vibration impacts originating from the construction of the Pepper 210 Commerce Center, vibration-generating activities are appropriately evaluated using the County of San Bernardino threshold to assess potential temporary construction-related impacts at nearby receiver locations. The County of San Bernardino Municipal Code identifies an operational vibration level threshold of 0.2 in/sec PPV.

## 4.3 CEQA GUIDELINES NOT FURTHER ANALYZED (THRESHOLD C)

CEQA Noise Threshold C applies when there are nearby public and private airports and/or air strips and focuses on land use compatibility of the Project to nearby airports and airstrips. The Project site is not located within two miles of an airport or airstrip. The closest airport is the San Bernardino International Airport located over 9 miles southeast of the Project site. As such, the Project site would not be exposed to excessive noise levels from airport operations, and

therefore, impacts are considered *less than significant,* and no further noise analysis is conducted in relation to Appendix G to the CEQA Guidelines, Noise Threshold C.

## 4.4 SIGNIFICANCE CRITERIA SUMMARY

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed Project. Table 4-1 shows the significance criteria summary matrix that includes the allowable criteria used to identify potentially significant incremental noise level increases.

**TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY**

| Analysis | Land Use | Condition(s) | Significance Criteria | |
|---|---|---|---|---|
| | | | Daytime | Nighttime |
| Off-Site Traffic | Noise-Sensitive[1] | if ambient is < 60 dBA CNEL | ≥ 5 dBA CNEL Project increase | |
| | | if ambient is 60 - 65 dBA CNEL | ≥ 3 dBA CNEL Project increase | |
| | | if ambient is > 65 dBA CNEL | ≥ 1.5 dBA CNEL Project increase | |
| | Non-Noise-Sensitive[2] | If ambient is > 70 dBA CNEL | ≥ 3 dBA CNEL Project increase | |
| Operational | Residential | Exterior Noise Level Limit[3] | 55 dBA $L_{eq}$ | 45 dBA $L_{eq}$ |
| | Noise-Sensitive[1] | if ambient is < 60 dBA $L_{eq}$ | ≥ 5 dBA $L_{eq}$ Project increase | |
| | | if ambient is 60 - 65 dBA $L_{eq}$ | ≥ 3 dBA $L_{eq}$ Project increase | |
| | | if ambient is > 65 dBA $L_{eq}$ | ≥ 1.5 dBA $L_{eq}$ Project increase | |
| Construction | Noise-Sensitive | Permitted between 7:00 a.m. to 7:00 p.m.; except Sundays and Federal holidays.[4] | | |
| | | Noise Level Threshold[5] | 80 dBA $L_{eq}$ | (see Table 3-1)[3] |
| | | Vibration Level Threshold[6] | 0.2 PPV (in/sec) | n/a |

[1] FICON, 1992.
[2] OPR land use/noise compatibility standards.
[3] County of San Bernardino Development Code, Title 8, Section 83.01.080 (Appendix 3.1)
[4] Section 83.01.080[g][3] of the County of San Bernardino County Code.
[5] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual.
[6] Section 83.01.090[a] of the County of San Bernardino County Code.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m. "n/a" = construction activities are not planned during the nighttime hours; "PPV" = peak particle velocity.

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# 5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at six locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, long-term noise level measurements were collected by Urban Crossroads, Inc. on Friday, February 17, 2023. 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 equivalent 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 equivalent 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*. (2) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (8)

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

assess potential noise increase due to the Project's contribution to the ambient noise levels. This approach is necessary to calculate the temporary or permanent increase in *ambient* noise levels as required by the CEQA Guidelines Environmental Checklist.

## 5.3 NOISE MEASUREMENT RESULTS

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

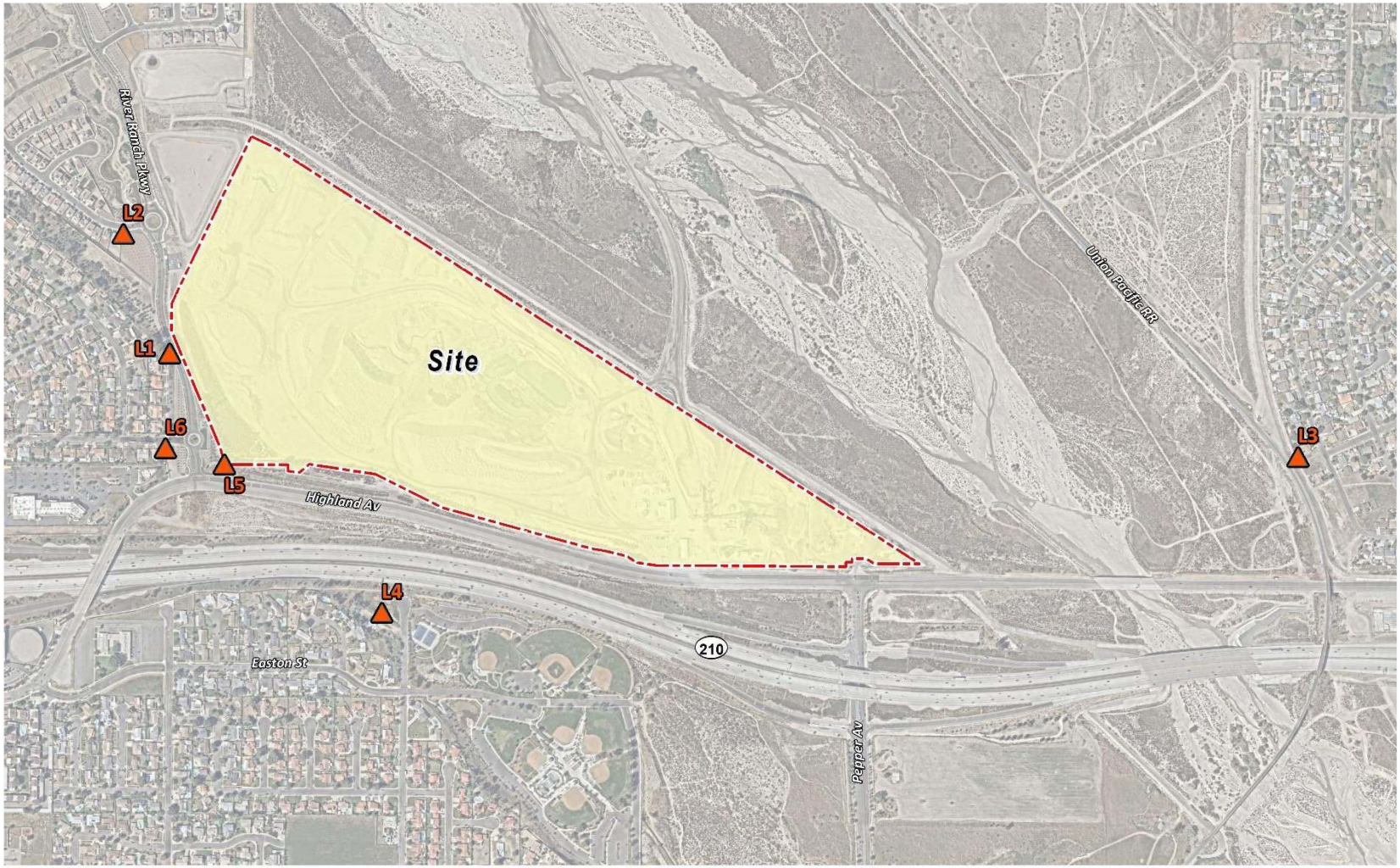
**TABLE 5-1: AMBIENT NOISE LEVEL MEASUREMENTS**

| Location[1] | Description | Energy Average Noise Level (dBA $L_{eq}$)[2] | |
|---|---|---|---|
| | | Daytime | Nighttime |
| L1 | Located west of the site near the residence at 2184 N Oakdale Ave. | 57.8 | 52.7 |
| L2 | Located west of the site near the residence at 2344 Powell Dr. | 58.4 | 51.9 |
| L3 | Located east of the site and the UPRR near the residence at 2382 Duffy St. | 59.9 | 59.3 |
| L4 | Located south of the site and the SR 210 near the residence at 1951 Joyce Ave. | 69.6 | 66.9 |
| L5 | Located southwest corner of the Project site near the entrance to the River Ranch community. | 58.6 | 54.7 |
| L6 | Located west of the site near the residence at 2132 N Oakdale Ave. | 58.9 | 53.4 |

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

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

**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 transportation related noise environment. Consistent with Section 83.01.080[d], Table 83-3 County of San Bernardino Development Code (12), 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 8 off-site study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the County of San Bernardino General Plan Circulation Element, and the vehicle speeds. The ADT volumes used in this study area presented on Table 6-2 are based on the *Pepper 210 Commerce Center Traffic Analysis*, prepared by Urban Crossroads, Inc. for the following traffic scenarios (21).

- Existing
- Existing plus Project
- Opening Year Cumulative (OYC) (2029) without Project Conditions
- Opening Year Cumulative (OYC) (2029) with Project Conditions
- Horizon Year (2040) without Project Conditions
- Horizon Year (2040) with Project Conditions

The ADT volumes vary for each roadway segment based on the existing traffic volumes and the combination of project traffic distributions. This analysis relies on a comparative evaluation of the off-site traffic noise impacts at the boundary of the right-of-way of the receiving adjacent land use, without and with project ADT traffic volumes from the Project traffic analysis.

Since the site is currently developed with an existing use, trip credit has been taken for the existing trips consistent with the Project Traffic Analysis. The Project is anticipated to generate a net total of 3,118 two-way trips per day (actual vehicles) that includes 132 truck trips.

**TABLE 6-1: OFF-SITE ROADWAY PARAMETERS**

| ID | Roadway | Segment | Classification[1] | Receiving Land Use[2] | Distance from Centerline to Receiving Land Use (Feet)[3] | Vehicle Speed (mph) |
|---|---|---|---|---|---|---|
| 1 | Pepper Av. | s/o Highland Av. | Major | Non-Sensitive | 52' | 45 |
| 2 | Pepper Av. | s/o SR-210 EB Ramps | Major | Sensitive | 52' | 45 |
| 3 | State St. | n/o Highland Av. | Major | Sensitive | 52' | 45 |
| 4 | State St. | s/o Highland Av. | Major | Sensitive | 52' | 45 |
| 5 | Highland Av. | w/o Driveway 1 | Major | Non-Sensitive | 52' | 45 |
| 6 | Highland Av. | w/o Pepper Av. | Major | Non-Sensitive | 52' | 45 |
| 7 | Highland Av. | e/o Pepper Av. | Major | Non-Sensitive | 52' | 45 |
| 8 | Highland Av. | e/o State St. | Major | Non-Sensitive | 52' | 45 |

[1] Pepper 210 Commerce Center Traffic Analysis, Urban Crossroads, Inc.
[2] Based on a review of existing aerial imagery.
[3] Distance to receiving land use is based upon the right-of-way distances.

**TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES**

| ID | Roadway | Segment | Average Daily Traffic Volumes[1] | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Existing | | OYC (2029) | | HY (2040) | |
| | | | Without Project | With Project | Without Project | With Project | Without Project | With Project |
| 1 | Pepper Av. | s/o Highland Av. | 12,006 | 14,788 | 17,115 | 19,897 | 18,826 | 21,608 |
| 2 | Pepper Av. | s/o SR-210 EB Ramps | 25,375 | 25,843 | 40,419 | 40,887 | 44,461 | 44,929 |
| 3 | State St. | n/o Highland Av. | 13,926 | 13,989 | 15,683 | 15,746 | 17,252 | 17,314 |
| 4 | State St. | s/o Highland Av. | 20,772 | 20,835 | 23,393 | 23,455 | 25,732 | 25,794 |
| 5 | Highland Av. | w/o Driveway 1 | 9,924 | 10,080 | 13,566 | 13,722 | 14,922 | 15,078 |
| 6 | Highland Av. | w/o Pepper Av. | 9,924 | 11,452 | 13,566 | 15,094 | 14,922 | 16,450 |
| 7 | Highland Av. | e/o Pepper Av. | 16,653 | 16,965 | 21,143 | 21,455 | 23,258 | 23,570 |
| 8 | Highland Av. | e/o State St. | 15,363 | 15,550 | 19,641 | 19,828 | 21,605 | 21,792 |

[1] Pepper 210 Commerce Center Traffic Analysis, Urban Crossroads, Inc.

To quantify the off-site noise levels, the Project related truck trips were added to the heavy truck category in the FHWA noise prediction model. The addition of the Project related truck trips increases the percentage of heavy trucks in the vehicle mix. This approach recognizes that the FHWA noise prediction model is significantly influenced by the number of heavy trucks in the vehicle mix. Table 6-3 provides the time of day (daytime, evening, and nighttime) vehicle splits. The daily Project truck trip-ends were assigned to the individual off-site study area roadway segments based on the Project truck trip distribution percentages documented in the *Pepper 210*

*Commerce Center Traffic Analysis*. Using the Project truck trips in combination with the Project trip distribution, Urban Crossroads, Inc. calculated the number of additional Project truck trips and vehicle mix percentages for each of the study area roadway segments. Table 6-4 shows the traffic flow by vehicle type (vehicle mix) used for all without Project traffic scenarios, and Tables 6-5 to 6-7 show the vehicle mixes used for the with Project traffic scenarios.

**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 | 64.01% | 16.78% | 19.21% | 100.00% |
| Medium Trucks | 77.11% | 6.43% | 16.47% | 100.00% |
| Heavy Trucks | 54.00% | 3.00% | 43.00% | 100.00% |

[1] Based on the August 11, 2022, directional vehicle classification count collected on Highland Avenue east of Riverside Avenue (Pepper 210 Commerce Center Traffic Analysis, Urban Crossroads, Inc.)
"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

**TABLE 6-4: WITHOUT PROJECT VEHICLE MIX**

| Classification | Total % Traffic Flow[1] | | | Total |
|---|---|---|---|---|
| | Autos | Medium Trucks | Heavy Trucks | |
| All Segments | 97.51% | 1.78% | 0.72% | 100.00% |

[1] Based on the August 11, 2022, directional vehicle classification count collected on Highland Avenue east of Riverside Avenue (Pepper 210 Commerce Center Traffic Analysis, Urban Crossroads, Inc.)

Due to the added Project truck trips, the increase in Project traffic volumes and the distributions of trucks on the study area road segments, the percentage of autos, medium trucks and heavy trucks will vary for each of the traffic scenarios. This explains why the existing and future traffic volumes and vehicle mixes vary between seemingly identical study area roadway segments.

**TABLE 6-5: EXISTING WITH PROJECT VEHICLE MIX**

| ID | Roadway | Segment | With Project[1] | | | |
|---|---|---|---|---|---|---|
| | | | Autos | Medium Trucks | Heavy Trucks | Total[2] |
| 1 | Pepper Av. | s/o Highland Av. | 97.08% | 1.53% | 1.38% | 100.00% |
| 2 | Pepper Av. | s/o SR-210 EB Ramps | 97.55% | 1.75% | 0.70% | 100.00% |
| 3 | State St. | n/o Highland Av. | 97.52% | 1.77% | 0.71% | 100.00% |
| 4 | State St. | s/o Highland Av. | 97.51% | 1.77% | 0.71% | 100.00% |
| 5 | Highland Av. | w/o Driveway 1 | 97.54% | 1.75% | 0.70% | 100.00% |
| 6 | Highland Av. | w/o Pepper Av. | 97.84% | 1.54% | 0.62% | 100.00% |
| 7 | Highland Av. | e/o Pepper Av. | 97.55% | 1.75% | 0.70% | 100.00% |
| 8 | Highland Av. | e/o State St. | 97.54% | 1.76% | 0.71% | 100.00% |

[1] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

**TABLE 6-6: OYC 2029 WITH PROJECT VEHICLE MIX**

| ID | Roadway | Segment | With Project[1] | | | |
|---|---|---|---|---|---|---|
| | | | Autos | Medium Trucks | Heavy Trucks | Total[2] |
| 1 | Pepper Av. | s/o Highland Av. | 97.19% | 1.60% | 1.21% | 100.00% |
| 2 | Pepper Av. | s/o SR-210 EB Ramps | 97.53% | 1.76% | 0.71% | 100.00% |
| 3 | State St. | n/o Highland Av. | 97.51% | 1.77% | 0.71% | 100.00% |
| 4 | State St. | s/o Highland Av. | 97.51% | 1.78% | 0.71% | 100.00% |
| 5 | Highland Av. | w/o Driveway 1 | 97.53% | 1.76% | 0.71% | 100.00% |
| 6 | Highland Av. | w/o Pepper Av. | 97.76% | 1.60% | 0.64% | 100.00% |
| 7 | Highland Av. | e/o Pepper Av. | 97.54% | 1.75% | 0.70% | 100.00% |
| 8 | Highland Av. | e/o State St. | 97.53% | 1.76% | 0.71% | 100.00% |

[1] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

**TABLE 6-7: HY 2040 WITH PROJECT VEHICLE MIX**

| ID | Roadway | Segment | With Project[1] | | | |
|---|---|---|---|---|---|---|
| | | | Autos | Medium Trucks | Heavy Trucks | Total[2] |
| 1 | Pepper Av. | s/o Highland Av. | 97.22% | 1.61% | 1.17% | 100.00% |
| 2 | Pepper Av. | s/o SR-210 EB Ramps | 97.53% | 1.76% | 0.71% | 100.00% |
| 3 | State St. | n/o Highland Av. | 97.51% | 1.77% | 0.71% | 100.00% |
| 4 | State St. | s/o Highland Av. | 97.51% | 1.78% | 0.71% | 100.00% |
| 5 | Highland Av. | w/o Driveway 1 | 97.53% | 1.76% | 0.71% | 100.00% |
| 6 | Highland Av. | w/o Pepper Av. | 97.74% | 1.61% | 0.65% | 100.00% |
| 7 | Highland Av. | e/o Pepper Av. | 97.54% | 1.76% | 0.71% | 100.00% |
| 8 | Highland Av. | e/o State St. | 97.53% | 1.76% | 0.71% | 100.00% |

[1] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

# 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 Pepper 210 Commerce Center Traffic Analysis* prepared by Urban Crossroads, Inc. (21) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway.

## 7.1 TRAFFIC NOISE CONTOURS

Noise contours were used to assess the Project's incremental 24-hour dBA CNEL traffic-related noise impacts at receiving 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 CNEL noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area. Tables 7-1 through 7-6 present a summary of the exterior traffic noise levels without barrier attenuation for each traffic condition. Appendix 7.1 includes the traffic noise level contours worksheets for each traffic condition.

**TABLE 7-1: EXISTING WITHOUT PROJECT CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | Pepper Av. | s/o Highland Av. | Non-Sensitive | 69.7 | 56 | 122 | 262 |
| 2 | Pepper Av. | s/o SR-210 EB Ramps | Sensitive | 73.0 | RW | 111 | 240 |
| 3 | State St. | n/o Highland Av. | Sensitive | 70.4 | RW | 75 | 161 |
| 4 | State St. | s/o Highland Av. | Sensitive | 72.1 | 75 | 162 | 350 |
| 5 | Highland Av. | w/o Driveway 1 | Non-Sensitive | 68.9 | 75 | 161 | 347 |
| 6 | Highland Av. | w/o Pepper Av. | Non-Sensitive | 68.9 | 170 | 367 | 790 |
| 7 | Highland Av. | e/o Pepper Av. | Non-Sensitive | 71.2 | 166 | 358 | 770 |
| 8 | Highland Av. | e/o State St. | Non-Sensitive | 70.8 | 166 | 358 | 771 |

[1] Based on a review of existing aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

**TABLE 7-2: EXISTING WITH PROJECT CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | Pepper Av. | s/o Highland Av. | Non-Sensitive | 71.6 | 66 | 143 | 307 |
| 2 | Pepper Av. | s/o SR-210 EB Ramps | Sensitive | 73.0 | 83 | 179 | 385 |
| 3 | State St. | n/o Highland Av. | Sensitive | 70.4 | 55 | 119 | 257 |
| 4 | State St. | s/o Highland Av. | Sensitive | 72.1 | 72 | 155 | 335 |
| 5 | Highland Av. | w/o Driveway 1 | Non-Sensitive | 69.0 | RW | 96 | 206 |
| 6 | Highland Av. | w/o Pepper Av. | Non-Sensitive | 69.3 | RW | 101 | 217 |
| 7 | Highland Av. | e/o Pepper Av. | Non-Sensitive | 71.2 | 63 | 135 | 291 |
| 8 | Highland Av. | e/o State St. | Non-Sensitive | 70.8 | 59 | 128 | 275 |

[1] Based on a review of existing aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

**TABLE 7-3: OYC 2029 WITHOUT PROJECT CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | Pepper Av. | s/o Highland Av. | Non-Sensitive | 71.3 | 63 | 136 | 294 |
| 2 | Pepper Av. | s/o SR-210 EB Ramps | Sensitive | 75.0 | 112 | 242 | 521 |
| 3 | State St. | n/o Highland Av. | Sensitive | 70.9 | 60 | 129 | 277 |
| 4 | State St. | s/o Highland Av. | Sensitive | 72.6 | 78 | 168 | 362 |
| 5 | Highland Av. | w/o Driveway 1 | Non-Sensitive | 70.3 | 54 | 117 | 252 |
| 6 | Highland Av. | w/o Pepper Av. | Non-Sensitive | 70.3 | 54 | 117 | 252 |
| 7 | Highland Av. | e/o Pepper Av. | Non-Sensitive | 72.2 | 73 | 157 | 338 |
| 8 | Highland Av. | e/o State St. | Non-Sensitive | 71.9 | 69 | 150 | 322 |

[1] Based on a review of existing aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

**TABLE 7-4: OYC 2029 WITH PROJECT CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | Pepper Av. | s/o Highland Av. | Non-Sensitive | 72.6 | 78 | 168 | 362 |
| 2 | Pepper Av. | s/o SR-210 EB Ramps | Sensitive | 75.0 | 113 | 243 | 524 |
| 3 | State St. | n/o Highland Av. | Sensitive | 70.9 | 60 | 129 | 278 |
| 4 | State St. | s/o Highland Av. | Sensitive | 72.6 | 78 | 168 | 362 |
| 5 | Highland Av. | w/o Driveway 1 | Non-Sensitive | 70.3 | 55 | 117 | 253 |
| 6 | Highland Av. | w/o Pepper Av. | Non-Sensitive | 70.6 | 57 | 122 | 263 |
| 7 | Highland Av. | e/o Pepper Av. | Non-Sensitive | 72.2 | 73 | 158 | 341 |
| 8 | Highland Av. | e/o State St. | Non-Sensitive | 71.9 | 70 | 150 | 324 |

[1] Based on a review of existing aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

**TABLE 7-5: HY 2040 WITHOUT PROJECT CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | Pepper Av. | s/o Highland Av. | Non-Sensitive | 71.7 | 67 | 145 | 313 |
| 2 | Pepper Av. | s/o SR-210 EB Ramps | Sensitive | 75.4 | 120 | 258 | 556 |
| 3 | State St. | n/o Highland Av. | Sensitive | 71.3 | 64 | 137 | 296 |
| 4 | State St. | s/o Highland Av. | Sensitive | 73.1 | 83 | 179 | 386 |
| 5 | Highland Av. | w/o Driveway 1 | Non-Sensitive | 70.7 | 58 | 125 | 268 |
| 6 | Highland Av. | w/o Pepper Av. | Non-Sensitive | 70.7 | 58 | 125 | 268 |
| 7 | Highland Av. | e/o Pepper Av. | Non-Sensitive | 72.6 | 78 | 167 | 361 |
| 8 | Highland Av. | e/o State St. | Non-Sensitive | 72.3 | 74 | 159 | 343 |

[1] Based on a review of existing aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

**TABLE 7-6: HY 2040 WITH PROJECT CONTOURS**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Receiving Land Use (dBA)[2] | Distance to Contour from Centerline (Feet) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 70 dBA CNEL | 65 dBA CNEL | 60 dBA CNEL |
| 1 | Pepper Av. | s/o Highland Av. | Non-Sensitive | 72.9 | 82 | 176 | 379 |
| 2 | Pepper Av. | s/o SR-210 EB Ramps | Sensitive | 75.5 | 120 | 259 | 558 |
| 3 | State St. | n/o Highland Av. | Sensitive | 71.3 | 64 | 137 | 296 |
| 4 | State St. | s/o Highland Av. | Sensitive | 73.1 | 83 | 179 | 386 |
| 5 | Highland Av. | w/o Driveway 1 | Non-Sensitive | 70.7 | 58 | 125 | 269 |
| 6 | Highland Av. | w/o Pepper Av. | Non-Sensitive | 71.0 | 60 | 130 | 280 |
| 7 | Highland Av. | e/o Pepper Av. | Non-Sensitive | 72.7 | 78 | 168 | 363 |
| 8 | Highland Av. | e/o State St. | Non-Sensitive | 72.3 | 74 | 160 | 345 |

[1] Based on a review of existing aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of the receiving adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

## 7.2 EXISTING PROJECT TRAFFIC NOISE LEVEL INCREASES

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project has been included in this report for informational purposes and to fully analyze all the existing traffic scenarios identified in the Traffic Analysis prepared by Urban Crossroads, Inc. However, the analysis of existing off-site traffic noise levels plus traffic noise generated by the proposed Project scenario will not actually occur since the Project would not be fully constructed and operational until Year 2029 conditions. Table 7-1 shows the Existing without Project conditions CNEL noise levels. The Existing without Project exterior noise levels range from 68.9 to 73.0 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions ranging from 69.0 to 73.0 dBA CNEL. Table 7-7 shows that the Project off-site traffic noise level increases range from 0.0 to 1.9 dBA CNEL on the study area roadway segments. Based on the significance criteria for off-site traffic noise presented in Table 4-1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level impacts due to unmitigated Project-related traffic noise levels.

## 7.3 OYC 2029 TRAFFIC NOISE LEVEL INCREASES

Table 7-3 presents the Opening Year Cumulative (OYC) without Project conditions CNEL noise levels. The OYC without Project exterior noise levels range from 70.3 to 75.0 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-4 shows that the OYC with Project conditions will range from 70.3 to 75.0 dBA CNEL. Table 7-8 shows that the Project off-site traffic noise level increases range from 0.0 to 1.3 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 4-1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level impacts due to unmitigated Project-related traffic noise levels.

## 7.4 HORIZON YEAR 2040 TRAFFIC NOISE LEVEL INCREASES

Table 7-5 presents the HY 2040 without Project conditions CNEL noise levels. The HY 2040 without Project exterior noise levels range from 70.7 to 75.4 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-6 shows that the HY 2040 with Project conditions will range from 70.7 to 75.5 dBA CNEL. Table 7-9 shows that the Project off-site traffic noise level increases range from 0.0 to 1.2 dBA CNEL. Based on the significance criteria for off-site traffic noise presented in Table 4-1, land uses adjacent to the study area roadway segments would experience *less than significant* noise level impacts due to unmitigated Project-related traffic noise levels.

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

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Receiving Land Use (dBA)[1] | | | Incremental Noise Level Increase Threshold[2] | |
|---|---|---|---|---|---|---|---|---|
| | | | | No Project | With Project | Project Addition | Limit | Exceeded? |
| 1 | Pepper Av. | s/o Highland Av. | Non-Sensitive | 69.7 | 71.6 | 1.9 | n/a | No |
| 2 | Pepper Av. | s/o SR-210 EB Ramps | Sensitive | 73.0 | 73.0 | 0.0 | 1.5 | No |
| 3 | State St. | n/o Highland Av. | Sensitive | 70.4 | 70.4 | 0.0 | 1.5 | No |
| 4 | State St. | s/o Highland Av. | Sensitive | 72.1 | 72.1 | 0.0 | 1.5 | No |
| 5 | Highland Av. | w/o Driveway 1 | Non-Sensitive | 68.9 | 69.0 | 0.1 | n/a | No |
| 6 | Highland Av. | w/o Pepper Av. | Non-Sensitive | 68.9 | 69.3 | 0.4 | n/a | No |
| 7 | Highland Av. | e/o Pepper Av. | Non-Sensitive | 71.2 | 71.2 | 0.0 | 3.0 | No |
| 8 | Highland Av. | e/o State St. | Non-Sensitive | 70.8 | 70.8 | 0.0 | 3.0 | 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)?
"n/a" Per the OPR land use/noise compatibility standards, a barely perceptible 3 dBA or greater noise level increase is considered a significant impact when the ambient non-noise sensitive noise level is greater than the normally acceptable 70 dBA CNEL land use compatibility criteria.

**TABLE 7-8: OYC 2029 WITH PROJECT TRAFFIC NOISE LEVEL INCREASES**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Receiving Land Use (dBA)[1] | | | Incremental Noise Level Increase Threshold[2] | |
|---|---|---|---|---|---|---|---|---|
| | | | | No Project | With Project | Project Addition | Limit | Exceeded? |
| 1 | Pepper Av. | s/o Highland Av. | Non-Sensitive | 71.3 | 72.6 | 1.3 | n/a | No |
| 2 | Pepper Av. | s/o SR-210 EB Ramps | Sensitive | 75.0 | 75.0 | 0.0 | 1.5 | No |
| 3 | State St. | n/o Highland Av. | Sensitive | 70.9 | 70.9 | 0.0 | 1.5 | No |
| 4 | State St. | s/o Highland Av. | Sensitive | 72.6 | 72.6 | 0.0 | 1.5 | No |
| 5 | Highland Av. | w/o Driveway 1 | Non-Sensitive | 70.3 | 70.3 | 0.0 | n/a | No |
| 6 | Highland Av. | w/o Pepper Av. | Non-Sensitive | 70.3 | 70.6 | 0.3 | n/a | No |
| 7 | Highland Av. | e/o Pepper Av. | Non-Sensitive | 72.2 | 72.2 | 0.0 | n/a | No |
| 8 | Highland Av. | e/o State St. | Non-Sensitive | 71.9 | 71.9 | 0.0 | n/a | 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)?
"n/a" Per the OPR land use/noise compatibility standards, a barely perceptible 3 dBA or greater noise level increase is considered a significant impact when the ambient non-noise sensitive noise level is greater than the normally acceptable 70 dBA CNEL land use compatibility criteria.

**TABLE 7-9: HY 2040 WITH PROJECT TRAFFIC NOISE LEVEL INCREASES**

| ID | Road | Segment | Receiving Land Use[1] | CNEL at Receiving Land Use (dBA)[1] | | | Incremental Noise Level Increase Threshold[2] | |
|---|---|---|---|---|---|---|---|---|
| | | | | No Project | With Project | Project Addition | Limit | Exceeded? |
| 1 | Pepper Av. | s/o Highland Av. | Non-Sensitive | 71.7 | 72.9 | 1.2 | n/a | No |
| 2 | Pepper Av. | s/o SR-210 EB Ramps | Sensitive | 75.4 | 75.5 | 0.1 | 1.5 | No |
| 3 | State St. | n/o Highland Av. | Sensitive | 71.3 | 71.3 | 0.0 | 1.5 | No |
| 4 | State St. | s/o Highland Av. | Sensitive | 73.1 | 73.1 | 0.0 | 1.5 | No |
| 5 | Highland Av. | w/o Driveway 1 | Non-Sensitive | 70.7 | 70.7 | 0.0 | n/a | No |
| 6 | Highland Av. | w/o Pepper Av. | Non-Sensitive | 70.7 | 71.0 | 0.3 | n/a | No |
| 7 | Highland Av. | e/o Pepper Av. | Non-Sensitive | 72.6 | 72.7 | 0.1 | n/a | No |
| 8 | Highland Av. | e/o State St. | Non-Sensitive | 72.3 | 72.3 | 0.0 | n/a | 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)?
"n/a" Per the OPR land use/noise compatibility standards, a barely perceptible 3 dBA or greater noise level increase is considered a significant impact when the ambient non-noise sensitive noise level is greater than the normally acceptable 70 dBA CNEL land use compatibility criteria.

# 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, six receiver locations in the vicinity of the Project site were identified. 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. Due to the additional attenuation from distance and the shielding of intervening structures, other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures. Distance is measured in a straight line from the project boundary to each receiver location.

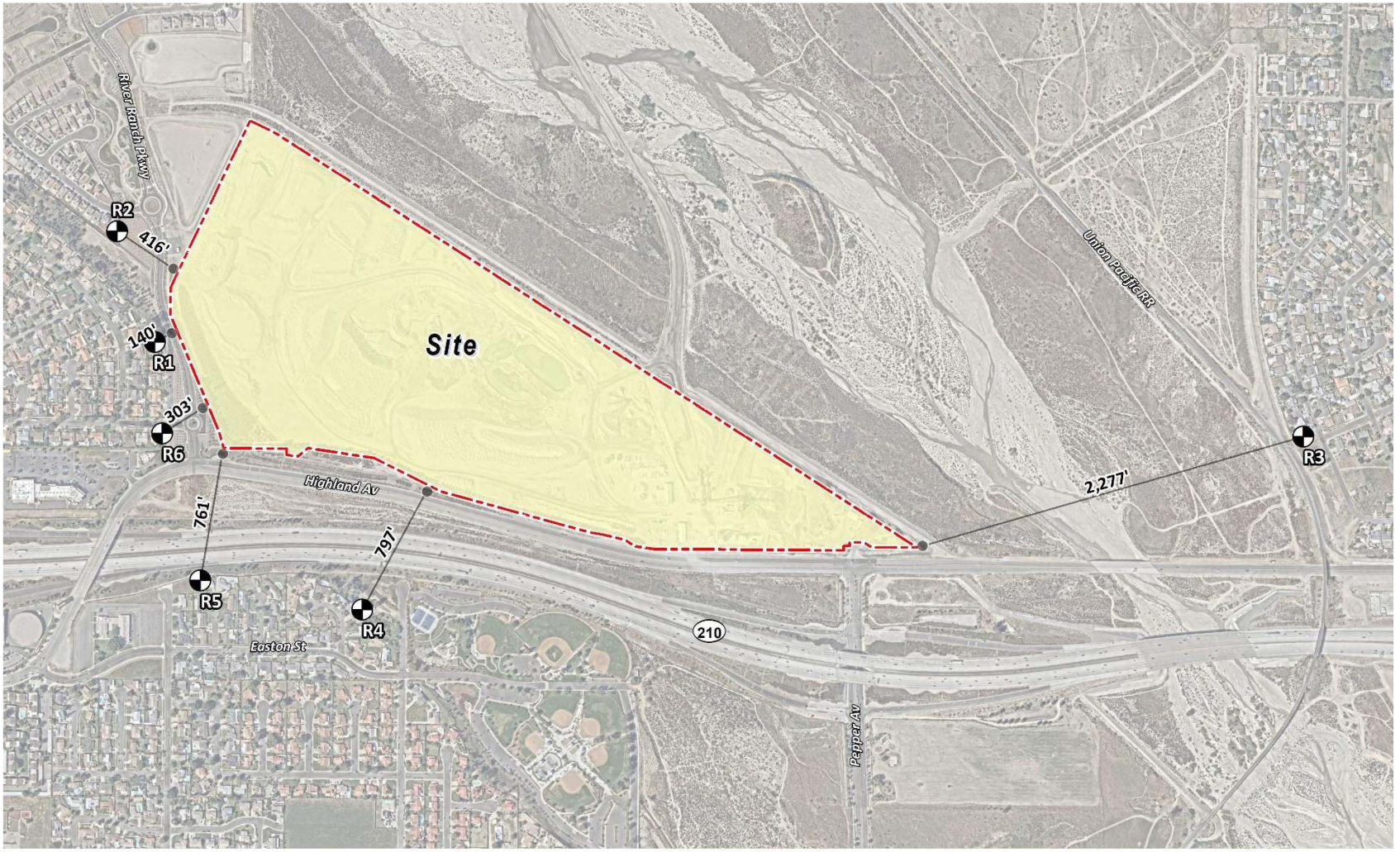
R1: Location R1 represents the existing noise sensitive residence at 2184 N Oakdale Avenue approximately 140 feet west of the Project site. Receiver R1 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the existing noise sensitive residence at 2344 Powell Drive, approximately 416 feet west of the Project site. Receiver R2 is placed in the private outdoor living areas (backyard) facing the Project site. 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 2382 Duffy Street approximately 2,277 feet east of the Project site. Receiver R3 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L3, to describe the existing ambient noise environment.

R4: Location R4 represents the existing noise sensitive residence at 1951 Joyce Avenue, approximately 797 feet south of the Project site. Receiver R4 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L4, to describe the existing ambient noise environment. ambient noise environment.

**EXHIBIT 8-A: RECEIVER LOCATIONS**




**LEGEND:**

N

Site Boundary | Receiver Locations | Distance from receiver to Project site boundary (in feet)

R5: Location R5 represents the existing noise sensitive residence at 1974 N Oakdale Avenue approximately 761 feet south of the Project site. Receiver R5 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L5, to describe the existing ambient noise environment.

R6: Location R6 represents the existing noise sensitive residence at 2132 N Oakdale Avenue approximately 303 feet west of the Project site. Receiver R6 is placed in the private outdoor living areas (backyard) facing the Project site. A 24-hour noise measurement was taken near this location, L6, to describe the existing ambient noise environment.

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# 9 OPERATIONAL NOISE IMPACTS

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 Pepper 210 Commerce Center Project. Exhibit 9-A of the Noise Study includes over 58 individual noise sources to fully describe the potential reasonable worst-case noise environment.

## 9.1 OPERATIONAL NOISE SOURCES

This operational noise analysis is intended to describe noise level impacts associated with the expected typical of daytime and nighttime activities at the Project site. Consistent with similar warehouse uses, the Project business operations would primarily be conducted within the enclosed building, except for traffic movement, parking, as well as loading and unloading of trucks at designated loading bays. The on-site Project-related noise sources are expected to include: loading dock activity, roof-top air conditioning units, parking lot vehicle activities, trash enclosure activity, and truck movements.

## 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 reasonable worst-case noise environment with the typical noise sources 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 precision 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

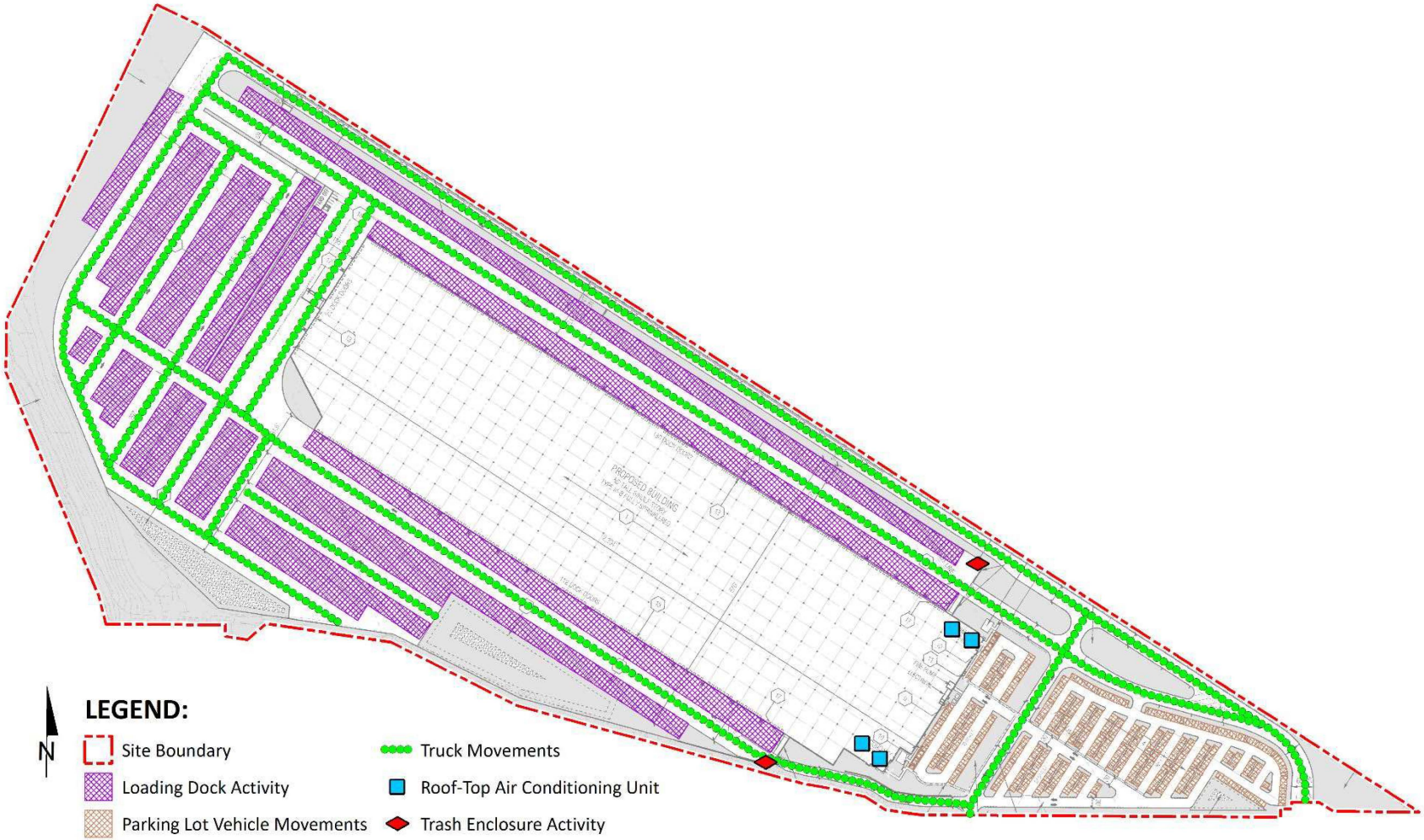


**TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS**

| Reference Noise Source | Noise Source Height (Feet) | Min./ Hour[1] | | Reference Noise Level (dBA $L_{eq}$) @ 50 Feet | Sound Power Level (dBA)[2] |
|---|---|---|---|---|---|
| | | Day | Night | | |
| Loading Dock Activity | 8' | 60 | 60 | 62.8 | 103.4 |
| Roof-Top Air Conditioning Units | 5' | 39 | 28 | 57.2 | 88.9 |
| Parking Lot Vehicle Movements | 5' | 60 | 60 | 52.6 | 81.1 |
| Trash Enclosure Activity | 5' | 60 | 30 | 57.3 | 89.0 |
| Truck Movements | 8' | 60 | 60 | 59.8 | 93.2 |

[1] 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. - 7:00 a.m.

[2] 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 LOADING DOCK ACTIVITY

The reference loading dock activities are intended to describe the typical operational noise source levels associated with the Project. This includes truck idling, deliveries, backup alarms, unloading/loading, docking including a combination of tractor trailer semi-trucks, two-axle delivery trucks, and background forklift operations. At a uniform reference distance of 50 feet, Urban Crossroads collected a reference noise level of 62.8 dBA $L_{eq}$. The loading dock activity noise level measurement was taken over a fifteen-minute period and represents multiple noise sources taken from the center of activity. The reference noise level measurement includes employees unloading a docked truck container included the squeaking of the truck's shocks when weight was removed from the truck, employees playing music over a radio, as well as a forklift horn and backup alarm. In addition, during the noise level measurement a truck entered the loading dock area and proceeded to reverse and dock in a nearby loading bay, adding truck engine, idling, air brakes noise, in addition to on-going idling of an already docked truck. Loading dock activity is estimated during all the daytime, evening, and nighttime hours.

### 9.2.3 ROOF-TOP AIR CONDITIONING UNITS

The noise level measurements describe a single mechanical roof-top air conditioning unit. The reference noise level represents a Lennox SCA120 series 10-ton model packaged air conditioning unit. At the uniform reference distance of 50 feet, the reference noise level is 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 and average 39 minutes per hour during the daytime hours, and 28 minutes per hour during the nighttime hours. These operating conditions reflect peak summer cooling requirements with measured temperatures approaching 96 degrees Fahrenheit (°F) with average daytime temperatures of 82°F. For this noise analysis, the air conditioning units are expected to be located on the roof of the Project buildings.

### 9.2.4 PARKING LOT VEHICLE MOVEMENTS

To describe the on-site parking lot activity, a long-term 29-hour reference noise level measurement was collected in the center of activity within the staff parking lot of a warehouse distribution center. At 50 feet from the center of activity, the parking lot produced a reference noise level of 52.6 dBA $L_{eq}$. Parking activities are expected to take place during the full hour (60 minutes) throughout the daytime and evening hours. The parking lot noise levels are mainly due to cars pulling in and out of parking spaces in combination with car doors opening and closing.

### 9.2.5 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.

### 9.2.6 TRUCK MOVEMENTS

The truck movements reference noise level measurement was collected over a period of 1 hour and 28 minutes and represent multiple heavy trucks entering and exiting the outdoor loading dock area producing a reference noise level of 59.8 dBA $L_{eq}$ at 50 feet. The noise sources included at this measurement location account for trucks entering and existing the Project driveways and maneuvering in and out of the outdoor loading dock activity area.

## 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 9613-2 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 9613-2 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 0.5 was used in the CadnaA noise analysis to account for mixed ground representing a combination of hard and soft surfaces. Appendix 9.1 includes the detailed noise model inputs including the planned screenwall 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 loading dock activity, roof-top air conditioning units, parking lot vehicle activities, trash enclosure activity, and truck movements, Urban Crossroads, Inc. calculated the unmitigated 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. Table 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 29.7 to 51.4 dBA $L_{eq}$.

**TABLE 9-2: DAYTIME PROJECT OPERATIONAL NOISE LEVELS**

| Noise Source[1] | Operational Noise Levels by Receiver Location (dBA Leq) | | | | | |
|---|---|---|---|---|---|---|
| | R1 | R2 | R3 | R4 | R5 | R6 |
| Loading Dock Activity | 51.1 | 48.6 | 28.7 | 44.8 | 43.6 | 46.9 |
| Roof-Top Air Conditioning Units | 17.0 | 15.8 | 14.6 | 22.8 | 18.3 | 17.6 |
| Parking Lot Vehicle Movements | 6.9 | 3.6 | 15.6 | 20.0 | 13.6 | 8.4 |
| Trash Enclosure Activity | 13.2 | 12.2 | 9.6 | 16.6 | 12.4 | 13.8 |
| Truck Movements | 38.8 | 35.7 | 20.5 | 32.7 | 31.9 | 35.5 |
| **Total (All Noise Sources)** | **51.4** | **48.8** | **29.7** | **45.1** | **43.9** | **47.2** |

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

Table 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 29.6 to 51.3 dBA $L_{eq}$. The differences between the daytime and nighttime noise levels are largely related to the estimated duration of noise activity as outlined in Table 9-1 and 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 | R4 | R5 | R6 |
| Loading Dock Activity | 51.1 | 48.6 | 28.7 | 44.8 | 43.6 | 46.9 |
| Roof-Top Air Conditioning Units | 14.6 | 13.4 | 12.1 | 20.4 | 15.9 | 15.2 |
| Parking Lot Vehicle Movements | 6.9 | 3.6 | 15.6 | 20.0 | 13.6 | 8.4 |
| Trash Enclosure Activity | 9.2 | 8.2 | 5.7 | 12.6 | 8.4 | 9.8 |
| Truck Movements | 38.8 | 35.7 | 20.5 | 32.7 | 31.9 | 35.5 |
| **Total (All Noise Sources)** | **51.3** | **48.8** | **29.6** | **45.1** | **43.9** | **47.2** |

[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 County of San Bernardino exterior noise level standards at nearby noise-sensitive receiver locations. Table 9-4 shows the operational noise levels associated with Pepper 210 Commerce Center will satisfy the exterior noise level standards, adjusted to reflect the ambient noise levels (see Table 5-1) per the County of San Bernardino Development Code Section 83.01.080[e]. 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 | 51.4 | 51.3 | 57.8 | 52.7 | No | No |
| R2 | 48.8 | 48.8 | 58.4 | 51.9 | No | No |
| R3 | 29.7 | 29.6 | 59.9 | 59.3 | No | No |
| R4 | 45.1 | 45.1 | 69.6 | 66.9 | No | No |
| R5 | 43.9 | 43.9 | 58.6 | 54.7 | No | No |
| R6 | 47.2 | 47.2 | 58.9 | 53.4 | No | No |

[1] See Exhibit 8-A for the receiver locations.
[2] Proposed Project unmitigated 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 County of San Bernardino Development Code Section 83.01.080[e].
[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.

## 9.6 PROJECT OPERATIONAL NOISE LEVEL INCREASES

To describe the Project operational noise level increases, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations that may be 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. (2) 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 Table 9-5, the Project will generate a daytime operational noise level increase ranging from 0.0 to 0.9 dBA $L_{eq}$ at the nearest receiver locations. Table 9-6 shows that the Project will generate a nighttime operational noise level increase ranging from 0.0 to 2.4 dBA $L_{eq}$ at the nearest receiver locations. Project-related operational noise level increases will not exceed the operational noise level increase significance criteria presented in Table 4-1. Therefore, Project related operational noise level 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] | Increase Criteria[7] | Increase Criteria Exceeded? |
|---|---|---|---|---|---|---|---|
| R1 | 51.3 | L1 | 57.8 | 58.7 | 0.9 | 5.0 | No |
| R2 | 48.8 | L2 | 58.4 | 58.9 | 0.5 | 5.0 | No |
| R3 | 29.6 | L3 | 59.9 | 59.9 | 0.0 | 5.0 | No |
| R4 | 45.1 | L4 | 69.6 | 69.6 | 0.0 | 1.5 | No |
| R5 | 43.9 | L5 | 58.6 | 58.7 | 0.1 | 5.0 | No |
| R6 | 47.2 | L6 | 58.9 | 59.2 | 0.3 | 5.0 | 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 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] | Increase Criteria[7] | Increase Criteria Exceeded? |
|---|---|---|---|---|---|---|---|
| R1 | 51.3 | L1 | 52.7 | 55.1 | 2.4 | 5.0 | No |
| R2 | 48.8 | L2 | 51.9 | 53.6 | 1.7 | 5.0 | No |
| R3 | 29.6 | L3 | 59.3 | 59.3 | 0.0 | 5.0 | No |
| R4 | 45.1 | L4 | 66.9 | 66.9 | 0.0 | 1.5 | No |
| R5 | 43.9 | L5 | 54.7 | 55.0 | 0.3 | 5.0 | No |
| R6 | 47.2 | L6 | 53.4 | 54.3 | 0.9 | 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.

# 10 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 10-A shows the construction noise source locations in relation to the nearest sensitive receiver locations previously described in Section 8. To prevent high levels of construction noise from impacting noise-sensitive land uses, County of San Bernardino Development Code Section 83.01.080[g][3], states that construction activities are limited to the hours of 7:00 a.m. to 7:00 p.m. on any day and limited at any time on Sundays and federal holidays.

## 10.1 CONSTRUCTION NOISE LEVELS

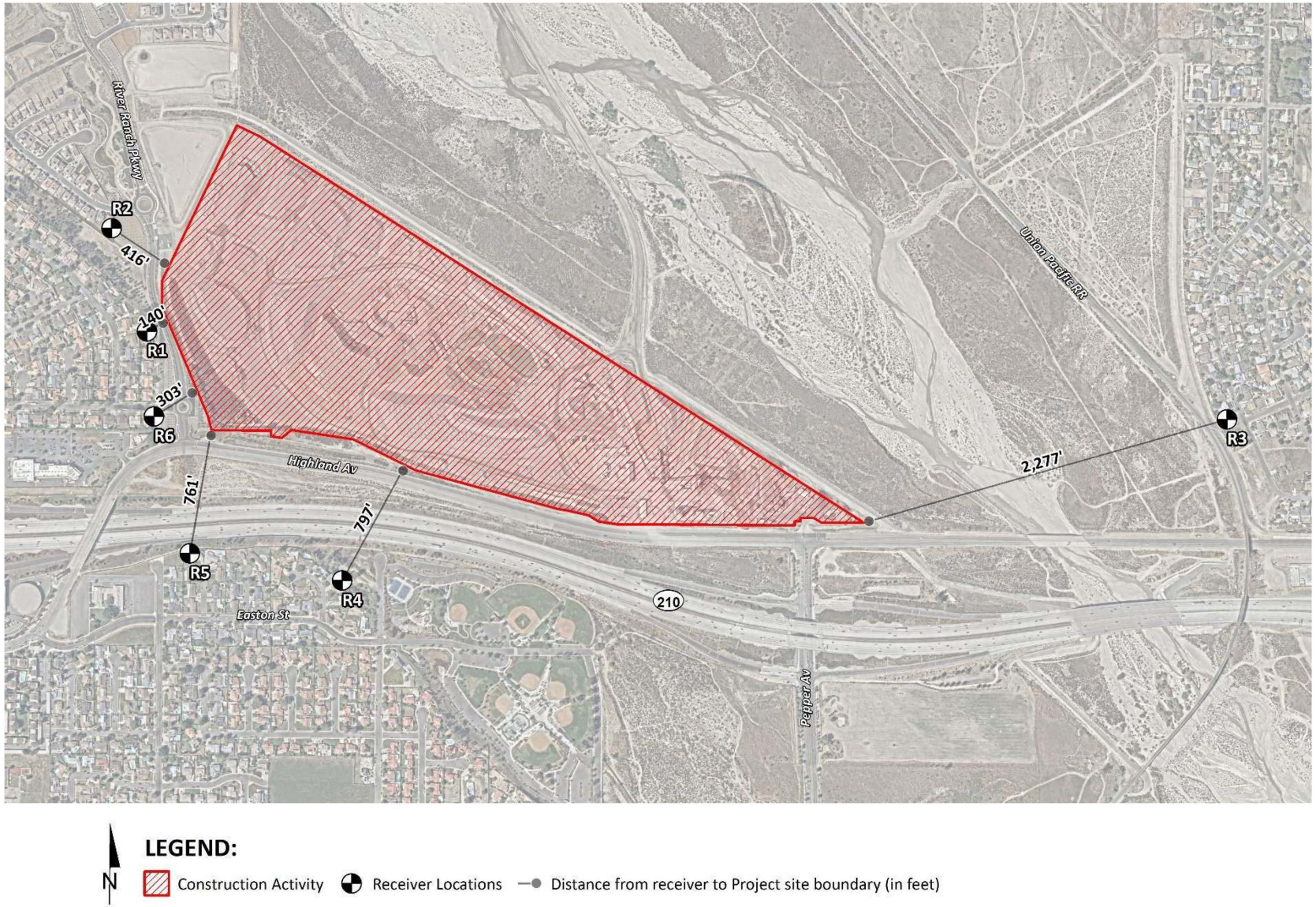
The FTA *Transit Noise and Vibration Impact Assessment Manual* recognizes that construction projects are accomplished in several different stages and outlines the procedures for assessing noise impacts during construction. Each stage has a specific equipment mix, depending on the work to be completed during that stage. As a result of the equipment mix, each stage has its own noise characteristics; some stages have higher continuous noise levels than others, and some have higher impact noise levels than others. The Project construction activities are expected to occur in the following stages:

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

## 10.2 CONSTRUCTION REFERENCE NOISE LEVELS

To describe construction noise activities, this construction noise analysis was prepared using reference construction equipment noise levels from the Federal Highway Administration (FHWA) published the Roadway Construction Noise Model (RCNM), which includes a national database of construction equipment reference noise emission levels. (22) The RCNM equipment database, provides a comprehensive list of the noise generating characteristics for specific types of construction equipment. In addition, the database provides an acoustical usage factor to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

**EXHIBIT 10-A: CONSTRUCTION NOISE SOURCE LOCATIONS**



## 10.3 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 nearby sensitive receiver locations were completed. Consistent with FTA guidance for detailed construction noise assessment, Table 10-1 presents the combined noise levels for the loudest construction equipment, assuming all equipment operates at the same time. To account for the dynamic nature of construction activities, the CadnaA construction noise analysis evaluates the equipment as multiple moving point sources within the construction area (Project site boundary). Construction impacts are based on the highest noise level calculated at each receiver location. As shown on Table 10-2, the construction noise levels are expected to range from 53.3 to 62.2 dBA $L_{eq}$ at the nearby receiver locations. Appendix 10.1 includes the detailed CadnaA construction noise model inputs.

**TABLE 10-1: CONSTRUCTION REFERENCE NOISE LEVELS**

| Construction Stage | Reference Construction Equipmnet[1] | Reference Noise Level @ 50 Feet (dBA $L_{eq}$) | Composite Reference Noise Level (dBA $L_{eq}$)[2] | Reference Power Level (dBA $L_w$)[3] |
|---|---|---|---|---|
| Site Preparation | Tractor | 80 | 84.0 | 115.6 |
| | Backhoe | 74 | | |
| | Grader | 81 | | |
| Grading | Scraper | 80 | 83.3 | 114.9 |
| | Excavator | 77 | | |
| | Dozer | 78 | | |
| Building Construction | Crane | 73 | 80.6 | 112.2 |
| | Generator | 78 | | |
| | Front End Loader | 75 | | |
| Paving | Paver | 74 | 77.8 | 109.5 |
| | Dump Truck | 72 | | |
| | Roller | 73 | | |
| Architectural Coating | Man Lift | 68 | 76.2 | 107.8 |
| | Compressor (air) | 74 | | |
| | Generator (<25kVA) | 70 | | |

[1] FHWA Road Construction Noise Model.
[2] Represents the combined noise level for all equipment assuming they operate at the same time consistent with FTA Transit Noise and Vibration Impact Assessment guidance.
[3] Sound power level represents the total amount of acoustical energy (noise level) produced by a sound source independent of distance or surroundings.

**TABLE 10-2: ON-SITE CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY**

| Receiver Location[1] | Construction Noise Levels (dBA $L_{eq}$) | | | | | |
|---|---|---|---|---|---|---|
| | Site Preparation | Grading | Building Construction | Paving | Architectural Coating | Highest Levels[2] |
| R1 | 56.4 | 55.7 | 53.0 | 50.3 | 48.6 | 56.4 |
| R2 | 53.2 | 52.5 | 49.8 | 47.1 | 45.4 | 53.2 |
| R3 | 41.2 | 40.5 | 37.8 | 35.1 | 33.4 | 41.2 |
| R4 | 53.5 | 52.8 | 50.1 | 47.4 | 45.7 | 53.5 |
| R5 | 50.0 | 49.3 | 46.6 | 43.9 | 42.2 | 50.0 |
| R6 | 52.5 | 51.8 | 49.1 | 46.4 | 44.7 | 52.5 |

[1] Construction noise source and receiver locations are shown on Exhibit 10-A.
[2] Construction noise level calculations based on distance from the construction activity, which is measured from the Project site boundary to the nearest receiver locations. CadnaA construction noise model inputs are included in Appendix 10.1.

## 10.4 CONSTRUCTION NOISE LEVEL COMPLIANCE

To evaluate whether the Project will generate potentially significant short-term noise levels at nearest receiver locations, a construction-related daytime noise level threshold of 80 dBA $L_{eq}$ is used as a reasonable threshold to assess the daytime construction noise level impacts. The construction noise analysis shows that the nearest receiver locations will satisfy the reasonable daytime 80 dBA $L_{eq}$ significance threshold during Project construction activities as shown on Table 10-3. Therefore, the noise impacts due to Project construction noise are considered *less than significant* at all receiver locations.

**TABLE 10-3: PROJECT SITE CONSTRUCTION NOISE LEVEL COMPLIANCE**

| Receiver Location[1] | Construction Noise Levels (dBA $L_{eq}$) | | |
|---|---|---|---|
| | Highest Construction Noise Levels[2] | Threshold[3] | Threshold Exceeded?[4] |
| R1 | 56.4 | 80 | No |
| R2 | 53.2 | 80 | No |
| R3 | 41.2 | 80 | No |
| R4 | 53.5 | 80 | No |
| R5 | 50.0 | 80 | No |
| R6 | 52.5 | 80 | No |

[1] Construction noise source and receiver locations are shown on Exhibit 10-A.
[2] Highest construction noise level calculations based on distance from the construction noise source activity to the nearest receiver locations as shown on Table 10-2.
[3] Construction noise level thresholds as shown on Table 4-1.
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

## 10.6 NIGHTTIME CONCRETE POUR NOISE ANALYSIS

It is our understanding that nighttime concrete pouring activities will occur as a part of Project building construction activities. Nighttime concrete pouring activities are often used to support

reduced concrete mixer truck transit times and lower air temperatures than during the daytime hours and are generally limited to the actual building pad area. Since the nighttime concrete pours will take place outside the permitted County of San Bernardino Municipal Code, Section 16.20.125.E.3 hours of *7:00 a.m. to 7:00 p.m. on any day and at any time on Sundays and federal holidays*. The Project Applicant will be required to obtain authorization for nighttime work from the County of San Bernardino. Any nighttime construction noise activities shall satisfy the noise limits outlined in Table 3-1.

### 10.6.1 Nighttime Concrete Pour Reference Noise Level Measurements

To estimate the noise levels due to nighttime concrete pouring activities, sample reference noise level measurements were taken during a nighttime concrete pouring at a construction site. Urban Crossroads, Inc. collected short-term nighttime concrete pour reference noise level measurements during the noise-sensitive nighttime hours between 1:00 a.m. to 2:00 a.m. at 27334 San Bernardino Avenue in the City of Redlands. The reference noise levels describe the expected concrete pour noise sources that may include concrete mixer truck movements and pouring activities, concrete paving equipment, rear mounted concrete mixer truck backup alarms, engine idling, air brakes, generators, and workers communicating/whistling. To describe the nighttime concrete pour noise levels associated with the construction of the Pepper 210 Commerce Center, this analysis relies on reference sound pressure level of 67.7 dBA $L_{eq}$ at 50 feet.

### 10.6.2 Nighttime Concrete Pour Noise Level Compliance

As shown on Table 10-4, the noise levels associated with the nighttime concrete pour activities are estimated to range from 25.9 to 41.1 dBA $L_{eq}$ and will satisfy the County of San Bernardino nighttime stationary-source exterior hourly average $L_{eq}$ residential noise level threshold at all the receiver locations. Based on the results of this analysis, all nearest noise receiver locations will experience *less than significant* impacts due to the Project related nighttime concrete pour activities. Appendix 10.2 includes the CadnaA nighttime concrete pour noise model inputs.

**TABLE 10-4: NIGHTTIME CONCRETE POUR NOISE LEVEL COMPLIANCE**

| Receiver Location[1] | Concrete Pour Construction Noise Levels (dBA $L_{eq}$) | | |
|---|---|---|---|
| | Exterior Noise Levels[2] | Threshold[3] | Threshold Exceeded?[4] |
| R1 | 41.1 | 52.7 | No |
| R2 | 37.9 | 51.9 | No |
| R3 | 25.9 | 59.3 | No |
| R4 | 38.2 | 66.9 | No |
| R5 | 34.7 | 54.7 | No |
| R6 | 37.2 | 53.4 | No |

[1] Construction noise source and receiver locations are shown on Exhibit 10-A.
[2] Nighttime Concrete Pour noise model inputs are included in Appendix 10.2.
[3] Exterior nighttime noise level standards, adjusted to reflect the ambient noise levels (see Table 5-1) per the County of San Bernardino Development Code Section 83.01.080[e].
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

## 10.7 CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. The 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 10-5. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential Project construction vibration levels using the following vibration assessment methods defined by the FTA. To calculate the vibration levles, the FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

**TABLE 10-5: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT**

| Equipment | PPV (in/sec) at 25 feet |
|---|---|
| Small bulldozer | 0.003 |
| Jackhammer | 0.035 |
| Loaded Trucks | 0.076 |
| Large bulldozer | 0.089 |
| Vibratory Roller | 0.210 |

Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual

Table 10-6 presents the expected Project related vibration levels at the nearby receiver locations. At distances ranging from 140 to 2,277 feet from Project construction activities, construction vibration velocity levels are estimated to range from 0.000 to 0.016 in/sec PPV. Based on maximum acceptable continuous vibration threshold of 0.2 PPV (in/sec), the typical Project construction vibration levels will fall below the building damage thresholds at all the noise sensitive receiver locations. Therefore, the Project-related vibration impacts are considered *less than significant* during typical construction activities at the Project site.

**TABLE 10-6: PROJECT CONSTRUCTION VIBRATION LEVELS**

| Location[1] | Distance to Const. Activity (Feet)[2] | Typical Construction Vibration Levels PPV (in/sec)[3] | | | | | | Thresholds PPV (in/sec)[4] | Thresholds Exceeded?[5] |
|---|---|---|---|---|---|---|---|---|---|
| | | Small bulldozer | Jack-hammer | Loaded Trucks | Large bulldozer | Vibratory Roller | Highest Vibration Level | | |
| R1 | 140' | 0.000 | 0.003 | 0.006 | 0.007 | 0.016 | 0.016 | 0.2 | No |
| R2 | 416' | 0.000 | 0.001 | 0.001 | 0.001 | 0.003 | 0.003 | 0.2 | No |
| R3 | 2,277' | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.2 | No |
| R4 | 797' | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.2 | No |
| R5 | 761' | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.001 | 0.2 | No |
| R6 | 303' | 0.000 | 0.001 | 0.002 | 0.002 | 0.005 | 0.005 | 0.2 | No |

[1] Construction noise source and receiver locations are shown on Exhibit 10-A.
[2] Distance from receiver to limits of construction activity.
[3] Based on the Vibration Source Levels of Construction Equipment (Table 10-5).
[4] Section 83.01.090[a] of the County of San Bernardino County Code.
[5] Does the peak vibration exceed the acceptable vibration thresholds?
"PPV" = Peak Particle Velocity

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# 11 REFERENCES


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5. **U.S. Department of Transportation Federal Highway Administration.** *Highway Noise Barrier Design Handbook.* 2001.
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10. **County of San Bernardino.** *Countywide Plan.* September 2022.
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19. **Urban Crossroads, Inc.** *Pepper 210 Commerce Center Traffic Analysis.* November 2023.
20. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning.** *FHWA Roadway Construction Noise Model.* January, 2006.

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# 12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Pepper 210 Commerce 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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**EDUCATION**

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

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

**PROFESSIONAL REGISTRATIONS**

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

**PROFESSIONAL AFFILIATIONS**

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

**PROFESSIONAL CERTIFICATIONS**

Certified Acoustical Consultant – County of San Diego • March, 2018
Certified Acoustical Consultant – County of Orange • February, 2011
FHWA-NHI-142051 Highway Traffic Noise Certificate of Training • February, 2013

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# APPENDIX 3.1:

# COUNTY OF SAN BERNARDINO MUNICIPAL CODE

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# CHAPTER 7: NOISE ABATEMENT AND CONTROL

Section



## § 24.0701 Purpose.

Disturbing, excessive or offensive noise may interfere with a person's right to enjoy life and property and may be detrimental to the public health and safety. The purpose of this Chapter is to regulate noise in the unincorporated area of the County of San Bernardino to promote the public health, comfort, and convenience of its inhabitants and visitors. This Chapter is not intended to establish thresholds of significance for the purpose of any analysis required by the California Environmental Quality Act and no such thresholds are established.

(Ord. 4361, passed - -2019)

## § 24.0702 Definitions.

The following definitions shall apply to this Chapter:

(a) ***AMBIENT NOISE LEVEL.*** The composite of existing noise from all sources at a given location and time. Ambient noise is sometimes referred to as background noise.

(b) ***AVERAGE SOUND LEVEL.*** The level in decibels of the mean-square A-weighted sound pressure during a stated time period, with reference to the square of the standard reference sound pressure of 20 micropascals. The ***AVERAGE SOUND LEVEL*** is equivalent to the industry standard LEQ.

(c) ***AUDIO EQUIPMENT.*** A television, stereo, radio, tape player, compact disc player, mp3 player, I-POD, or other similar device.

(d) ***A-WEIGHTED SOUND LEVEL.*** The sound level in decibels as measured on a sound level meter using the A-weighted network. The A-weighted network is the network for measuring sound that most closely resembles what the human ear hears. Sound measured using the A-weighted network is designated dB(A).

(e) ***CONSTRUCTION EQUIPMENT.*** Tools, machinery, or equipment including "special construction equipment" defined in the Vehicle Code, used in a construction operation on any construction site.

(f) ***DECIBEL.*** A unit for measuring the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals.

(g) ***DISTURBING, EXCESSIVE, OR OFFENSIVE NOISE.*** Any sound or noise that endangers the health or safety of any person, or causes discomfort or annoyance to any reasonable person of normal sensitivity.

(h) ***EMERGENCY WORK.*** Work: (1) necessary to restore property to a safe condition following a public calamity; (2) required to protect a person or property from injury or damage; or (3) by a public or private utility to restore utility service.

(i) ***ENFORCEMENT AUTHORITY.*** The County of San Bernardino Land Use Services Department, Code Enforcement Division, the San Bernardino County Sheriff's Department, and any other County department designated by the County Chief Executive Officer or Board of Supervisors to enforce the provisions of the County Code and/or this Chapter.

(j) ***MAXIMUM SOUND LEVEL.*** The highest sound level reached when measuring noise with a sound level meter using the A-weighted network and slow time weighting. The ***MAXIMUM SOUND LEVEL*** is equivalent to the industry standard known as LMAX.

(k) ***MOTOR VEHICLE.*** Any self-propelled vehicle as defined in the Vehicle Code and includes a mini-bike and a go-cart.

(l) ***NEIGHBORING INHABITANT.*** Any individual residing within 200 yards of a property that is alleged to be the source of noise in violation of this Chapter.

(m) ***OCCUPIED PROPERTY.*** Property on which there is a building for which a certificate of occupancy has been issued.

(n) ***PLAINLY AUDIBLE.*** Any sound that can be detected by a person using his or her unaided hearing faculties. As an example, if the sound source under investigation is a portable or personal vehicular sound amplification or reproduction device, the detection of the rhythmic base component of music is sufficient to verify plainly audible sound. The enforcement authority need not determine the title, specific words, or the artist performing the music.

(o) ***SOUND AMPLIFYING EQUIPMENT.*** Any machine or device used to amplify music, the human voice, or any sound such as a loudspeaker, microphone, megaphone, or other similar device.

(p) ***SOUND LEVEL.*** The weighted sound pressure level obtained using a sound level meter and frequency weighting network as provided in the American National Standards Institute (ANSI) specifications for sound level meters. As used in this Chapter, ***SOUND LEVEL*** means the same as "noise level."

(q) ***SOUND LEVEL METER.*** An instrument for the measurement of sound levels, which meets or exceeds the requirements pertinent for a type 1 or type 2 meter in the ANSI specifications for sound level meters (ANSI § SI.4 1979, Type 1 or Type 2).

(Ord. 4361, passed - -2019)

### § 24.0703 Sound Level Measurements.

A sound level measurement made pursuant to this Chapter shall be measured:

(a) At the property line of the nearest site that is occupied, and/or zoned or designated to allow the development of noise-sensitive land uses;

(b) With a sound level meter that meets the standards of the American National Standards Institute (ANSI § SI.4 1979, Type 1 or Type 2); and

(c) Using the A-weighted sound level pressure scale in decibels (ref. pressure = 20 micronewtons per meter squared). The unit of measure shall be designated as dB(A).

(Ord. 4361, passed - -2019)

### § 24.0704 General Sound Level Limits.

The general noise standards concerning acceptable noise levels identified in §83.01.080 of this Code, or as subsequently modified or renumbered, are incorporated herein by reference. No person shall create any sound, or allow the creation of any sound, on any property that causes the sound level on any other occupied property to exceed the sound level limits set forth in § 83.01.080 of this Code.

(Ord. 4361, passed - -2019)

### § 24.0705 Disturbing, Excessive or Offensive Noise.

(a) In addition to the general limitations on sound levels in §24.0704, it shall be unlawful for any person or property owner within the County to make, cause, or allow to be made a noise that would be disturbing, excessive, or offensive to a reasonable person. The types of disturbing, excessive, or offensive noise may include, but shall not be limited to, yelling, shouting, hooting, whistling, singing, playing a musical instrument, or emitting or transmitting any loud music or noise from any audio equipment or sound amplifying equipment.

(b) The factors, standards, and conditions that may be considered in determining whether a violation of this Section has been committed, include, but are not limited to, the following:

(1) The level of the noise.

(2) The level and intensity of the background (ambient) noise, if any.

(3) The proximity of the noise to residential or commercial sleeping areas.

(4) The nature and zoning of the area within which the noise emanates and where it is received.

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

(6) The time of day and night the noise occurs.

(7) The duration of the noise.

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

(9) Whether the origin of the noise is natural or unnatural.

(10) Whether the noise is produced by a commercial or noncommercial activity.

(11) The number of complaints received.

(c) Unless a noise source is determined to be disturbing, excessive or offensive by the enforcement authority after

responding to or investigating a complaint, evidence of a violation of this Section must be supported by declarations from two neighboring inhabitants residing on separate properties, unless there is only one neighboring inhabitant. These declarations are to be made under penalty of perjury within a 60-day period from the date of the complaint stating in detail all of the following:

(1) That the declarant is a resident of a residential neighborhood located within 200 yards of the noise source; and

(2) Within the past 30 days the declarant has heard disturbing, excessive or offensive noise for substantially long periods to the annoyance of the declarant.

(d) A complainant residing in excess of 200 yards of the noise source may also establish evidence of a violation in accordance with all other requirements of Subdivision (c) above, provided that the complainant can provide the enforcement authority with credible evidence that he, she, or they are experiencing disturbing, excessive, or offensive noise for the enforcement authority to waive the 200 yard requirement. Evidence may include, but is not limited to, tape recordings, videotapes, sound monitoring logs, photographs, maps, or declarations of other persons.

(e) Whether the sound or noise identified by a declarant endangers the health or safety of any person, or causes discomfort or annoyance to a reasonable person of normal sensitivity, will be determined by the enforcement authority. Declarants should provide additional credible evidence in support of their declaration, which may include, but is not limited to, tape recordings, videotapes, sound monitoring logs, photographs, maps, or declarations of other persons.

(Ord. 4361, passed - -2019)

### § 24.0706 Special Sound Source Standards.

The general sound level limits in §24.0704 and disturbing, excessive or offensive noise in §24.0705 apply to sound emanating from all sources, including the following special sound sources, and the person creating, or allowing the creation of, the sound is subject to the requirements of those sections. In addition, there is a reasonable expectation that certain hours of the evening and early morning will be even quieter and more peaceful than other hours of the day and that certain sound sources occurring during this time period causes discomfort or annoyance to reasonable persons of normal sensitivities. As a result of that expectation, the following special sound sources are subject to the following additional standards, the failure to comply with which constitutes a separate violation of this Chapter and have been declared to be disturbing, excessive, or offensive noise. A noise source is established as a per se violation of this Section in the same manner as provided in Subdivision (c) of § 24.0705.

(a) *Audio Equipment.* No person shall operate, or allow the operation of, any audio equipment, whether portable or not, between the hours of 10:00 p.m. and 7:00 a.m. such that the equipment is plainly audible inside an occupied dwelling other than a dwelling in which the equipment may be located. Sound level measurements may be used, but are not required, to establish a violation of this Subdivision.

(b) *Sound Amplifying Equipment and Live Music.* No person shall install, use or operate sound amplifying equipment, or perform, or allow to be performed, live music, between the hours of 10:00 p.m. and 7:00 a.m. such that the sound amplifying equipment or live music is plainly audible inside an occupied dwelling other than a dwelling in which the sound source is located. Sound level measurements may be used, but are not required, to establish a violation of this Subdivision.

(c) *Power Tools and Equipment.* Except for emergency work, no person shall operate any power tools or equipment between the hours of 10:00 p.m. and 7:00 a.m. such that the power tools or equipment are plainly audible inside an occupied dwelling other than a dwelling in which the power tools or equipment may be located. Sound level measurements may be used, but are not required, to establish a violation of this Subdivision.

(d) *Construction Activity.* Except for emergency work, it shall be unlawful for any person to operate or cause to be operated, construction equipment between 7:00 p.m. and 7:00 a.m.

(Ord. 4361, passed - -2019)

### § 24.0707 Exemptions.

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

(a) *Emergency Work.* Noise sources associated with alerting persons to the existence of an emergency or in the performance of emergency work.

(b) *School Sponsored Activities.* Noise sources emanating from authorized school bands, school athletic and school entertainment events.

(c) *Federal or State Preempted Activities.* Any activity the noise level of which is regulated by State or Federal law.

(d) *Minor Maintenance to Residential Property.* Noise sources associated with minor maintenance to property used for residential purposes, including, but not limited to, lawnmowers, leaf blowers, etc., provided the activities take place between the hours of 7:00 a.m. and 7:00 p.m.

(e) *Public Health, Welfare, and Safety Activities.* Noise sources associated with construction, maintenance, and repair operations conducted by public agencies and/or utility companies or their contractors which are deemed necessary to serve the best interest of the public and to protect the public health, welfare, and safety, including but not limited to, trash collection, street sweeping, debris and limb removal, removal of downed wires, restoring electrical service, repairing traffic

signals, unplugging sewers, vacuuming catch basins, repairing of damaged poles, removing abandoned vehicles, repairing water hydrants and mains, gas lines, oil lines, sewers, storm drains, roads, or sidewalks, and the executing of official duties by public safety personnel. This exemption includes, without limitation, sound emanating from all equipment used by such personnel, whether stationery or mobile.

(f) *Animals.* The provisions of this Chapter shall not apply to any noise sources associated with barking dogs or other intermittent noises made by animals on any property within the County. Such noise shall be subject to the provisions of § 32.0119 (Animals Which Habitually Make Noise) of this Code.

(g) *Agriculture Operations.* Noise sources associated with mechanical devices, apparatus, or equipment associated with agriculture operations, provided that each piece of equipment or machinery powered by an internal-combustion engine is equipped with appropriate muffler and/or air intake silencer in good working order and the operations and equipment are utilized for the preparation, planting, harvesting, protection, or salvage of agricultural crops.

(h) *Authorized Events.* Noise sources associated with outdoor gatherings, public dances, shows, sporting and entertainment events and other similar events, provided the activity is conducted pursuant to a permit or license issued by the appropriate jurisdiction and contain acoustic and/or noise standard conditions of approval. This Subdivision is not intended to excuse the act of an individual not participating in the event who violates this Chapter.

(Ord. 4361, passed - -2019)

### § 24.0708 Other Public Agency Exception.

The provisions of this Chapter shall not be construed to prohibit any work at different hours by or under the direction of any other public agency or public or private utility companies in cases of necessity or emergency.

(Ord. 4361, passed - -2019)

### § 24.0709 False Statements.

No person shall knowingly provide false information, either orally or in writing, to the enforcement authority related to the enforcement of this Chapter.

(Ord. 4361, passed - -2019)

### § 24.0710 Violations and Penalties.

(a) Any person found by the enforcement authority to have negligently or knowingly violated any provision of this Chapter may be charged with an infraction. Any person found by the enforcement authority to have negligently or knowingly violated any provision of this Chapter more than once within a 180-day period may be charged with a misdemeanor. Each day a violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such.

(b) All violations of this Chapter may be enforced by the enforcement authority and addressed through the institution of a criminal action, a civil action, and/or an administrative action as set forth in Chapter 2 of Division 1 of Title 1 (Violations and Enforcement) of this Code or as otherwise provided by law. Pursuant to Cal. Penal Code § 836.5, any peace officer of the San Bernardino County Sheriff's Department may arrest a person without a warrant if he or she has reasonable cause to believe that the person has committed a misdemeanor in his or her presence that violates this Chapter.

(c) Any violation of this Chapter is declared to be a public nuisance and may be abated in accordance with law, including but not limited to by a restraining order or injunction issued by a court of competent jurisdiction.

(Ord. 4361, passed - -2019)

## § 83.01.080 Noise.

This Section establishes standards concerning acceptable noise levels for both noise-sensitive land uses and for noise-generating land uses.

(a) *Noise Measurement.* Noise shall be measured:

(1) At the property line of the nearest site that is occupied by, and/or zoned or designated to allow the development of noise-sensitive land uses;

(2) With a sound level meter that meets the standards of the American National Standards Institute (ANSI § SI4 1979, Type 1 or Type 2);

(3) Using the "A" weighted sound pressure level scale in decibels (ref. pressure = 20 micronewtons per meter squared). The unit of measure shall be designated as dB(A).

(b) *Noise Impacted Areas.* Areas within the County shall be designated as "noise-impacted" if exposed to existing or projected future exterior noise levels from mobile or stationary sources exceeding the standards listed in Subdivision (d) (Noise Standards for Stationary Noise Sources) and Subdivision (e) (Noise Standards for Adjacent Mobile Noise Sources), below. New development of residential or other noise-sensitive land uses shall not be allowed in noise-impacted areas unless effective mitigation measures are incorporated into the project design to reduce noise levels to these standards. Noise-sensitive land uses shall include residential uses, schools, hospitals, nursing homes, religious institutions, libraries, and similar uses.

(c) *Noise Standards for Stationary Noise Sources.*

(1) *Noise Standards.* Table 83-2 (Noise Standards for Stationary Noise Sources) describes the noise standard for emanations from a stationary noise source, as it affects adjacent properties:

| ***Table 83-2*** | | |
|---|---|---|
| ***Noise Standards for Stationary Noise Sources*** | | |
| ***Affected Land Uses (Receiving Noise)*** | ***7:00 a.m. - 10:00 p.m. Leq*** | ***10:00 p.m. - 7:00 a.m. Leq*** |



| ***Table 83-2*** | | |
|---|---|---|
| ***Noise Standards for Stationary Noise Sources*** | | |
| ***Affected Land Uses (Receiving Noise)*** | ***7:00 a.m. - 10:00 p.m. Leq*** | ***10:00 p.m. - 7:00 a.m. Leq*** |



| | | |
|---|---|---|
| Residential | 55 dB(A) | 45 dB(A) |
| Professional Services | 55 dB(A) | 55 dB(A) |
| Other Commercial | 60 dB(A) | 60 dB(A) |
| Industrial | 70 dB(A) | 70 dB(A) |
| Leq = (Equivalent Energy Level). The sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over a given sample period, typically one, eight or 24 hours. | | |
| dB(A) = (A-weighted Sound Pressure Level). The sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitivity range of the human ear. | | |
| Ldn = (Day-Night Noise Level). The average equivalent A-weighted sound level during a 24-hour day obtained by adding 10 decibels to the hourly noise levels measured during the night (from 10:00 p.m. to 7:00 a.m.). In this way Ldn takes into account the lower tolerance of people for noise during nighttime periods. | | |

(2) *Noise Limit Categories.* No person shall operate or cause to be operated a source of sound at a location or allow the creation of noise on property owned, leased, occupied, or otherwise controlled by the person, which causes the noise level, when measured on another property, either incorporated or unincorporated, to exceed any one of the following:

(A) The noise standard for the receiving land use as specified in Subdivision (b) (Noise-Impacted Areas), above, for a cumulative period of more than 30 minutes in any hour.

(B) The noise standard plus five dB(A) for a cumulative period of more than 15 minutes in any hour.

(C) The noise standard plus ten dB(A) for a cumulative period of more than five minutes in any hour.

(D) The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour.

(E) The noise standard plus 20 dB(A) for any period of time.

(d) *Noise Standards for Adjacent Mobile Noise Sources.* Noise from mobile sources may affect adjacent properties adversely. When it does, the noise shall be mitigated for any new development to a level that shall not exceed the standards described in the following Table 83-3 (Noise Standards for Adjacent Mobile Noise Sources).

| ***Table 83-3*** | | | |
|---|---|---|---|
| ***Noise Standards for Adjacent Mobile Noise Sources*** | | | |
| ***Land Use*** | | ***Ldn (or CNEL) dB(A)*** | |
| ***Categories*** | ***Uses*** | ***Interior*** (1) | ***Exterior*** (2) |
| Residential | Single and multi-family, duplex, mobile homes | 45 | 60(3) |
| Commercial | Hotel, motel, transient housing | 45 | 60(3) |
| | Commercial retail, bank, restaurant | 50 | N/A |
| | Office building, research and development, professional offices | 45 | 65 |
| | Amphitheater, concert hall, auditorium, movie theater | 45 | N/A |
| Institutional/Public | Hospital, nursing home, school classroom, religious institution, library | 45 | 65 |
| Open Space | Park | N/A | 65 |

**Notes:**

(1) The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors.

(2) The outdoor environment shall be limited to:
- Hospital/office building patios
- Hotel and motel recreation areas
- Mobile home parks
- Multi-family private patios or balconies
- Park picnic areas
- Private yard of single-family dwellings
- School playgrounds

(3) An exterior noise level of up to 65 dB(A) (or CNEL) shall be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dB(A) (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level shall necessitate the use of air conditioning or mechanical ventilation.

CNEL = (Community Noise Equivalent Level). The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night from 10:00 p.m. to 7:00 a.m.

(e) *Increases in Allowable Noise Levels.* If the measured ambient level exceeds any of the first four noise limit categories in Subdivision (d)(2), above, the allowable noise exposure standard shall be increased to reflect the ambient noise level. If the ambient noise level exceeds the fifth noise limit category in Subdivision (d)(2), above, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level.

(f) *Reductions in Allowable Noise Levels.* If the alleged offense consists entirely of impact noise or simple tone noise, each of the noise levels in Table 83-2 (Noise Standards for Stationary Noise Sources) shall be reduced by five dB(A).

(g) *Exempt Noise.* The following sources of noise shall be exempt from the regulations of this Section:

(1) Motor vehicles not under the control of the commercial or industrial use.

(2) Emergency equipment, vehicles, and devices.

(3) Temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and Federal holidays.

(h) *Noise Standards for Other Structures.* All other structures shall be sound attenuated against the combined input of all present and projected exterior noise to not exceed the criteria.

| ***Table 83-4*** | |
|---|---|
| ***Noise Standards for Other Structures*** | |
| ***Typical Uses*** | ***12-Hour Equivalent Sound Level (Interior) in dBA Ldn*** |
| Educational, institutions, libraries, meeting facilities, etc. | 45 |
| General office, reception, etc. | 50 |
| Retail stores, restaurants, etc. | 55 |
| Other areas for manufacturing, assembly, testing, warehousing, etc. | 65 |

In addition, the average of the maximum levels on the loudest of intrusive sounds occurring during a 24-hour period shall not exceed 65 dBA interior.

(Ord. 4011, passed - -2007; Am. Ord. 4245, passed - -2014)

## § 83.01.090 Vibration.

(a) *Vibration Standard.* No ground vibration shall be allowed that can be felt without the aid of instruments at or beyond the lot line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to two-tenths inches per second measured at or beyond the lot line.

(b) *Vibration Measurement.* Vibration velocity shall be measured with a seismograph or other instrument capable of measuring and recording displacement and frequency, particle velocity, or acceleration. Readings shall be made at points of maximum vibration along any lot line next to a parcel within a residential, commercial and industrial land use zoning district.

(c) *Exempt Vibrations.* The following sources of vibration shall be exempt from the regulations of this Section.

(1) Motor vehicles not under the control of the subject use.

(2) Temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and Federal holidays.

(Ord. 4011, passed - -2007)

# APPENDIX 5.1:

# STUDY AREA PHOTOS

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# JN:14324

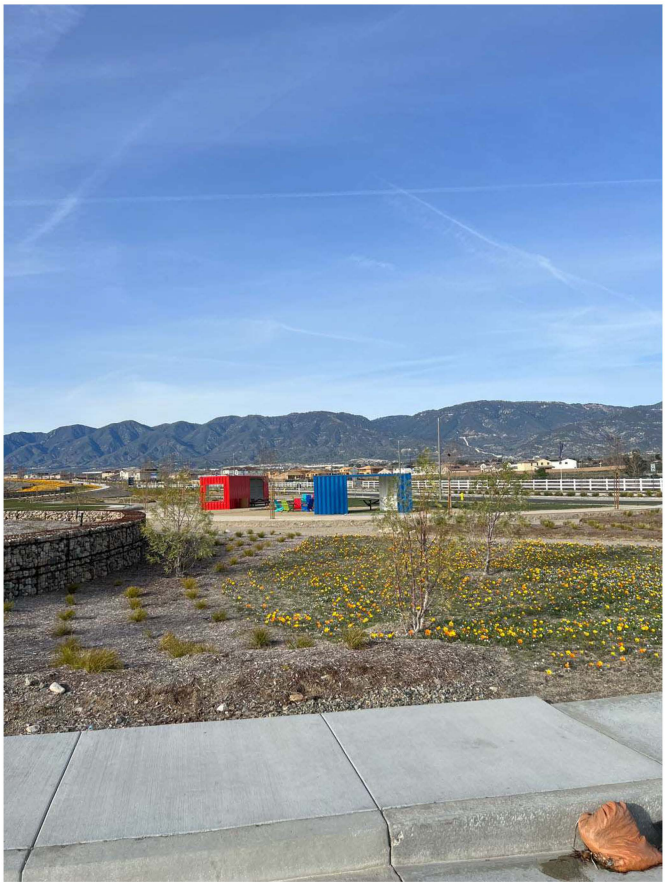
14324_L1_F 1.North
34, 8' 19.950000", 117, 21' 57.730000"

14324_L1_F 2.South
34, 8' 19.930000", 117, 21' 57.730000"

14324_L1_F 3.East
34, 8' 19.920000", 117, 21' 57.670000"

14324_L1_F 4.West
34, 8' 19.780000", 117, 21' 57.840000"

# JN:14324



14324_L2_J 1.North
34, 8' 29.380000", 117, 22' 1.080000"

14324_L2_J 2.South
34, 8' 29.090000", 117, 22' 1.080000"


14324_L2_J 3.East
34, 8' 29.090000", 117, 22' 1.080000"

14324_L2_J 4.West
34, 8' 29.130000", 117, 22' 1.270000"

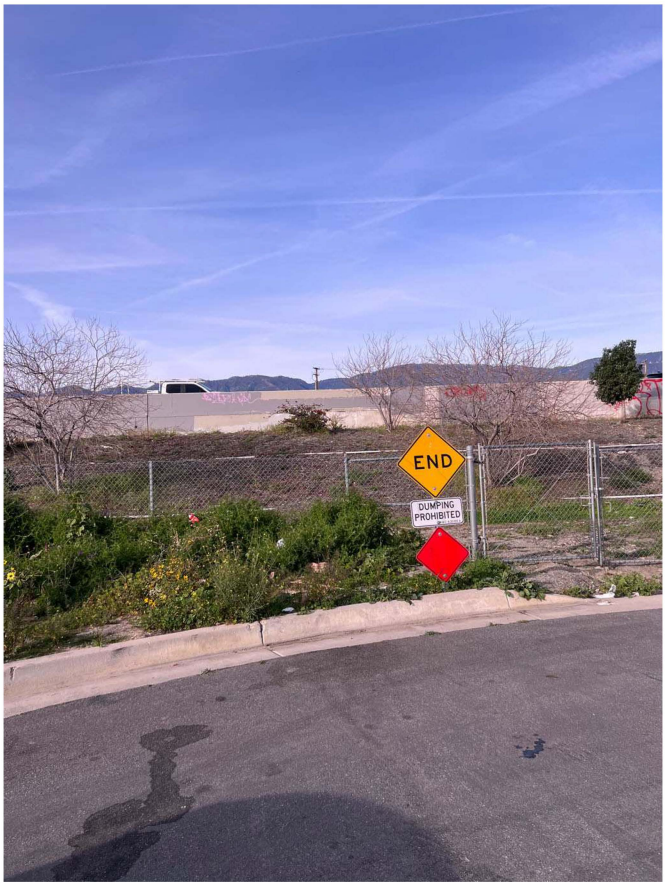
14324_L3_O 1.North
34, 8' 17.090000", 117, 20' 40.910000"

14324_L3_O 2.South
34, 8' 16.990000", 117, 20' 40.710000"

14324_L3_O 3.East
34, 8' 17.080000", 117, 20' 40.410000"

14324_L3_O 4.West
34, 8' 17.040000", 117, 20' 40.580000"

# JN:14324




14324_L4_L 1.North
34, 8' 8.560000", 117, 21' 42.370000"

14324_L4_L 2.South
34, 8' 8.450000", 117, 21' 42.400000"

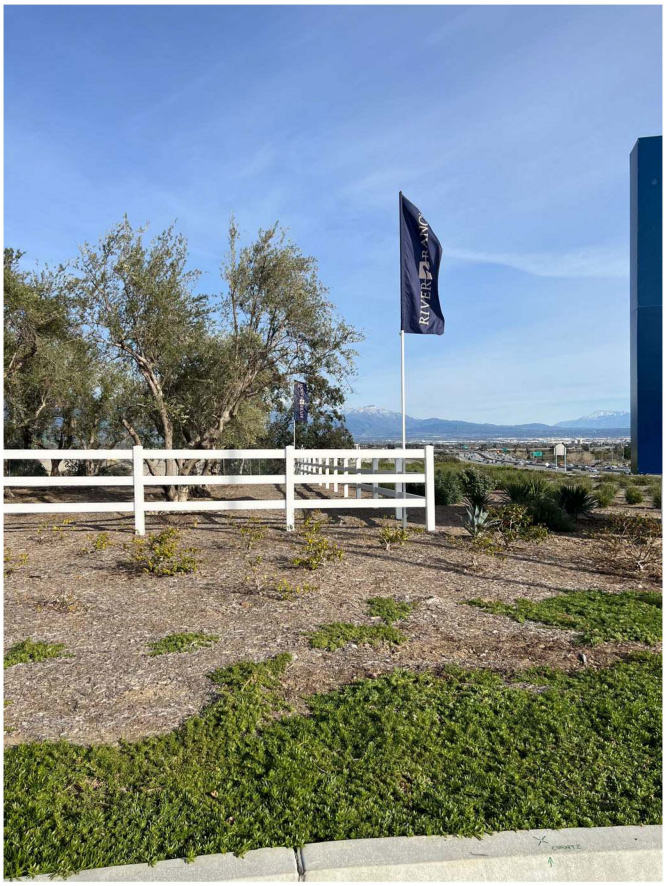
14324_L4_L 3.East
34, 8' 8.480000", 117, 21' 42.430000"

14324_L4_L 4.West
34, 8' 8.450000", 117, 21' 42.730000"

# JN:14324

14324_L5_I 1.North
34, 8' 16.130000", 117, 21' 56.080000"

14324_L5_I 2.South
34, 8' 16.100000", 117, 21' 56.080000"



14324_L5_I 3.East
34, 8' 16.130000", 117, 21' 56.050000"

14324_L5_I 4.West
34, 8' 16.140000", 117, 21' 56.080000"

# JN:14324

14324_L6_H 1.North
34, 8' 17.250000", 117, 21' 57.230000"

14324_L6_H 2.South
34, 8' 17.150000", 117, 21' 57.180000"

14324_L6_H 3.East
34, 8' 17.150000", 117, 21' 57.180000"


14324_L6_H 4.West
34, 8' 17.240000", 117, 21' 57.320000"

# APPENDIX 5.2:

# NOISE LEVEL MEASUREMENT WORKSHEETS

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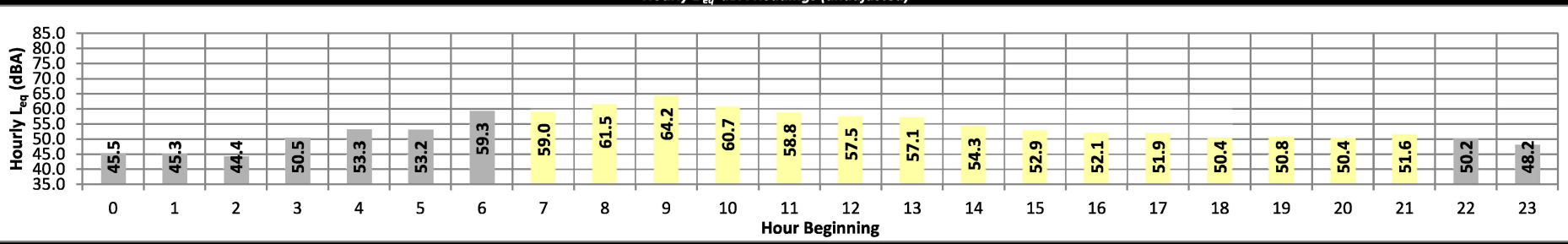
## 24-Hour Noise Level Measurement Summary

*Date:* Friday, February 17, 2023 *Location:* L1 - Located west of the site near the residence at 2184 *Meter:* Piccolo II *JN:* 14324

*Project:* Pepper 210 *Source:* Oakdale Ave. *Analyst:* Z. Ibrahim

***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 | 45.5 | 53.5 | 42.8 | 53.0 | 52.1 | 49.8 | 48.4 | 45.1 | 44.0 | 43.1 | 43.0 | 42.8 | 45.5 | 10.0 | 55.5 |
| | 1 | 45.3 | 50.6 | 43.5 | 49.9 | 49.2 | 47.9 | 47.2 | 45.5 | 44.8 | 43.9 | 43.7 | 43.6 | 45.3 | 10.0 | 55.3 |
| | 2 | 44.4 | 51.4 | 42.5 | 51.0 | 50.3 | 47.8 | 46.3 | 44.2 | 43.4 | 42.8 | 42.7 | 42.6 | 44.4 | 10.0 | 54.4 |
| | 3 | 50.5 | 59.7 | 44.4 | 59.1 | 58.3 | 55.9 | 54.5 | 50.5 | 47.9 | 45.3 | 44.9 | 44.5 | 50.5 | 10.0 | 60.5 |
| | 4 | 53.3 | 61.8 | 45.7 | 61.2 | 60.4 | 58.8 | 57.4 | 53.8 | 50.8 | 47.0 | 46.4 | 45.9 | 53.3 | 10.0 | 63.3 |
| | 5 | 53.2 | 62.9 | 47.7 | 62.4 | 61.7 | 59.0 | 57.2 | 52.7 | 50.4 | 48.4 | 48.1 | 47.8 | 53.2 | 10.0 | 63.2 |
| | 6 | 59.3 | 68.6 | 50.2 | 68.0 | 67.3 | 65.4 | 64.0 | 59.6 | 56.0 | 51.5 | 51.0 | 50.5 | 59.3 | 10.0 | 69.3 |
| Day | 7 | 59.0 | 68.4 | 50.0 | 67.9 | 67.2 | 65.1 | 63.6 | 59.1 | 55.4 | 51.2 | 50.7 | 50.1 | 59.0 | 0.0 | 59.0 |
| | 8 | 61.5 | 70.5 | 52.0 | 69.9 | 69.1 | 67.3 | 66.1 | 62.0 | 58.6 | 53.6 | 52.9 | 52.2 | 61.5 | 0.0 | 61.5 |
| | 9 | 64.2 | 73.0 | 53.1 | 72.6 | 71.9 | 70.3 | 69.1 | 64.9 | 60.7 | 55.3 | 54.3 | 53.4 | 64.2 | 0.0 | 64.2 |
| | 10 | 60.7 | 70.4 | 51.9 | 69.8 | 68.9 | 66.7 | 65.1 | 61.0 | 57.2 | 53.1 | 52.6 | 52.0 | 60.7 | 0.0 | 60.7 |
| | 11 | 58.8 | 68.0 | 50.7 | 67.4 | 66.7 | 64.8 | 63.5 | 59.1 | 55.4 | 51.8 | 51.3 | 50.8 | 58.8 | 0.0 | 58.8 |
| | 12 | 57.5 | 66.5 | 49.4 | 66.0 | 65.3 | 63.5 | 62.2 | 57.8 | 54.4 | 50.5 | 50.0 | 49.5 | 57.5 | 0.0 | 57.5 |
| | 13 | 57.1 | 67.5 | 48.2 | 67.0 | 66.2 | 63.4 | 61.5 | 56.5 | 53.3 | 49.4 | 48.9 | 48.3 | 57.1 | 0.0 | 57.1 |
| | 14 | 54.3 | 63.4 | 46.8 | 63.0 | 62.3 | 60.3 | 58.9 | 54.2 | 51.1 | 48.0 | 47.6 | 46.9 | 54.3 | 0.0 | 54.3 |
| | 15 | 52.9 | 62.5 | 46.0 | 62.2 | 61.5 | 59.2 | 57.3 | 52.4 | 49.6 | 47.1 | 46.6 | 46.2 | 52.9 | 0.0 | 52.9 |
| | 16 | 52.1 | 60.5 | 46.4 | 60.1 | 59.4 | 57.4 | 56.1 | 52.3 | 49.7 | 47.3 | 46.9 | 46.5 | 52.1 | 0.0 | 52.1 |
| | 17 | 51.9 | 60.6 | 45.5 | 60.1 | 59.4 | 57.4 | 56.2 | 52.2 | 49.0 | 46.3 | 46.0 | 45.6 | 51.9 | 0.0 | 51.9 |
| | 18 | 50.4 | 57.6 | 47.1 | 57.3 | 56.7 | 54.9 | 53.6 | 50.3 | 48.8 | 47.6 | 47.4 | 47.2 | 50.4 | 0.0 | 50.4 |
| | 19 | 50.8 | 58.6 | 46.3 | 58.1 | 57.5 | 55.7 | 54.5 | 51.1 | 48.8 | 46.9 | 46.7 | 46.4 | 50.8 | 5.0 | 55.8 |
| | 20 | 50.4 | 58.1 | 45.9 | 57.6 | 57.1 | 55.3 | 54.1 | 50.9 | 48.4 | 46.6 | 46.3 | 46.0 | 50.4 | 5.0 | 55.4 |
| | 21 | 51.6 | 57.9 | 46.7 | 57.5 | 57.0 | 56.0 | 55.3 | 52.3 | 50.2 | 47.8 | 47.3 | 46.8 | 51.6 | 5.0 | 56.6 |
| Night | 22 | 50.2 | 57.0 | 46.1 | 56.7 | 56.3 | 54.8 | 53.7 | 50.5 | 48.6 | 46.8 | 46.5 | 46.2 | 50.2 | 10.0 | 60.2 |
| | 23 | 48.2 | 54.7 | 44.9 | 54.4 | 53.8 | 52.5 | 51.3 | 48.5 | 46.7 | 45.5 | 45.3 | 45.0 | 48.2 | 10.0 | 58.2 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 50.4 | 57.6 | 45.5 | 57.3 | 56.7 | 54.9 | 53.6 | 50.3 | 48.4 | 46.3 | 46.0 | 45.6 |
| | Max | 64.2 | 73.0 | 53.1 | 72.6 | 71.9 | 70.3 | 69.1 | 64.9 | 60.7 | 55.3 | 54.3 | 53.4 |
| Energy Average | | 57.8 | Average: | | 63.8 | 63.1 | 61.1 | 59.8 | 55.7 | 52.7 | 49.5 | 49.0 | 48.5 |
| Night | Min | 44.4 | 50.6 | 42.5 | 49.9 | 49.2 | 47.8 | 46.3 | 44.2 | 43.4 | 42.8 | 42.7 | 42.6 |
| | Max | 59.3 | 68.6 | 50.2 | 68.0 | 67.3 | 65.4 | 64.0 | 59.6 | 56.0 | 51.5 | 51.0 | 50.5 |
| Energy Average | | 52.7 | Average: | | 57.3 | 56.6 | 54.7 | 53.3 | 50.0 | 48.1 | 46.0 | 45.7 | 45.4 |

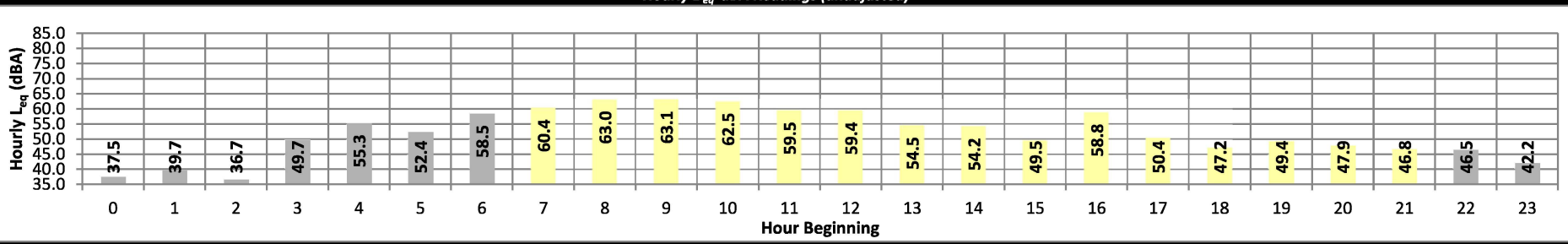
| 24-Hour CNEL | Leq (dBA) Daytime (7am-10pm) | Leq (dBA) Nighttime (10pm-7am) |
|---|---|---|
| 60.4 | 57.8 | 52.7 |

## 24-Hour Noise Level Measurement Summary

*Date:* Friday, February 17, 2023 *Location:* L2 - Located west of the site near the residence at 2344 Powell *Meter:* Piccolo II *JN:* 14324

*Project:* Pepper 210 *Source:* Dr. *Analyst:* Z. Ibrahim

***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 | 37.5 | 44.6 | 33.7 | 44.1 | 43.5 | 42.2 | 40.9 | 37.7 | 36.0 | 34.3 | 34.1 | 33.8 | 37.5 | 10.0 | 47.5 |
| | 1 | 39.7 | 45.0 | 36.8 | 44.4 | 43.8 | 42.8 | 42.1 | 40.1 | 39.0 | 37.5 | 37.3 | 36.9 | 39.7 | 10.0 | 49.7 |
| | 2 | 36.7 | 44.3 | 33.2 | 43.8 | 43.4 | 42.0 | 40.7 | 36.1 | 34.7 | 33.7 | 33.5 | 33.3 | 36.7 | 10.0 | 46.7 |
| | 3 | 49.7 | 58.5 | 41.2 | 57.6 | 56.7 | 55.3 | 54.2 | 50.4 | 46.9 | 42.8 | 42.3 | 41.5 | 49.7 | 10.0 | 59.7 |
| | 4 | 55.3 | 64.2 | 45.9 | 63.7 | 62.5 | 60.4 | 59.6 | 56.2 | 53.0 | 47.3 | 46.7 | 46.1 | 55.3 | 10.0 | 65.3 |
| | 5 | 52.4 | 61.6 | 44.2 | 60.8 | 59.9 | 58.1 | 56.6 | 52.9 | 49.7 | 45.8 | 45.1 | 44.4 | 52.4 | 10.0 | 62.4 |
| | 6 | 58.5 | 66.4 | 50.4 | 65.7 | 65.0 | 63.6 | 62.6 | 59.4 | 56.2 | 52.0 | 51.4 | 50.7 | 58.5 | 10.0 | 68.5 |
| Day | 7 | 60.4 | 68.8 | 52.3 | 68.2 | 67.7 | 66.1 | 64.9 | 60.6 | 57.6 | 53.5 | 52.9 | 52.4 | 60.4 | 0.0 | 60.4 |
| | 8 | 63.0 | 70.8 | 52.4 | 70.1 | 69.5 | 68.1 | 67.3 | 64.1 | 61.4 | 54.5 | 53.7 | 52.7 | 63.0 | 0.0 | 63.0 |
| | 9 | 63.1 | 71.3 | 53.0 | 70.5 | 69.9 | 68.3 | 67.3 | 64.2 | 60.9 | 55.4 | 54.5 | 53.3 | 63.1 | 0.0 | 63.1 |
| | 10 | 62.5 | 71.2 | 52.9 | 70.4 | 69.8 | 68.1 | 67.0 | 63.1 | 59.9 | 54.9 | 54.2 | 53.2 | 62.5 | 0.0 | 62.5 |
| | 11 | 59.5 | 69.2 | 50.0 | 68.3 | 67.3 | 65.3 | 63.8 | 59.7 | 56.7 | 52.4 | 51.4 | 50.4 | 59.5 | 0.0 | 59.5 |
| | 12 | 59.4 | 67.3 | 49.1 | 66.7 | 66.2 | 65.1 | 64.5 | 61.6 | 54.3 | 50.5 | 50.0 | 49.3 | 59.4 | 0.0 | 59.4 |
| | 13 | 54.5 | 62.9 | 45.8 | 62.3 | 61.8 | 60.4 | 59.3 | 55.1 | 51.3 | 47.3 | 46.7 | 46.0 | 54.5 | 0.0 | 54.5 |
| | 14 | 54.2 | 61.8 | 45.0 | 61.2 | 60.8 | 59.6 | 58.8 | 55.5 | 51.4 | 47.0 | 46.3 | 45.3 | 54.2 | 0.0 | 54.2 |
| | 15 | 49.5 | 58.4 | 41.5 | 58.0 | 57.3 | 55.2 | 53.9 | 49.9 | 46.4 | 42.9 | 42.3 | 41.6 | 49.5 | 0.0 | 49.5 |
| | 16 | 58.8 | 65.2 | 46.0 | 64.9 | 64.5 | 63.4 | 62.7 | 60.6 | 58.4 | 47.2 | 46.7 | 46.2 | 58.8 | 0.0 | 58.8 |
| | 17 | 50.4 | 59.1 | 40.9 | 58.7 | 58.2 | 57.0 | 56.3 | 49.9 | 46.2 | 42.5 | 41.9 | 41.2 | 50.4 | 0.0 | 50.4 |
| | 18 | 47.2 | 54.1 | 43.0 | 53.7 | 53.2 | 52.1 | 50.7 | 47.4 | 45.6 | 43.9 | 43.5 | 43.1 | 47.2 | 0.0 | 47.2 |
| | 19 | 49.4 | 59.1 | 40.9 | 58.3 | 57.5 | 55.0 | 53.5 | 49.5 | 46.4 | 42.7 | 42.0 | 41.2 | 49.4 | 5.0 | 54.4 |
| | 20 | 47.9 | 56.8 | 40.6 | 56.2 | 55.6 | 53.7 | 52.4 | 48.2 | 44.9 | 41.8 | 41.3 | 40.8 | 47.9 | 5.0 | 52.9 |
| | 21 | 46.8 | 55.5 | 38.7 | 54.9 | 54.2 | 52.6 | 51.4 | 47.1 | 44.0 | 40.2 | 39.5 | 38.8 | 46.8 | 5.0 | 51.8 |
| Night | 22 | 46.5 | 54.9 | 39.4 | 54.3 | 53.7 | 51.9 | 50.6 | 47.0 | 44.4 | 40.5 | 40.1 | 39.6 | 46.5 | 10.0 | 56.5 |
| | 23 | 42.2 | 50.4 | 35.6 | 49.8 | 49.2 | 47.8 | 46.8 | 42.7 | 39.5 | 36.4 | 36.1 | 35.7 | 42.2 | 10.0 | 52.2 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 46.8 | 54.1 | 38.7 | 53.7 | 53.2 | 52.1 | 50.7 | 47.1 | 44.0 | 40.2 | 39.5 | 38.8 |
| | Max | 63.1 | 71.3 | 53.0 | 70.5 | 69.9 | 68.3 | 67.3 | 64.2 | 61.4 | 55.4 | 54.5 | 53.3 |
| Energy Average | | 58.4 | Average: | | 62.8 | 62.2 | 60.7 | 59.6 | 55.8 | 52.4 | 47.8 | 47.1 | 46.4 |
| Night | Min | 36.7 | 44.3 | 33.2 | 43.8 | 43.4 | 42.0 | 40.7 | 36.1 | 34.7 | 33.7 | 33.5 | 33.3 |
| | Max | 58.5 | 66.4 | 50.4 | 65.7 | 65.0 | 63.6 | 62.6 | 59.4 | 56.2 | 52.0 | 51.4 | 50.7 |
| Energy Average | | 51.9 | Average: | | 53.8 | 53.1 | 51.6 | 50.5 | 46.9 | 44.4 | 41.1 | 40.7 | 40.2 |

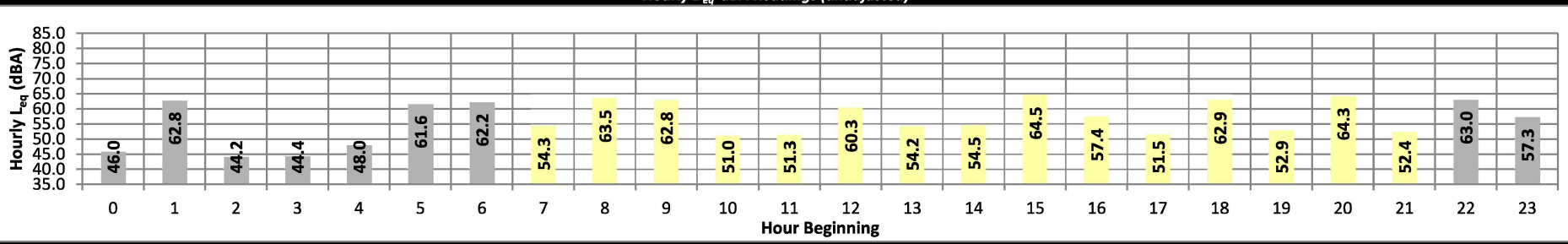
| 24-Hour CNEL | Leq (dBA) Daytime (7am-10pm) | Leq (dBA) Nighttime (10pm-7am) |
|---|---|---|
| 60.1 | 58.4 | 51.9 |

## 24-Hour Noise Level Measurement Summary

*Date:* Friday, February 17, 2023 *Location:* L3 - Located east of the site and the UPRR near the residence *Meter:* Piccolo II *JN:* 14324

*Project:* Metro Westwood UCLA *Source:* at 2382 Duffy St. *Analyst:* Z. Ibrahim

***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 | 46.0 | 51.2 | 42.4 | 50.8 | 50.4 | 49.5 | 49.0 | 46.5 | 44.9 | 43.4 | 43.0 | 42.5 | 46.0 | 10.0 | 56.0 |
| | 1 | 62.8 | 70.3 | 56.1 | 69.9 | 69.4 | 68.3 | 67.4 | 62.7 | 60.4 | 57.6 | 57.2 | 56.4 | 62.8 | 10.0 | 72.8 |
| | 2 | 44.2 | 55.3 | 37.8 | 55.0 | 54.4 | 50.7 | 47.5 | 42.1 | 40.6 | 38.7 | 38.3 | 37.9 | 44.2 | 10.0 | 54.2 |
| | 3 | 44.4 | 51.3 | 40.2 | 50.8 | 50.1 | 48.5 | 47.6 | 44.9 | 43.0 | 41.1 | 40.7 | 40.3 | 44.4 | 10.0 | 54.4 |
| | 4 | 48.0 | 52.9 | 44.4 | 52.5 | 52.0 | 51.0 | 50.4 | 48.6 | 47.2 | 45.5 | 45.1 | 44.6 | 48.0 | 10.0 | 58.0 |
| | 5 | 61.6 | 69.9 | 52.6 | 69.5 | 69.2 | 67.7 | 67.0 | 61.8 | 58.0 | 53.8 | 53.4 | 52.8 | 61.6 | 10.0 | 71.6 |
| | 6 | 62.2 | 69.6 | 56.4 | 69.1 | 68.6 | 67.4 | 66.2 | 62.7 | 60.7 | 57.7 | 57.2 | 56.6 | 62.2 | 10.0 | 72.2 |
| Day | 7 | 54.3 | 62.0 | 47.1 | 61.4 | 60.7 | 58.9 | 57.9 | 55.4 | 52.6 | 49.0 | 48.4 | 47.5 | 54.3 | 0.0 | 54.3 |
| | 8 | 63.5 | 72.4 | 56.7 | 72.1 | 71.8 | 70.4 | 68.7 | 62.6 | 59.7 | 57.5 | 57.0 | 56.8 | 63.5 | 0.0 | 63.5 |
| | 9 | 62.8 | 70.3 | 53.5 | 69.9 | 69.2 | 68.1 | 67.3 | 63.7 | 60.5 | 55.9 | 55.4 | 53.9 | 62.8 | 0.0 | 62.8 |
| | 10 | 51.0 | 61.2 | 45.1 | 60.4 | 59.4 | 57.0 | 55.0 | 50.3 | 48.1 | 46.0 | 45.7 | 45.2 | 51.0 | 0.0 | 51.0 |
| | 11 | 51.3 | 62.5 | 44.4 | 61.7 | 60.6 | 57.4 | 55.0 | 50.4 | 47.8 | 45.4 | 45.1 | 44.6 | 51.3 | 0.0 | 51.3 |
| | 12 | 60.3 | 69.2 | 53.2 | 68.7 | 68.0 | 66.3 | 65.1 | 60.0 | 57.7 | 54.3 | 54.0 | 53.3 | 60.3 | 0.0 | 60.3 |
| | 13 | 54.2 | 66.2 | 44.9 | 65.8 | 64.8 | 60.4 | 58.4 | 51.9 | 48.9 | 46.0 | 45.6 | 45.1 | 54.2 | 0.0 | 54.2 |
| | 14 | 54.5 | 66.0 | 44.7 | 65.2 | 64.2 | 61.1 | 59.1 | 53.1 | 49.9 | 46.2 | 45.7 | 45.0 | 54.5 | 0.0 | 54.5 |
| | 15 | 64.5 | 73.5 | 50.9 | 73.1 | 72.8 | 71.8 | 70.1 | 64.0 | 60.7 | 53.9 | 52.0 | 51.1 | 64.5 | 0.0 | 64.5 |
| | 16 | 57.4 | 69.9 | 45.1 | 69.5 | 68.6 | 65.0 | 61.9 | 53.6 | 50.1 | 46.5 | 45.9 | 45.3 | 57.4 | 0.0 | 57.4 |
| | 17 | 51.5 | 62.2 | 45.3 | 61.4 | 60.1 | 57.6 | 55.5 | 50.6 | 48.4 | 46.3 | 45.9 | 45.5 | 51.5 | 0.0 | 51.5 |
| | 18 | 62.9 | 72.0 | 55.9 | 71.3 | 70.9 | 69.4 | 67.9 | 62.4 | 59.7 | 56.9 | 56.3 | 56.0 | 62.9 | 0.0 | 62.9 |
| | 19 | 52.9 | 62.5 | 44.6 | 62.1 | 61.7 | 60.1 | 58.5 | 51.6 | 48.3 | 45.6 | 45.3 | 44.8 | 52.9 | 5.0 | 57.9 |
| | 20 | 64.3 | 71.6 | 56.8 | 71.2 | 70.7 | 69.3 | 68.6 | 64.8 | 62.2 | 58.3 | 57.7 | 57.0 | 64.3 | 5.0 | 69.3 |
| | 21 | 52.4 | 63.3 | 46.3 | 62.8 | 62.1 | 59.0 | 56.4 | 50.4 | 48.7 | 47.0 | 46.7 | 46.4 | 52.4 | 5.0 | 57.4 |
| Night | 22 | 63.0 | 71.7 | 55.8 | 71.2 | 70.6 | 69.0 | 67.8 | 62.5 | 60.1 | 57.0 | 56.6 | 56.0 | 63.0 | 10.0 | 73.0 |
| | 23 | 57.3 | 62.1 | 54.6 | 61.7 | 61.3 | 60.4 | 59.5 | 57.6 | 56.7 | 55.3 | 55.1 | 54.7 | 57.3 | 10.0 | 67.3 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 51.0 | 61.2 | 44.4 | 60.4 | 59.4 | 57.0 | 55.0 | 50.3 | 47.8 | 45.4 | 45.1 | 44.6 |
| | Max | 64.5 | 73.5 | 56.8 | 73.1 | 72.8 | 71.8 | 70.1 | 64.8 | 62.2 | 58.3 | 57.7 | 57.0 |
| Energy Average | | 59.9 | Average: | | 66.4 | 65.7 | 63.4 | 61.7 | 56.3 | 53.5 | 50.3 | 49.8 | 49.2 |
| Night | Min | 44.2 | 51.2 | 37.8 | 50.8 | 50.1 | 48.5 | 47.5 | 42.1 | 40.6 | 38.7 | 38.3 | 37.9 |
| | Max | 63.0 | 71.7 | 56.4 | 71.2 | 70.6 | 69.0 | 67.8 | 62.7 | 60.7 | 57.7 | 57.2 | 56.6 |
| Energy Average | | 59.3 | Average: | | 61.2 | 60.6 | 59.2 | 58.0 | 54.4 | 52.4 | 50.0 | 49.6 | 49.1 |

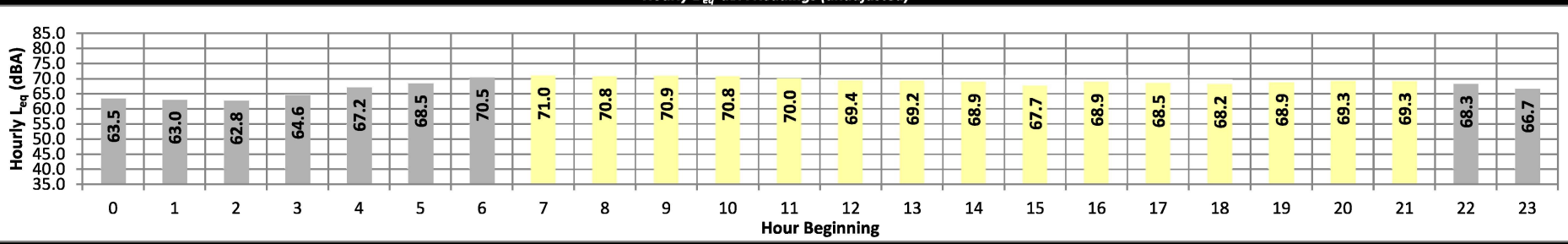
| 24-Hour CNEL | Leq (dBA) Daytime (7am-10pm) | Leq (dBA) Nighttime (10pm-7am) |
|---|---|---|
| **66.1** | **59.9** | **59.3** |

## 24-Hour Noise Level Measurement Summary

*Date:* Friday, February 17, 2023 *Location:* L4 - Located south of the site and the SR 210 near the *Meter:* Piccolo II *JN:* 14324

*Project:* Pepper 210 *Source:* residence at 1951 Joyce Ave. *Analyst:* Z. Ibrahim

***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 | 63.5 | 69.3 | 56.5 | 69.0 | 68.7 | 67.7 | 66.8 | 64.5 | 62.6 | 58.7 | 57.7 | 56.7 | 63.5 | 10.0 | 73.5 |
| | 1 | 63.0 | 68.9 | 55.8 | 68.6 | 68.4 | 67.4 | 66.3 | 63.9 | 61.9 | 58.0 | 57.1 | 56.1 | 63.0 | 10.0 | 73.0 |
| | 2 | 62.8 | 69.0 | 55.1 | 68.7 | 68.4 | 67.3 | 66.2 | 63.8 | 61.6 | 57.2 | 56.1 | 55.3 | 62.8 | 10.0 | 72.8 |
| | 3 | 64.6 | 70.0 | 58.1 | 69.7 | 69.4 | 68.7 | 67.8 | 65.7 | 63.6 | 60.1 | 59.1 | 58.3 | 64.6 | 10.0 | 74.6 |
| | 4 | 67.2 | 72.3 | 62.0 | 72.0 | 71.6 | 70.7 | 70.0 | 68.1 | 66.4 | 63.4 | 62.8 | 62.2 | 67.2 | 10.0 | 77.2 |
| | 5 | 68.5 | 72.8 | 64.5 | 72.5 | 72.2 | 71.5 | 70.9 | 69.3 | 68.0 | 65.8 | 65.3 | 64.7 | 68.5 | 10.0 | 78.5 |
| | 6 | 70.5 | 74.3 | 67.0 | 74.0 | 73.7 | 73.1 | 72.6 | 71.3 | 70.2 | 68.2 | 67.6 | 67.2 | 70.5 | 10.0 | 80.5 |
| Day | 7 | 71.0 | 74.5 | 68.2 | 74.1 | 73.8 | 73.2 | 72.8 | 71.6 | 70.7 | 69.2 | 68.8 | 68.3 | 71.0 | 0.0 | 71.0 |
| | 8 | 70.8 | 74.7 | 67.6 | 74.4 | 74.0 | 73.3 | 72.7 | 71.4 | 70.4 | 68.7 | 68.3 | 67.8 | 70.8 | 0.0 | 70.8 |
| | 9 | 70.9 | 74.9 | 67.2 | 74.6 | 74.3 | 73.4 | 72.9 | 71.6 | 70.5 | 68.5 | 68.0 | 67.4 | 70.9 | 0.0 | 70.9 |
| | 10 | 70.8 | 74.6 | 67.0 | 74.3 | 74.0 | 73.2 | 72.8 | 71.5 | 70.4 | 68.3 | 67.8 | 67.2 | 70.8 | 0.0 | 70.8 |
| | 11 | 70.0 | 73.9 | 66.7 | 73.6 | 73.3 | 72.5 | 72.0 | 70.6 | 69.6 | 67.8 | 67.4 | 66.8 | 70.0 | 0.0 | 70.0 |
| | 12 | 69.4 | 73.3 | 66.0 | 72.9 | 72.5 | 71.7 | 71.3 | 70.1 | 69.0 | 67.1 | 66.6 | 66.1 | 69.4 | 0.0 | 69.4 |
| | 13 | 69.2 | 73.2 | 66.1 | 72.9 | 72.6 | 71.7 | 71.1 | 69.9 | 68.9 | 67.1 | 66.7 | 66.3 | 69.2 | 0.0 | 69.2 |
| | 14 | 68.9 | 71.8 | 66.6 | 71.6 | 71.4 | 70.9 | 70.5 | 69.4 | 68.7 | 67.4 | 67.1 | 66.7 | 68.9 | 0.0 | 68.9 |
| | 15 | 67.7 | 70.8 | 65.4 | 70.5 | 70.3 | 69.8 | 69.3 | 68.2 | 67.4 | 66.1 | 65.8 | 65.5 | 67.7 | 0.0 | 67.7 |
| | 16 | 68.9 | 73.1 | 66.3 | 72.8 | 72.5 | 71.6 | 70.8 | 69.3 | 68.4 | 67.1 | 66.8 | 66.4 | 68.9 | 0.0 | 68.9 |
| | 17 | 68.5 | 72.1 | 66.2 | 71.8 | 71.6 | 70.9 | 70.3 | 68.9 | 68.1 | 66.8 | 66.6 | 66.3 | 68.5 | 0.0 | 68.5 |
| | 18 | 68.2 | 74.5 | 65.5 | 74.2 | 73.8 | 71.9 | 70.3 | 68.2 | 67.3 | 66.1 | 65.9 | 65.6 | 68.2 | 0.0 | 68.2 |
| | 19 | 68.9 | 73.1 | 66.1 | 72.8 | 72.3 | 71.6 | 71.0 | 69.4 | 68.4 | 66.9 | 66.6 | 66.2 | 68.9 | 5.0 | 73.9 |
| | 20 | 69.3 | 74.1 | 66.3 | 73.8 | 73.3 | 72.0 | 71.2 | 69.8 | 68.9 | 67.2 | 66.9 | 66.4 | 69.3 | 5.0 | 74.3 |
| | 21 | 69.3 | 73.4 | 65.9 | 73.1 | 72.8 | 71.9 | 71.4 | 69.9 | 68.8 | 67.0 | 66.5 | 66.1 | 69.3 | 5.0 | 74.3 |
| Night | 22 | 68.3 | 73.2 | 64.7 | 72.8 | 72.5 | 71.3 | 70.7 | 68.9 | 67.8 | 65.7 | 65.3 | 64.9 | 68.3 | 10.0 | 78.3 |
| | 23 | 66.7 | 70.6 | 63.1 | 70.4 | 70.2 | 69.5 | 69.0 | 67.5 | 66.2 | 64.1 | 63.7 | 63.2 | 66.7 | 10.0 | 76.7 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 67.7 | 70.8 | 65.4 | 70.5 | 70.3 | 69.8 | 69.3 | 68.2 | 67.3 | 66.1 | 65.8 | 65.5 |
| | Max | 71.0 | 74.9 | 68.2 | 74.6 | 74.3 | 73.4 | 72.9 | 71.6 | 70.7 | 69.2 | 68.8 | 68.3 |
| Energy Average | | 69.6 | Average: | | 73.2 | 72.8 | 72.0 | 71.4 | 70.0 | 69.0 | 67.4 | 67.0 | 66.6 |
| Night | Min | 62.8 | 68.9 | 55.1 | 68.6 | 68.4 | 67.3 | 66.2 | 63.8 | 61.6 | 57.2 | 56.1 | 55.3 |
| | Max | 70.5 | 74.3 | 67.0 | 74.0 | 73.7 | 73.1 | 72.6 | 71.3 | 70.2 | 68.2 | 67.6 | 67.2 |
| Energy Average | | 66.9 | Average: | | 70.9 | 70.6 | 69.7 | 68.9 | 67.0 | 65.4 | 62.4 | 61.6 | 61.0 |

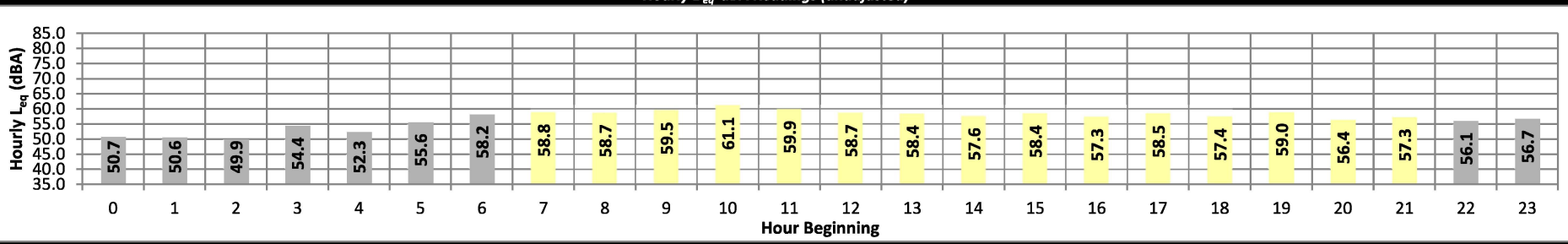
| 24-Hour CNEL | Leq (dBA) Daytime (7am-10pm) | Leq (dBA) Nighttime (10pm-7am) |
|---|---|---|
| **74.2** | **69.6** | **66.9** |

## 24-Hour Noise Level Measurement Summary

*Date:* Friday, February 17, 2023 | *Location:* L5 - Located southwest corner of the Project site near the entrance to the River Ranch community. | *Meter:* Piccolo II | *JN:* 14324

*Project:* Pepper 210 | *Source:* | *Analyst:* Z. Ibrahim

***Hourly $L_{eq}$ dBA Readings (unadjusted)***




| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% | $L_{eq}$ | Adj. | Adj. $L_{eq}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Night | 0 | 50.7 | 57.7 | 45.7 | 57.2 | 56.5 | 55.1 | 54.4 | 51.6 | 48.7 | 46.4 | 46.1 | 45.8 | 50.7 | 10.0 | 60.7 |
| | 1 | 50.6 | 57.0 | 45.8 | 56.7 | 56.4 | 55.6 | 54.4 | 51.1 | 48.8 | 46.6 | 46.3 | 46.0 | 50.6 | 10.0 | 60.6 |
| | 2 | 49.9 | 55.9 | 44.9 | 55.6 | 55.3 | 54.4 | 53.8 | 50.7 | 48.3 | 46.0 | 45.5 | 45.1 | 49.9 | 10.0 | 59.9 |
| | 3 | 54.4 | 63.3 | 46.8 | 62.8 | 62.5 | 61.1 | 59.7 | 54.1 | 50.5 | 47.7 | 47.3 | 46.9 | 54.4 | 10.0 | 64.4 |
| | 4 | 52.3 | 58.0 | 48.1 | 57.5 | 57.1 | 56.3 | 55.4 | 53.0 | 51.3 | 49.0 | 48.6 | 48.2 | 52.3 | 10.0 | 62.3 |
| | 5 | 55.6 | 61.9 | 51.4 | 61.4 | 60.9 | 59.5 | 58.5 | 56.2 | 54.6 | 52.4 | 52.0 | 51.6 | 55.6 | 10.0 | 65.6 |
| | 6 | 58.2 | 64.9 | 53.1 | 64.4 | 63.9 | 62.3 | 61.5 | 59.0 | 57.0 | 54.4 | 53.9 | 53.3 | 58.2 | 10.0 | 68.2 |
| Day | 7 | 58.8 | 66.5 | 53.2 | 65.9 | 65.3 | 63.8 | 62.8 | 59.0 | 57.0 | 54.4 | 54.0 | 53.4 | 58.8 | 0.0 | 58.8 |
| | 8 | 58.7 | 65.3 | 53.5 | 64.6 | 64.1 | 63.0 | 62.2 | 59.3 | 57.3 | 54.7 | 54.2 | 53.7 | 58.7 | 0.0 | 58.7 |
| | 9 | 59.5 | 66.8 | 52.9 | 66.2 | 65.6 | 64.2 | 63.1 | 60.4 | 57.9 | 54.3 | 53.7 | 53.0 | 59.5 | 0.0 | 59.5 |
| | 10 | 61.1 | 67.9 | 54.1 | 67.3 | 66.7 | 65.6 | 64.7 | 62.2 | 59.5 | 56.0 | 55.2 | 54.4 | 61.1 | 0.0 | 61.1 |
| | 11 | 59.9 | 68.3 | 53.4 | 67.7 | 66.9 | 65.0 | 63.9 | 60.2 | 58.0 | 54.8 | 54.3 | 53.6 | 59.9 | 0.0 | 59.9 |
| | 12 | 58.7 | 67.3 | 52.5 | 66.4 | 65.4 | 63.6 | 62.5 | 59.0 | 56.7 | 53.9 | 53.3 | 52.7 | 58.7 | 0.0 | 58.7 |
| | 13 | 58.4 | 67.0 | 51.7 | 66.6 | 66.0 | 64.5 | 63.0 | 58.1 | 55.8 | 52.8 | 52.4 | 51.8 | 58.4 | 0.0 | 58.4 |
| | 14 | 57.6 | 65.9 | 51.9 | 65.5 | 64.8 | 63.3 | 62.1 | 57.4 | 55.2 | 52.8 | 52.4 | 52.0 | 57.6 | 0.0 | 57.6 |
| | 15 | 58.4 | 67.5 | 51.6 | 67.1 | 66.6 | 64.8 | 63.4 | 57.7 | 55.3 | 52.7 | 52.3 | 51.7 | 58.4 | 0.0 | 58.4 |
| | 16 | 57.3 | 64.3 | 52.2 | 64.0 | 63.4 | 62.2 | 60.9 | 57.8 | 55.9 | 53.2 | 52.7 | 52.3 | 57.3 | 0.0 | 57.3 |
| | 17 | 58.5 | 66.6 | 52.6 | 66.3 | 65.9 | 64.3 | 62.7 | 58.3 | 56.1 | 53.7 | 53.3 | 52.8 | 58.5 | 0.0 | 58.5 |
| | 18 | 57.4 | 63.4 | 52.8 | 63.0 | 62.6 | 61.5 | 60.6 | 58.1 | 56.3 | 53.9 | 53.4 | 53.0 | 57.4 | 0.0 | 57.4 |
| | 19 | 59.0 | 71.0 | 51.8 | 70.3 | 68.7 | 64.6 | 61.6 | 57.9 | 55.5 | 52.8 | 52.3 | 51.9 | 59.0 | 5.0 | 64.0 |
| | 20 | 56.4 | 64.1 | 51.1 | 63.7 | 63.2 | 61.5 | 60.1 | 56.7 | 54.5 | 52.0 | 51.6 | 51.2 | 56.4 | 5.0 | 61.4 |
| | 21 | 57.3 | 66.5 | 51.0 | 66.1 | 65.5 | 63.7 | 62.0 | 56.5 | 54.5 | 51.9 | 51.6 | 51.2 | 57.3 | 5.0 | 62.3 |
| Night | 22 | 56.1 | 62.2 | 51.6 | 61.8 | 61.4 | 60.1 | 59.2 | 56.7 | 55.0 | 52.6 | 52.1 | 51.8 | 56.1 | 10.0 | 66.1 |
| | 23 | 56.7 | 63.2 | 52.4 | 62.7 | 62.2 | 61.2 | 60.1 | 57.0 | 55.5 | 53.3 | 52.9 | 52.5 | 56.7 | 10.0 | 66.7 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 56.4 | 63.4 | 51.0 | 63.0 | 62.6 | 61.5 | 60.1 | 56.5 | 54.5 | 51.9 | 51.6 | 51.2 |
| | Max | 61.1 | 71.0 | 54.1 | 70.3 | 68.7 | 65.6 | 64.7 | 62.2 | 59.5 | 56.0 | 55.2 | 54.4 |
| Energy Average | | 58.6 | Average: | | 66.0 | 65.4 | 63.7 | 62.4 | 58.6 | 56.4 | 53.6 | 53.1 | 52.6 |
| Night | Min | 49.9 | 55.9 | 44.9 | 55.6 | 55.3 | 54.4 | 53.8 | 50.7 | 48.3 | 46.0 | 45.5 | 45.1 |
| | Max | 58.2 | 64.9 | 53.1 | 64.4 | 63.9 | 62.3 | 61.5 | 59.0 | 57.0 | 54.4 | 53.9 | 53.3 |
| Energy Average | | 54.7 | Average: | | 60.0 | 59.6 | 58.4 | 57.4 | 54.4 | 52.2 | 49.8 | 49.4 | 49.0 |

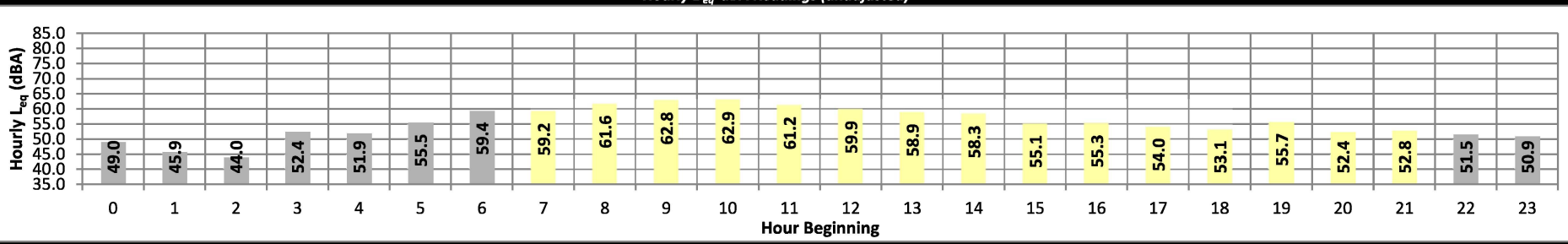
| 24-Hour CNEL | Leq (dBA) Daytime (7am-10pm) | Leq (dBA) Nighttime (10pm-7am) |
|---|---|---|
| 62.4 | 58.6 | 54.7 |

## 24-Hour Noise Level Measurement Summary

*Date:* Friday, February 17, 2023 *Location:* L6 - Located southwest of the site near the residence at 2132 *Meter:* Piccolo II *JN:* 14324

*Project:* Pepper 210 *Source:* N Oakdale Ave. *Analyst:* Z. Ibrahim

***Hourly $L_{eq}$ dBA Readings (unadjusted)***




| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% | $L_{eq}$ | Adj. | Adj. $L_{eq}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Night | 0 | 49.0 | 57.0 | 42.1 | 56.7 | 56.4 | 55.6 | 54.3 | 48.9 | 45.2 | 42.9 | 42.6 | 42.3 | 49.0 | 10.0 | 59.0 |
| | 1 | 45.9 | 53.7 | 41.1 | 53.2 | 52.3 | 50.6 | 49.2 | 46.5 | 43.8 | 41.8 | 41.5 | 41.2 | 45.9 | 10.0 | 55.9 |
| | 2 | 44.0 | 49.3 | 40.5 | 49.0 | 48.7 | 47.9 | 47.2 | 44.6 | 42.9 | 41.1 | 40.9 | 40.6 | 44.0 | 10.0 | 54.0 |
| | 3 | 52.4 | 63.0 | 43.5 | 62.2 | 61.4 | 59.2 | 57.6 | 51.5 | 47.3 | 44.5 | 44.1 | 43.6 | 52.4 | 10.0 | 62.4 |
| | 4 | 51.9 | 62.1 | 44.5 | 61.3 | 60.3 | 58.2 | 56.6 | 51.4 | 48.4 | 45.4 | 45.0 | 44.6 | 51.9 | 10.0 | 61.9 |
| | 5 | 55.5 | 64.7 | 48.5 | 64.1 | 63.3 | 61.4 | 60.0 | 55.5 | 52.4 | 49.6 | 49.1 | 48.6 | 55.5 | 10.0 | 65.5 |
| | 6 | 59.4 | 68.9 | 50.8 | 68.2 | 67.5 | 65.5 | 64.1 | 59.6 | 56.0 | 52.2 | 51.5 | 50.9 | 59.4 | 10.0 | 69.4 |
| Day | 7 | 59.2 | 68.7 | 51.1 | 68.1 | 67.1 | 65.2 | 63.8 | 59.4 | 55.9 | 52.3 | 51.7 | 51.2 | 59.2 | 0.0 | 59.2 |
| | 8 | 61.6 | 70.6 | 54.3 | 69.8 | 68.9 | 67.1 | 65.9 | 62.0 | 58.9 | 55.5 | 55.1 | 54.5 | 61.6 | 0.0 | 61.6 |
| | 9 | 62.8 | 71.6 | 54.3 | 71.0 | 70.3 | 68.5 | 67.4 | 63.4 | 59.6 | 55.6 | 55.0 | 54.4 | 62.8 | 0.0 | 62.8 |
| | 10 | 62.9 | 72.6 | 52.4 | 71.9 | 71.0 | 69.0 | 67.7 | 63.2 | 59.3 | 54.1 | 53.3 | 52.6 | 62.9 | 0.0 | 62.9 |
| | 11 | 61.2 | 70.2 | 51.9 | 69.6 | 68.9 | 67.3 | 66.2 | 61.7 | 57.5 | 53.4 | 52.8 | 52.1 | 61.2 | 0.0 | 61.2 |
| | 12 | 59.9 | 69.4 | 50.7 | 68.7 | 68.0 | 66.1 | 64.5 | 60.0 | 56.4 | 52.3 | 51.6 | 50.9 | 59.9 | 0.0 | 59.9 |
| | 13 | 58.9 | 68.5 | 49.8 | 68.0 | 67.4 | 65.4 | 63.4 | 58.8 | 54.8 | 51.1 | 50.6 | 50.0 | 58.9 | 0.0 | 58.9 |
| | 14 | 58.3 | 69.4 | 49.2 | 68.7 | 67.5 | 65.4 | 64.1 | 56.6 | 52.8 | 50.2 | 49.8 | 49.3 | 58.3 | 0.0 | 58.3 |
| | 15 | 55.1 | 63.2 | 48.6 | 62.8 | 62.4 | 60.7 | 59.2 | 55.2 | 52.9 | 49.8 | 49.3 | 48.8 | 55.1 | 0.0 | 55.1 |
| | 16 | 55.3 | 64.0 | 49.4 | 63.6 | 63.0 | 61.2 | 59.5 | 55.0 | 52.8 | 50.3 | 49.9 | 49.5 | 55.3 | 0.0 | 55.3 |
| | 17 | 54.0 | 61.1 | 49.0 | 60.6 | 60.0 | 58.6 | 57.3 | 54.6 | 52.6 | 50.1 | 49.6 | 49.2 | 54.0 | 0.0 | 54.0 |
| | 18 | 53.1 | 59.3 | 49.2 | 59.0 | 58.5 | 57.2 | 56.4 | 53.4 | 52.0 | 50.0 | 49.7 | 49.3 | 53.1 | 0.0 | 53.1 |
| | 19 | 55.7 | 65.7 | 48.7 | 65.2 | 64.7 | 61.9 | 59.8 | 54.9 | 52.4 | 49.7 | 49.2 | 48.8 | 55.7 | 5.0 | 60.7 |
| | 20 | 52.4 | 59.6 | 47.3 | 59.1 | 58.5 | 56.9 | 55.9 | 53.0 | 50.8 | 48.2 | 47.8 | 47.4 | 52.4 | 5.0 | 57.4 |
| | 21 | 52.8 | 61.7 | 46.8 | 61.2 | 60.4 | 58.6 | 57.4 | 52.4 | 50.1 | 47.7 | 47.4 | 47.0 | 52.8 | 5.0 | 57.8 |
| Night | 22 | 51.5 | 58.6 | 47.2 | 58.0 | 57.2 | 55.9 | 54.8 | 51.9 | 50.1 | 48.1 | 47.6 | 47.3 | 51.5 | 10.0 | 61.5 |
| | 23 | 50.9 | 56.2 | 47.4 | 55.9 | 55.6 | 54.9 | 54.2 | 51.6 | 49.7 | 48.1 | 47.8 | 47.5 | 50.9 | 10.0 | 60.9 |

| Timeframe | Hour | $L_{eq}$ | $L_{max}$ | $L_{min}$ | L1% | L2% | L5% | L8% | L25% | L50% | L90% | L95% | L99% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Min | 52.4 | 59.3 | 46.8 | 59.0 | 58.5 | 56.9 | 55.9 | 52.4 | 50.1 | 47.7 | 47.4 | 47.0 |
| | Max | 62.9 | 72.6 | 54.3 | 71.9 | 71.0 | 69.0 | 67.7 | 63.4 | 59.6 | 55.6 | 55.1 | 54.5 |
| Energy Average | | 58.9 | Average: | | 65.8 | 65.1 | 63.3 | 61.9 | 57.6 | 54.6 | 51.3 | 50.8 | 50.3 |
| Night | Min | 44.0 | 49.3 | 40.5 | 49.0 | 48.7 | 47.9 | 47.2 | 44.6 | 42.9 | 41.1 | 40.9 | 40.6 |
| | Max | 59.4 | 68.9 | 50.8 | 68.2 | 67.5 | 65.5 | 64.1 | 59.6 | 56.0 | 52.2 | 51.5 | 50.9 |
| Energy Average | | 53.4 | Average: | | 58.7 | 58.1 | 56.6 | 55.3 | 51.3 | 48.4 | 46.0 | 45.6 | 45.2 |

| 24-Hour CNEL | Leq (dBA) Daytime (7am-10pm) | Leq (dBA) Nighttime (10pm-7am) |
|---|---|---|
| **61.4** | **58.9** | **53.4** |

# APPENDIX 7.1:

# OFF-SITE TRAFFIC NOISE LEVEL CALCULATIONS

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## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E
Road Name: Pepper Av.
Road Segment: s/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 12,006 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 819 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -2.82 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -20.20 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -24.16 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 64.8 | 63.8 | 64.0 | 59.8 | 67.0 | 67.6 |
| Medium Trucks: | 58.5 | 58.2 | 53.4 | 52.7 | 60.3 | 60.5 |
| Heavy Trucks: | 59.3 | 57.5 | 51.0 | 57.8 | 64.0 | 64.1 |
| Vehicle Noise: | 66.6 | 65.6 | 64.5 | 62.4 | 69.4 | 69.7 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 47 | 102 | 219 | 473 |
| CNEL: | 50 | 108 | 232 | 500 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P
Road Name: Pepper Av.
Road Segment: s/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 14,788 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,009 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.08% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.53% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 1.38% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -1.93 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -19.94 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -20.39 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 65.7 | 64.6 | 64.9 | 60.7 | 67.9 | 68.5 |
| Medium Trucks: | 58.7 | 58.5 | 53.7 | 53.0 | 60.5 | 60.8 |
| Heavy Trucks: | 63.1 | 61.3 | 54.7 | 61.5 | 67.8 | 67.9 |
| Vehicle Noise: | 68.1 | 67.0 | 65.5 | 64.5 | 71.3 | 71.6 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 63 | 136 | 293 | 631 |
| CNEL: | 66 | 143 | 307 | 662 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC
Road Name: Pepper Av.
Road Segment: s/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 17,115 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,167 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -1.28 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -18.66 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -22.62 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 66.4 | 65.3 | 65.5 | 61.3 | 68.6 | 69.1 |
| Medium Trucks: | 60.0 | 59.7 | 55.0 | 54.3 | 61.8 | 62.0 |
| Heavy Trucks: | 60.8 | 59.0 | 52.5 | 59.3 | 65.6 | 65.6 |
| Vehicle Noise: | 68.2 | 67.1 | 66.1 | 63.9 | 70.9 | 71.3 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 60 | 129 | 278 | 599 |
| CNEL: | 63 | 136 | 294 | 633 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P
Road Name: Pepper Av.
Road Segment: s/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 19,897 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,357 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.19% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.60% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 1.21% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -0.64 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -18.48 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -19.68 | 0.41 | -1.20 | -5.41 | 0.000 | 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 | 65.9 | 66.1 | 62.0 | 69.2 | 69.8 |
| Medium Trucks: | 60.2 | 59.9 | 55.2 | 54.5 | 62.0 | 62.2 |
| Heavy Trucks: | 63.8 | 62.0 | 55.4 | 62.2 | 68.5 | 68.6 |
| Vehicle Noise: | 69.3 | 68.1 | 66.8 | 65.5 | 72.3 | 72.6 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 74 | 160 | 345 | 743 |
| CNEL: | 78 | 168 | 362 | 780 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: HY
Road Name: Pepper Av.
Road Segment: s/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 18,826 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,284 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -0.86 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -18.25 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -22.21 | 0.41 | -1.20 | -5.41 | 0.000 | 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 | 65.7 | 65.9 | 61.7 | 69.0 | 69.5 |
| Medium Trucks: | 60.4 | 60.2 | 55.4 | 54.7 | 62.2 | 62.5 |
| Heavy Trucks: | 61.3 | 59.4 | 52.9 | 59.7 | 66.0 | 66.0 |
| Vehicle Noise: | 68.6 | 67.5 | 66.5 | 64.3 | 71.3 | 71.7 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 64 | 137 | 296 | 638 |
| CNEL: | 67 | 145 | 313 | 675 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: HY+P
Road Name: Pepper Av.
Road Segment: s/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 21,608 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,474 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.22% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.61% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 1.17% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -0.28 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -18.08 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -19.46 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.4 | 66.3 | 66.5 | 62.3 | 69.6 | 70.1 |
| Medium Trucks: | 60.6 | 60.3 | 55.5 | 54.9 | 62.4 | 62.6 |
| Heavy Trucks: | 64.0 | 62.2 | 55.7 | 62.5 | 68.7 | 68.8 |
| Vehicle Noise: | 69.6 | 68.5 | 67.2 | 65.8 | 72.6 | 72.9 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 78 | 168 | 361 | 778 |
| CNEL: | 82 | 176 | 379 | 817 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E
Road Name: Pepper Av.
Road Segment: s/o SR-210 EB Ramps
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 25,375 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,731 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 0.43 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -16.95 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -20.91 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 68.1 | 67.0 | 67.2 | 63.0 | 70.3 | 70.8 |
| Medium Trucks: | 61.7 | 61.4 | 56.7 | 56.0 | 63.5 | 63.8 |
| Heavy Trucks: | 62.5 | 60.7 | 54.2 | 61.0 | 67.3 | 67.3 |
| Vehicle Noise: | 69.9 | 68.8 | 67.8 | 65.6 | 72.6 | 73.0 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 78 | 168 | 361 | 778 |
| CNEL: | 82 | 177 | 382 | 824 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P
Road Name: Pepper Av.
Road Segment: s/o SR-210 EB Ramps
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 25,843 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,762 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.55% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.75% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.70% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 0.52 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -16.95 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -20.91 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 68.2 | 67.1 | 67.3 | 63.1 | 70.4 | 70.9 |
| Medium Trucks: | 61.7 | 61.4 | 56.7 | 56.0 | 63.5 | 63.8 |
| Heavy Trucks: | 62.5 | 60.7 | 54.2 | 61.0 | 67.3 | 67.3 |
| Vehicle Noise: | 69.9 | 68.9 | 67.9 | 65.7 | 72.7 | 73.0 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 78 | 169 | 364 | 784 |
| CNEL: | 83 | 179 | 385 | 830 |

**FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)**

Scenario: OYC | Project Name: Pepper 210
Road Name: Pepper Av. | Job Number: 14324
Road Segment: s/o SR-210 EB Ramps

**SITE SPECIFIC INPUT DATA**

*Highway Data*

| | |
|---|---|
| Average Daily Traffic (Adt): | 40,419 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 2,757 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

**NOISE MODEL INPUTS**

*Site Conditions (Hard = 10, Soft = 15)*

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

*Vehicle Mix*

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

*Noise Source Elevations (in feet)*

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

*Lane Equivalent Distance (in feet)*

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

*FHWA Noise Model Calculations*

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 2.46 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -14.93 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -18.89 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

*Unmitigated Noise Levels (without Topo and barrier attenuation)*

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 70.1 | 69.0 | 69.2 | 65.1 | 72.3 | 72.9 |
| Medium Trucks: | 63.7 | 63.5 | 58.7 | 58.0 | 65.5 | 65.8 |
| Heavy Trucks: | 64.6 | 62.8 | 56.2 | 63.0 | 69.3 | 69.4 |
| Vehicle Noise: | 71.9 | 70.8 | 69.8 | 67.7 | 74.6 | 75.0 |

*Centerline Distance to Noise Contour (in feet)*

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 106 | 229 | 493 | 1,061 |
| CNEL: | 112 | 242 | 521 | 1,123 |



**FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)**

Scenario: OYC+P | Project Name: Pepper 210
Road Name: Pepper Av. | Job Number: 14324
Road Segment: s/o SR-210 EB Ramps

**SITE SPECIFIC INPUT DATA**

*Highway Data*

| | |
|---|---|
| Average Daily Traffic (Adt): | 40,887 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 2,789 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

**NOISE MODEL INPUTS**

*Site Conditions (Hard = 10, Soft = 15)*

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

*Vehicle Mix*

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.53% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.76% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.71% |

*Noise Source Elevations (in feet)*

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

*Lane Equivalent Distance (in feet)*

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

*FHWA Noise Model Calculations*

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 2.51 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -14.93 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -18.89 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

*Unmitigated Noise Levels (without Topo and barrier attenuation)*

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 70.2 | 69.1 | 69.3 | 65.1 | 72.4 | 72.9 |
| Medium Trucks: | 63.7 | 63.5 | 58.7 | 58.0 | 65.5 | 65.8 |
| Heavy Trucks: | 64.6 | 62.8 | 56.2 | 63.0 | 69.3 | 69.4 |
| Vehicle Noise: | 71.9 | 70.9 | 69.8 | 67.7 | 74.7 | 75.0 |

*Centerline Distance to Noise Contour (in feet)*

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 107 | 230 | 495 | 1,066 |
| CNEL: | 113 | 243 | 524 | 1,129 |



**FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)**

Scenario: HY | Project Name: Pepper 210
Road Name: Pepper Av. | Job Number: 14324
Road Segment: s/o SR-210 EB Ramps

**SITE SPECIFIC INPUT DATA**

*Highway Data*

| | |
|---|---|
| Average Daily Traffic (Adt): | 44,461 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 3,032 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

**NOISE MODEL INPUTS**

*Site Conditions (Hard = 10, Soft = 15)*

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

*Vehicle Mix*

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

*Noise Source Elevations (in feet)*

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

*Lane Equivalent Distance (in feet)*

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

*FHWA Noise Model Calculations*

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 2.87 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -14.52 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -18.48 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

*Unmitigated Noise Levels (without Topo and barrier attenuation)*

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 70.5 | 69.4 | 69.7 | 65.5 | 72.7 | 73.3 |
| Medium Trucks: | 64.1 | 63.9 | 59.1 | 58.4 | 66.0 | 66.2 |
| Heavy Trucks: | 65.0 | 63.2 | 56.6 | 63.4 | 69.7 | 69.8 |
| Vehicle Noise: | 72.3 | 71.2 | 70.2 | 68.1 | 75.1 | 75.4 |

*Centerline Distance to Noise Contour (in feet)*

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 113 | 244 | 525 | 1,131 |
| CNEL: | 120 | 258 | 556 | 1,197 |



**FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)**

Scenario: HY+P | Project Name: Pepper 210
Road Name: Pepper Av. | Job Number: 14324
Road Segment: s/o SR-210 EB Ramps

**SITE SPECIFIC INPUT DATA**

*Highway Data*

| | |
|---|---|
| Average Daily Traffic (Adt): | 44,929 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 3,064 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

**NOISE MODEL INPUTS**

*Site Conditions (Hard = 10, Soft = 15)*

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

*Vehicle Mix*

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.53% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.76% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.71% |

*Noise Source Elevations (in feet)*

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

*Lane Equivalent Distance (in feet)*

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

*FHWA Noise Model Calculations*

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 2.92 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -14.52 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -18.48 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

*Unmitigated Noise Levels (without Topo and barrier attenuation)*

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 70.6 | 69.5 | 69.7 | 65.5 | 72.8 | 73.3 |
| Medium Trucks: | 64.1 | 63.9 | 59.1 | 58.4 | 66.0 | 66.2 |
| Heavy Trucks: | 65.0 | 63.2 | 56.6 | 63.4 | 69.7 | 69.8 |
| Vehicle Noise: | 72.3 | 71.3 | 70.3 | 68.1 | 75.1 | 75.5 |

*Centerline Distance to Noise Contour (in feet)*

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 114 | 245 | 527 | 1,136 |
| CNEL: | 120 | 259 | 558 | 1,202 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E
Road Name: State St.
Road Segment: n/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 13,926 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 950 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -2.17 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -19.56 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -23.52 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 65.5 | 64.4 | 64.6 | 60.4 | 67.7 | 68.2 |
| Medium Trucks: | 59.1 | 58.8 | 54.1 | 53.4 | 60.9 | 61.1 |
| Heavy Trucks: | 59.9 | 58.1 | 51.6 | 58.4 | 64.7 | 64.7 |
| Vehicle Noise: | 67.3 | 66.2 | 65.2 | 63.0 | 70.0 | 70.4 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 52 | 112 | 242 | 522 |
| CNEL: | 55 | 119 | 256 | 552 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P
Road Name: State St.
Road Segment: n/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 13,989 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 954 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.52% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.77% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.71% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -2.15 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -19.56 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -23.52 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 65.5 | 64.4 | 64.6 | 60.4 | 67.7 | 68.3 |
| Medium Trucks: | 59.1 | 58.8 | 54.1 | 53.4 | 60.9 | 61.1 |
| Heavy Trucks: | 59.9 | 58.1 | 51.6 | 58.4 | 64.7 | 64.7 |
| Vehicle Noise: | 67.3 | 66.2 | 65.2 | 63.0 | 70.0 | 70.4 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 52 | 113 | 243 | 523 |
| CNEL: | 55 | 119 | 257 | 553 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC
Road Name: State St.
Road Segment: n/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 15,683 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,070 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -1.65 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -19.04 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -23.00 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 66.0 | 64.9 | 65.1 | 60.9 | 68.2 | 68.8 |
| Medium Trucks: | 59.6 | 59.4 | 54.6 | 53.9 | 61.4 | 61.7 |
| Heavy Trucks: | 60.5 | 58.7 | 52.1 | 58.9 | 65.2 | 65.3 |
| Vehicle Noise: | 67.8 | 66.7 | 65.7 | 63.6 | 70.5 | 70.9 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 56 | 122 | 262 | 565 |
| CNEL: | 60 | 129 | 277 | 598 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P
Road Name: State St.
Road Segment: n/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 15,746 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,074 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.77% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.71% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -1.64 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -19.04 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -23.00 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 66.0 | 64.9 | 65.1 | 61.0 | 68.2 | 68.8 |
| Medium Trucks: | 59.6 | 59.4 | 54.6 | 53.9 | 61.4 | 61.7 |
| Heavy Trucks: | 60.5 | 58.7 | 52.1 | 58.9 | 65.2 | 65.3 |
| Vehicle Noise: | 67.8 | 66.7 | 65.7 | 63.6 | 70.5 | 70.9 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 57 | 122 | 263 | 566 |
| CNEL: | 60 | 129 | 278 | 599 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: HY
Road Name: State St.
Road Segment: n/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 17,252 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,177 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -1.24 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -18.63 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -22.59 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 66.4 | 65.3 | 65.5 | 61.4 | 68.6 | 69.2 |
| Medium Trucks: | 60.0 | 59.8 | 55.0 | 54.3 | 61.8 | 62.1 |
| Heavy Trucks: | 60.9 | 59.1 | 52.5 | 59.3 | 65.6 | 65.7 |
| Vehicle Noise: | 68.2 | 67.1 | 66.1 | 64.0 | 71.0 | 71.3 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 60 | 130 | 279 | 602 |
| CNEL: | 64 | 137 | 296 | 637 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: HY+P
Road Name: State St.
Road Segment: n/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 17,314 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,181 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.77% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.71% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -1.22 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -18.63 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -22.59 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 66.4 | 65.4 | 65.6 | 61.4 | 68.6 | 69.2 |
| Medium Trucks: | 60.0 | 59.8 | 55.0 | 54.3 | 61.8 | 62.1 |
| Heavy Trucks: | 60.9 | 59.1 | 52.5 | 59.3 | 65.6 | 65.7 |
| Vehicle Noise: | 68.2 | 67.1 | 66.1 | 64.0 | 71.0 | 71.3 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 60 | 130 | 280 | 603 |
| CNEL: | 64 | 137 | 296 | 638 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E
Road Name: State St.
Road Segment: s/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 20,772 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,417 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -0.43 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -17.82 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -21.78 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.2 | 66.1 | 66.3 | 62.2 | 69.4 | 70.0 |
| Medium Trucks: | 60.8 | 60.6 | 55.8 | 55.1 | 62.6 | 62.9 |
| Heavy Trucks: | 61.7 | 59.9 | 53.3 | 60.1 | 66.4 | 66.5 |
| Vehicle Noise: | 69.0 | 67.9 | 66.9 | 64.8 | 71.8 | 72.1 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 68 | 147 | 316 | 681 |
| CNEL: | 72 | 155 | 334 | 721 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P
Road Name: State St.
Road Segment: s/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 20,835 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,421 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.77% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.71% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -0.42 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -17.82 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -21.78 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.2 | 66.2 | 66.4 | 62.2 | 69.4 | 70.0 |
| Medium Trucks: | 60.8 | 60.6 | 55.8 | 55.1 | 62.6 | 62.9 |
| Heavy Trucks: | 61.7 | 59.9 | 53.3 | 60.1 | 66.4 | 66.5 |
| Vehicle Noise: | 69.0 | 68.0 | 66.9 | 64.8 | 71.8 | 72.1 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 68 | 147 | 316 | 682 |
| CNEL: | 72 | 155 | 335 | 722 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC
Road Name: State St.
Road Segment: s/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 23,393 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,595 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 0.08 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -17.30 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -21.27 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.7 | 66.7 | 66.9 | 62.7 | 69.9 | 70.5 |
| Medium Trucks: | 61.4 | 61.1 | 56.3 | 55.6 | 63.2 | 63.4 |
| Heavy Trucks: | 62.2 | 60.4 | 53.9 | 60.6 | 66.9 | 67.0 |
| Vehicle Noise: | 69.5 | 68.5 | 67.4 | 65.3 | 72.3 | 72.6 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 74 | 159 | 342 | 737 |
| CNEL: | 78 | 168 | 362 | 780 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P
Road Name: State St.
Road Segment: s/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 23,455 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,600 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.71% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 0.09 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -17.30 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -21.27 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.7 | 66.7 | 66.9 | 62.7 | 70.0 | 70.5 |
| Medium Trucks: | 61.4 | 61.1 | 56.3 | 55.6 | 63.2 | 63.4 |
| Heavy Trucks: | 62.2 | 60.4 | 53.9 | 60.6 | 66.9 | 67.0 |
| Vehicle Noise: | 69.5 | 68.5 | 67.4 | 65.3 | 72.3 | 72.6 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 74 | 159 | 343 | 738 |
| CNEL: | 78 | 168 | 362 | 781 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: HY
Road Name: State St.
Road Segment: s/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 25,732 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,755 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 0.50 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -16.89 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -20.85 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 68.1 | 67.1 | 67.3 | 63.1 | 70.4 | 70.9 |
| Medium Trucks: | 61.8 | 61.5 | 56.7 | 56.1 | 63.6 | 63.8 |
| Heavy Trucks: | 62.6 | 60.8 | 54.3 | 61.1 | 67.3 | 67.4 |
| Vehicle Noise: | 69.9 | 68.9 | 67.8 | 65.7 | 72.7 | 73.1 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 79 | 169 | 365 | 786 |
| CNEL: | 83 | 179 | 386 | 831 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: HY+P
Road Name: State St.
Road Segment: s/o Highland Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 25,794 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,759 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.71% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 0.51 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -16.89 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -20.85 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 68.2 | 67.1 | 67.3 | 63.1 | 70.4 | 70.9 |
| Medium Trucks: | 61.8 | 61.5 | 56.7 | 56.1 | 63.6 | 63.8 |
| Heavy Trucks: | 62.6 | 60.8 | 54.3 | 61.1 | 67.3 | 67.4 |
| Vehicle Noise: | 69.9 | 68.9 | 67.8 | 65.7 | 72.7 | 73.1 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 79 | 169 | 365 | 786 |
| CNEL: | 83 | 179 | 386 | 832 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E
Road Name: Highland Av.
Road Segment: w/o Driveway 1
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 9,924 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 677 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -3.64 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -21.03 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -24.99 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 64.0 | 62.9 | 63.1 | 59.0 | 66.2 | 66.8 |
| Medium Trucks: | 57.6 | 57.4 | 52.6 | 51.9 | 59.4 | 59.7 |
| Heavy Trucks: | 58.5 | 56.7 | 50.1 | 56.9 | 63.2 | 63.3 |
| Vehicle Noise: | 65.8 | 64.7 | 63.7 | 61.6 | 68.5 | 68.9 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 42 | 90 | 193 | 416 |
| CNEL: | 44 | 95 | 204 | 440 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P
Road Name: Highland Av.
Road Segment: w/o Driveway 1
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 10,080 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 687 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.54% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.75% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.70% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -3.57 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -21.03 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -24.99 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 64.1 | 63.0 | 63.2 | 59.0 | 66.3 | 66.8 |
| Medium Trucks: | 57.6 | 57.4 | 52.6 | 51.9 | 59.4 | 59.7 |
| Heavy Trucks: | 58.5 | 56.7 | 50.1 | 56.9 | 63.2 | 63.3 |
| Vehicle Noise: | 65.8 | 64.8 | 63.8 | 61.6 | 68.6 | 69.0 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 42 | 90 | 194 | 419 |
| CNEL: | 44 | 96 | 206 | 443 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC
Road Name: Highland Av.
Road Segment: w/o Driveway 1
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 13,566 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 925 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -2.28 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -19.67 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -23.63 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 65.4 | 64.3 | 64.5 | 60.3 | 67.6 | 68.1 |
| Medium Trucks: | 59.0 | 58.7 | 54.0 | 53.3 | 60.8 | 61.0 |
| Heavy Trucks: | 59.8 | 58.0 | 51.5 | 58.3 | 64.6 | 64.6 |
| Vehicle Noise: | 67.2 | 66.1 | 65.1 | 62.9 | 69.9 | 70.3 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 51 | 110 | 238 | 513 |
| CNEL: | 54 | 117 | 252 | 542 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P
Road Name: Highland Av.
Road Segment: w/o Driveway 1
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 13,722 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 936 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.53% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.76% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.71% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -2.23 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -19.67 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -23.63 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 65.4 | 64.3 | 64.5 | 60.4 | 67.6 | 68.2 |
| Medium Trucks: | 59.0 | 58.7 | 54.0 | 53.3 | 60.8 | 61.0 |
| Heavy Trucks: | 59.8 | 58.0 | 51.5 | 58.3 | 64.6 | 64.6 |
| Vehicle Noise: | 67.2 | 66.1 | 65.1 | 63.0 | 69.9 | 70.3 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 51 | 111 | 239 | 515 |
| CNEL: | 55 | 117 | 253 | 545 |

**FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)**

Scenario: HY
Road Name: Highland Av.
Road Segment: w/o Driveway 1
Project Name: Pepper 210
Job Number: 14324

**SITE SPECIFIC INPUT DATA**

*Highway Data*

| | |
|---|---|
| Average Daily Traffic (Adt): | 14,922 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,018 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

**NOISE MODEL INPUTS**

*Site Conditions (Hard = 10, Soft = 15)*

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

*Vehicle Mix*

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

*Noise Source Elevations (in feet)*

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

*Lane Equivalent Distance (in feet)*

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

*FHWA Noise Model Calculations*

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -1.87 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -19.26 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -23.22 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

*Unmitigated Noise Levels (without Topo and barrier attenuation)*

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 65.8 | 64.7 | 64.9 | 60.7 | 68.0 | 68.5 |
| Medium Trucks: | 59.4 | 59.1 | 54.4 | 53.7 | 61.2 | 61.4 |
| Heavy Trucks: | 60.2 | 58.4 | 51.9 | 58.7 | 65.0 | 65.0 |
| Vehicle Noise: | 67.6 | 66.5 | 65.5 | 63.3 | 70.3 | 70.7 |

*Centerline Distance to Noise Contour (in feet)*

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 55 | 118 | 254 | 546 |
| CNEL: | 58 | 125 | 268 | 578 |



**FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)**

Scenario: HY+P
Road Name: Highland Av.
Road Segment: w/o Driveway 1
Project Name: Pepper 210
Job Number: 14324

**SITE SPECIFIC INPUT DATA**

*Highway Data*

| | |
|---|---|
| Average Daily Traffic (Adt): | 15,078 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,028 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

**NOISE MODEL INPUTS**

*Site Conditions (Hard = 10, Soft = 15)*

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

*Vehicle Mix*

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.53% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.76% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.71% |

*Noise Source Elevations (in feet)*

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

*Lane Equivalent Distance (in feet)*

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

*FHWA Noise Model Calculations*

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -1.82 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -19.26 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -23.22 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

*Unmitigated Noise Levels (without Topo and barrier attenuation)*

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 65.8 | 64.8 | 65.0 | 60.8 | 68.0 | 68.6 |
| Medium Trucks: | 59.4 | 59.1 | 54.4 | 53.7 | 61.2 | 61.4 |
| Heavy Trucks: | 60.2 | 58.4 | 51.9 | 58.7 | 65.0 | 65.0 |
| Vehicle Noise: | 67.6 | 66.5 | 65.5 | 63.4 | 70.3 | 70.7 |

*Centerline Distance to Noise Contour (in feet)*

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 55 | 118 | 255 | 549 |
| CNEL: | 58 | 125 | 269 | 581 |



**FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)**

Scenario: E
Road Name: Highland Av.
Road Segment: w/o Pepper Av.
Project Name: Pepper 210
Job Number: 14324

**SITE SPECIFIC INPUT DATA**

*Highway Data*

| | |
|---|---|
| Average Daily Traffic (Adt): | 9,924 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 677 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

**NOISE MODEL INPUTS**

*Site Conditions (Hard = 10, Soft = 15)*

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

*Vehicle Mix*

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

*Noise Source Elevations (in feet)*

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

*Lane Equivalent Distance (in feet)*

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

*FHWA Noise Model Calculations*

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -3.64 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -21.03 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -24.99 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

*Unmitigated Noise Levels (without Topo and barrier attenuation)*

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 64.0 | 62.9 | 63.1 | 59.0 | 66.2 | 66.8 |
| Medium Trucks: | 57.6 | 57.4 | 52.6 | 51.9 | 59.4 | 59.7 |
| Heavy Trucks: | 58.5 | 56.7 | 50.1 | 56.9 | 63.2 | 63.3 |
| Vehicle Noise: | 65.8 | 64.7 | 63.7 | 61.6 | 68.5 | 68.9 |

*Centerline Distance to Noise Contour (in feet)*

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 42 | 90 | 193 | 416 |
| CNEL: | 44 | 95 | 204 | 440 |



**FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)**

Scenario: E+P
Road Name: Highland Av.
Road Segment: w/o Pepper Av.
Project Name: Pepper 210
Job Number: 14324

**SITE SPECIFIC INPUT DATA**

*Highway Data*

| | |
|---|---|
| Average Daily Traffic (Adt): | 11,452 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 781 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

**NOISE MODEL INPUTS**

*Site Conditions (Hard = 10, Soft = 15)*

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

*Vehicle Mix*

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.84% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.54% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.62% |

*Noise Source Elevations (in feet)*

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

*Lane Equivalent Distance (in feet)*

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

*FHWA Noise Model Calculations*

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -3.01 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -21.03 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -24.99 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

*Unmitigated Noise Levels (without Topo and barrier attenuation)*

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 64.6 | 63.6 | 63.8 | 59.6 | 66.9 | 67.4 |
| Medium Trucks: | 57.6 | 57.4 | 52.6 | 51.9 | 59.4 | 59.7 |
| Heavy Trucks: | 58.5 | 56.7 | 50.1 | 56.9 | 63.2 | 63.3 |
| Vehicle Noise: | 66.2 | 65.2 | 64.3 | 61.9 | 68.9 | 69.3 |

*Centerline Distance to Noise Contour (in feet)*

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 44 | 95 | 205 | 441 |
| CNEL: | 47 | 101 | 217 | 468 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC
Road Name: Highland Av.
Road Segment: w/o Pepper Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 13,566 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 925 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -2.28 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -19.67 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -23.63 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 65.4 | 64.3 | 64.5 | 60.3 | 67.6 | 68.1 |
| Medium Trucks: | 59.0 | 58.7 | 54.0 | 53.3 | 60.8 | 61.0 |
| Heavy Trucks: | 59.8 | 58.0 | 51.5 | 58.3 | 64.6 | 64.6 |
| Vehicle Noise: | 67.2 | 66.1 | 65.1 | 62.9 | 69.9 | 70.3 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 51 | 110 | 238 | 513 |
| CNEL: | 54 | 117 | 252 | 542 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P
Road Name: Highland Av.
Road Segment: w/o Pepper Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 15,094 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,029 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.76% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.60% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.64% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -1.81 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -19.67 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -23.63 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 65.8 | 64.8 | 65.0 | 60.8 | 68.1 | 68.6 |
| Medium Trucks: | 59.0 | 58.7 | 54.0 | 53.3 | 60.8 | 61.0 |
| Heavy Trucks: | 59.8 | 58.0 | 51.5 | 58.3 | 64.6 | 64.6 |
| Vehicle Noise: | 67.5 | 66.4 | 65.5 | 63.2 | 70.2 | 70.6 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 54 | 115 | 249 | 535 |
| CNEL: | 57 | 122 | 263 | 568 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: HY
Road Name: Highland Av.
Road Segment: w/o Pepper Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 14,922 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,018 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -1.87 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -19.26 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -23.22 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 65.8 | 64.7 | 64.9 | 60.7 | 68.0 | 68.5 |
| Medium Trucks: | 59.4 | 59.1 | 54.4 | 53.7 | 61.2 | 61.4 |
| Heavy Trucks: | 60.2 | 58.4 | 51.9 | 58.7 | 65.0 | 65.0 |
| Vehicle Noise: | 67.6 | 66.5 | 65.5 | 63.3 | 70.3 | 70.7 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 55 | 118 | 254 | 546 |
| CNEL: | 58 | 125 | 268 | 578 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: HY+P
Road Name: Highland Av.
Road Segment: w/o Pepper Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 16,450 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,122 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.74% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.61% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.65% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -1.44 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -19.26 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -23.22 | 0.41 | -1.20 | -5.41 | 0.000 | 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 | 65.1 | 65.3 | 61.2 | 68.4 | 69.0 |
| Medium Trucks: | 59.4 | 59.1 | 54.4 | 53.7 | 61.2 | 61.4 |
| Heavy Trucks: | 60.2 | 58.4 | 51.9 | 58.7 | 65.0 | 65.0 |
| Vehicle Noise: | 67.9 | 66.8 | 65.9 | 63.6 | 70.6 | 71.0 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 57 | 122 | 264 | 568 |
| CNEL: | 60 | 130 | 280 | 602 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E
Road Name: Highland Av.
Road Segment: e/o Pepper Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 16,653 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,136 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -1.39 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -18.78 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -22.74 | 0.41 | -1.20 | -5.41 | 0.000 | 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 | 65.2 | 65.4 | 61.2 | 68.5 | 69.0 |
| Medium Trucks: | 59.9 | 59.6 | 54.8 | 54.2 | 61.7 | 61.9 |
| Heavy Trucks: | 60.7 | 58.9 | 52.4 | 59.2 | 65.5 | 65.5 |
| Vehicle Noise: | 68.0 | 67.0 | 66.0 | 63.8 | 70.8 | 71.2 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 59 | 127 | 273 | 588 |
| CNEL: | 62 | 134 | 289 | 622 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P
Road Name: Highland Av.
Road Segment: e/o Pepper Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 16,965 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,157 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.55% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.75% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.70% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -1.31 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -18.78 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -22.74 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 66.3 | 65.3 | 65.5 | 61.3 | 68.6 | 69.1 |
| Medium Trucks: | 59.9 | 59.6 | 54.8 | 54.2 | 61.7 | 61.9 |
| Heavy Trucks: | 60.7 | 58.9 | 52.4 | 59.2 | 65.5 | 65.5 |
| Vehicle Noise: | 68.1 | 67.0 | 66.0 | 63.9 | 70.8 | 71.2 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 59 | 128 | 275 | 592 |
| CNEL: | 63 | 135 | 291 | 627 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC
Road Name: Highland Av.
Road Segment: e/o Pepper Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 21,143 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,442 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -0.36 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -17.74 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -21.70 | 0.41 | -1.20 | -5.41 | 0.000 | 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 | 66.2 | 66.4 | 62.2 | 69.5 | 70.0 |
| Medium Trucks: | 60.9 | 60.7 | 55.9 | 55.2 | 62.7 | 63.0 |
| Heavy Trucks: | 61.8 | 59.9 | 53.4 | 60.2 | 66.5 | 66.5 |
| Vehicle Noise: | 69.1 | 68.0 | 67.0 | 64.9 | 71.8 | 72.2 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 69 | 148 | 320 | 689 |
| CNEL: | 73 | 157 | 338 | 729 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P
Road Name: Highland Av.
Road Segment: e/o Pepper Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 21,455 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,463 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.54% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.75% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.70% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -0.29 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -17.74 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -21.70 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.4 | 66.3 | 66.5 | 62.3 | 69.6 | 70.1 |
| Medium Trucks: | 60.9 | 60.7 | 55.9 | 55.2 | 62.7 | 63.0 |
| Heavy Trucks: | 61.8 | 59.9 | 53.4 | 60.2 | 66.5 | 66.5 |
| Vehicle Noise: | 69.1 | 68.1 | 67.0 | 64.9 | 71.9 | 72.2 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 69 | 149 | 322 | 693 |
| CNEL: | 73 | 158 | 341 | 734 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: HY
Road Name: Highland Av.
Road Segment: e/o Pepper Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 23,258 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,586 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 0.06 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -17.33 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -21.29 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.7 | 66.6 | 66.8 | 62.7 | 69.9 | 70.5 |
| Medium Trucks: | 61.3 | 61.1 | 56.3 | 55.6 | 63.1 | 63.4 |
| Heavy Trucks: | 62.2 | 60.4 | 53.8 | 60.6 | 66.9 | 67.0 |
| Vehicle Noise: | 69.5 | 68.4 | 67.4 | 65.3 | 72.2 | 72.6 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 73 | 158 | 341 | 734 |
| CNEL: | 78 | 167 | 361 | 777 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: HY+P
Road Name: Highland Av.
Road Segment: e/o Pepper Av.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 23,570 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,607 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.54% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.76% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.71% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | 0.12 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -17.33 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -21.29 | 0.41 | -1.20 | -5.41 | 0.000 | 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 | 66.7 | 66.9 | 62.7 | 70.0 | 70.5 |
| Medium Trucks: | 61.3 | 61.1 | 56.3 | 55.6 | 63.1 | 63.4 |
| Heavy Trucks: | 62.2 | 60.4 | 53.8 | 60.6 | 66.9 | 67.0 |
| Vehicle Noise: | 69.5 | 68.5 | 67.5 | 65.3 | 72.3 | 72.7 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 74 | 159 | 343 | 738 |
| CNEL: | 78 | 168 | 363 | 781 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E
Road Name: Highland Av.
Road Segment: e/o State St.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 15,363 vehicles |
| Peak Hour Percentage: | 6.82% |
| 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -1.74 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -19.13 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -23.09 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 65.9 | 64.8 | 65.0 | 60.9 | 68.1 | 68.7 |
| Medium Trucks: | 59.5 | 59.3 | 54.5 | 53.8 | 61.3 | 61.6 |
| Heavy Trucks: | 60.4 | 58.6 | 52.0 | 58.8 | 65.1 | 65.2 |
| Vehicle Noise: | 67.7 | 66.6 | 65.6 | 63.5 | 70.4 | 70.8 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 56 | 120 | 259 | 557 |
| CNEL: | 59 | 127 | 274 | 589 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: E+P
Road Name: Highland Av.
Road Segment: e/o State St.
Project Name: Pepper 210
Job Number: 14324

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 15,550 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,061 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.54% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.76% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.71% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -1.69 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -19.13 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -23.09 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 66.0 | 64.9 | 65.1 | 60.9 | 68.2 | 68.7 |
| Medium Trucks: | 59.5 | 59.3 | 54.5 | 53.8 | 61.3 | 61.6 |
| Heavy Trucks: | 60.4 | 58.6 | 52.0 | 58.8 | 65.1 | 65.2 |
| Vehicle Noise: | 67.7 | 66.7 | 65.6 | 63.5 | 70.5 | 70.8 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 56 | 121 | 260 | 560 |
| CNEL: | 59 | 128 | 275 | 592 |

## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC | Project Name: Pepper 210
Road Name: Highland Av. | Job Number: 14324
Road Segment: e/o State St.

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 19,641 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,340 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -0.68 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -18.06 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -22.02 | 0.41 | -1.20 | -5.41 | 0.000 | 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 | 65.9 | 66.1 | 61.9 | 69.2 | 69.7 |
| Medium Trucks: | 60.6 | 60.3 | 55.6 | 54.9 | 62.4 | 62.6 |
| Heavy Trucks: | 61.4 | 59.6 | 53.1 | 59.9 | 66.2 | 66.2 |
| Vehicle Noise: | 68.8 | 67.7 | 66.7 | 64.5 | 71.5 | 71.9 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 66 | 141 | 305 | 656 |
| CNEL: | 69 | 150 | 322 | 694 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: OYC+P | Project Name: Pepper 210
Road Name: Highland Av. | Job Number: 14324
Road Segment: e/o State St.

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 19,828 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,352 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.53% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.76% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.71% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -0.64 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -18.06 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -22.02 | 0.41 | -1.20 | -5.41 | 0.000 | 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 | 65.9 | 66.1 | 62.0 | 69.2 | 69.8 |
| Medium Trucks: | 60.6 | 60.3 | 55.6 | 54.9 | 62.4 | 62.6 |
| Heavy Trucks: | 61.4 | 59.6 | 53.1 | 59.9 | 66.2 | 66.2 |
| Vehicle Noise: | 68.8 | 67.7 | 66.7 | 64.6 | 71.5 | 71.9 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 66 | 142 | 306 | 659 |
| CNEL: | 70 | 150 | 324 | 697 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: HY | Project Name: Pepper 210
Road Name: Highland Av. | Job Number: 14324
Road Segment: e/o State St.

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 21,605 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,473 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.51% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.78% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.72% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -0.26 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -17.65 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -21.61 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.4 | 66.3 | 66.5 | 62.3 | 69.6 | 70.1 |
| Medium Trucks: | 61.0 | 60.8 | 56.0 | 55.3 | 62.8 | 63.1 |
| Heavy Trucks: | 61.8 | 60.0 | 53.5 | 60.3 | 66.6 | 66.6 |
| Vehicle Noise: | 69.2 | 68.1 | 67.1 | 64.9 | 71.9 | 72.3 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 70 | 151 | 324 | 699 |
| CNEL: | 74 | 159 | 343 | 740 |



## FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (9/12/2021)

Scenario: HY+P | Project Name: Pepper 210
Road Name: Highland Av. | Job Number: 14324
Road Segment: e/o State St.

### SITE SPECIFIC INPUT DATA

**Highway Data**

| | |
|---|---|
| Average Daily Traffic (Adt): | 21,792 vehicles |
| Peak Hour Percentage: | 6.82% |
| Peak Hour Volume: | 1,486 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: | 52.0 feet |
| Centerline Dist. to Observer: | 52.0 feet |
| Barrier Distance to Observer: | 0.0 feet |
| Observer Height (Above Pad): | 5.0 feet |
| Pad Elevation: | 0.0 feet |
| Road Elevation: | 0.0 feet |
| Road Grade: | 0.0% |
| Left View: | -90.0 degrees |
| Right View: | 90.0 degrees |

### NOISE MODEL INPUTS

**Site Conditions (Hard = 10, Soft = 15)**

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

**Vehicle Mix**

| VehicleType | Day | Evening | Night | Daily |
|---|---|---|---|---|
| Autos: | 64.0% | 16.8% | 19.2% | 97.53% |
| Medium Trucks: | 77.1% | 6.4% | 16.5% | 1.76% |
| Heavy Trucks: | 54.0% | 3.0% | 43.0% | 0.71% |

**Noise Source Elevations (in feet)**

| | | | |
|---|---|---|---|
| Autos: | 0.000 | | |
| Medium Trucks: | 2.297 | | |
| Heavy Trucks: | 8.004 | Grade Adjustment: | 0.0 |

**Lane Equivalent Distance (in feet)**

| | |
|---|---|
| Autos: | 46.400 |
| Medium Trucks: | 46.209 |
| Heavy Trucks: | 46.228 |

**FHWA Noise Model Calculations**

| VehicleType | REMEL | Traffic Flow | Distance | Finite Road | Fresnel | Barrier Atten | Berm Atten |
|---|---|---|---|---|---|---|---|
| Autos: | 68.46 | -0.23 | 0.38 | -1.20 | -4.66 | 0.000 | 0.000 |
| Medium Trucks: | 79.45 | -17.65 | 0.41 | -1.20 | -4.87 | 0.000 | 0.000 |
| Heavy Trucks: | 84.25 | -21.61 | 0.41 | -1.20 | -5.41 | 0.000 | 0.000 |

**Unmitigated Noise Levels (without Topo and barrier attenuation)**

| VehicleType | Leq Peak Hour | Leq Day | Leq Evening | Leq Night | Ldn | CNEL |
|---|---|---|---|---|---|---|
| Autos: | 67.4 | 66.4 | 66.6 | 62.4 | 69.6 | 70.2 |
| Medium Trucks: | 61.0 | 60.8 | 56.0 | 55.3 | 62.8 | 63.1 |
| Heavy Trucks: | 61.8 | 60.0 | 53.5 | 60.3 | 66.6 | 66.6 |
| Vehicle Noise: | 69.2 | 68.1 | 67.1 | 65.0 | 72.0 | 72.3 |

**Centerline Distance to Noise Contour (in feet)**

| | 70 dBA | 65 dBA | 60 dBA | 55 dBA |
|---|---|---|---|---|
| Ldn: | 70 | 151 | 326 | 702 |
| CNEL: | 74 | 160 | 345 | 742 |

# APPENDIX 9.1:

# OPERATIONAL NOISE CALCULATIONS

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# 14324 - Pepper 210

**CadnaA Noise Prediction Model:** 14324-02.cna
**Date:** 25.01.24
**Analyst:** B. Lawson

## Calculation Configuration

| Configuration | |
|---|---|
| **Parameter** | **Value** |
| **General** | |
| **Max. Error (dB)** | **0.00** |
| **Max. Search Radius (#(Unit,LEN))** | **3048.00** |
| **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** | |
| **Daytime Penalty (dB)** | **0.00** |
| **Recr. Time Penalty (dB)** | **5.00** |
| **Night-time Penalty (dB)** | **10.00** |
| **DTM** | |
| **Standard Height (m)** | **365.76** |
| **Model of Terrain** | **Triangulation** |
| **Reflection** | |
| **max. Order of Reflection** | **1** |
| **Search Radius Src** | **100.00** |
| **Search Radius Rcvr** | **100.00** |
| **Max. Distance Source - Rcvr** | **1000.00 1000.00** |
| **Min. Distance Rvcr - Reflector** | **1.00 1.00** |
| **Min. Distance Source - Reflector** | **0.10** |
| **Industrial (ISO 9613)** | |
| **Lateral Diffraction** | **some Obj** |
| **Obst. within Area Src do not shield** | **On** |
| **Screening** | **Incl. Ground Att. over Barrier** |
| | **Dz with limit (20/25)** |
| **Barrier Coefficients C1,2,3** | **3.0 20.0 0.0** |
| **Temperature (#(Unit,TEMP))** | **10** |
| **rel. Humidity (%)** | **70** |
| **Ground Absorption G** | **0.50** |
| **Wind Speed for Dir. (#(Unit,SPEED))** | **3.0** |
| **Roads (TNM)** | |
| **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 | 51.4 | 51.4 | 58.0 | 57.8 | 52.7 | 0.0 | | | | 5.00 | r | 6223818.04 | 2360027.16 | 1411.49 |
| RECEIVERS | | R2 | 48.8 | 48.8 | 55.5 | 58.4 | 51.9 | 0.0 | | | | 5.00 | r | 6223612.13 | 2360666.53 | 1384.68 |
| RECEIVERS | | R3 | 29.7 | 29.6 | 36.3 | 59.9 | 59.3 | 0.0 | | | | 5.00 | r | 6230332.33 | 2359504.19 | 1299.25 |
| RECEIVERS | | R4 | 45.1 | 45.1 | 51.8 | 69.6 | 66.9 | 0.0 | | | | 5.00 | r | 6225001.22 | 2358523.59 | 1370.59 |
| RECEIVERS | | R5 | 43.9 | 43.9 | 50.6 | 58.6 | 54.7 | 0.0 | | | | 5.00 | r | 6224083.55 | 2358688.48 | 1398.20 |
| RECEIVERS | | R6 | 47.2 | 47.2 | 53.9 | 58.9 | 53.4 | 0.0 | | | | 5.00 | r | 6223867.90 | 2359521.90 | 1410.82 |

## Point Source(s)

| Name | M. | ID | Result. PWL | | | Lw / Li | | | Operating Time | | | Height | | Coordinates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Type | Value | norm. | Day | Special | Night | | | X | Y | Z |
| | | | (dBA) | (dBA) | (dBA) | | | dB(A) | (min) | (min) | (min) | (ft) | | (ft) | (ft) | (ft) |
| POINTSOURCE | | AC01 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 585.00 | 0.00 | 252.00 | 5.00 | g | 6226805.38 | 2359389.05 | 1421.55 |
| POINTSOURCE | | AC02 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 585.00 | 0.00 | 252.00 | 5.00 | g | 6226746.93 | 2359421.71 | 1421.55 |
| POINTSOURCE | | AC03 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 585.00 | 0.00 | 252.00 | 5.00 | g | 6226530.33 | 2359034.93 | 1421.55 |
| POINTSOURCE | | AC04 | 88.9 | 88.9 | 88.9 | Lw | 88.9 | | 585.00 | 0.00 | 252.00 | 5.00 | g | 6226477.04 | 2359079.62 | 1421.55 |
| POINTSOURCE | | TRASH01 | 89.0 | 89.0 | 89.0 | Lw | 89 | | 900.00 | 0.00 | 270.00 | 5.00 | r | 6226822.57 | 2359617.68 | 1346.11 |
| POINTSOURCE | | TRASH02 | 89.0 | 89.0 | 89.0 | Lw | 89 | | 900.00 | 0.00 | 270.00 | 5.00 | r | 6226188.28 | 2359023.67 | 1312.97 |

## Line Source(s)

| Name | M. | ID | Result. PWL | | | Result. PWL' | | | Lw / Li | | | Operating Time | | | Moving Pt. Src | | | | Height | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Day | Evening | Night | Type | Value | norm. | Day | Special | Night | Number | | | Speed | | |
| | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | dB(A) | (min) | (min) | (min) | Day | Evening | Night | (mph) | (ft) | |
| LINESOURCE | | TRUCK01 | 93.2 | 93.2 | 93.2 | 69.9 | 69.9 | 69.9 | Lw | 93.2 | | | | | | | | | 8 | r |
| LINESOURCE | | TRUCK02 | 93.2 | 93.2 | 93.2 | 64.6 | 64.6 | 64.6 | Lw | 93.2 | | | | | | | | | 8 | r |

| Name | M. | ID | Result. PWL | | | Result. PWL' | | | Lw / Li | | | Operating Time | | | Moving Pt. Src | | | | Height | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Day | Evening | Night | Type | Value | norm. | Day | Special | Night | Number | | | Speed | | |
| | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | dB(A) | (min) | (min) | (min) | Day | Evening | Night | (mph) | (ft) | |
| LINESOURCE | | TRUCK03 | 93.2 | 93.2 | 93.2 | 70.0 | 70.0 | 70.0 | Lw | 93.2 | | | | | | | | | 8 | r |
| LINESOURCE | | TRUCK04 | 93.2 | 93.2 | 93.2 | 71.8 | 71.8 | 71.8 | Lw | 93.2 | | | | | | | | | 8 | r |
| LINESOURCE | | TRUCK05 | 93.2 | 93.2 | 93.2 | 65.9 | 65.9 | 65.9 | Lw | 93.2 | | | | | | | | | 8 | r |
| LINESOURCE | | TRUCK06 | 93.2 | 93.2 | 93.2 | 62.4 | 62.4 | 62.4 | Lw | 93.2 | | | | | | | | | 8 | r |
| LINESOURCE | | TRUCK07 | 93.2 | 93.2 | 93.2 | 62.7 | 62.7 | 62.7 | Lw | 93.2 | | | | | | | | | 8 | r |
| LINESOURCE | | TRUCK08 | 93.2 | 93.2 | 93.2 | 67.0 | 67.0 | 67.0 | Lw | 93.2 | | | | | | | | | 8 | r |
| LINESOURCE | | TRUCK09 | 93.2 | 93.2 | 93.2 | 69.0 | 69.0 | 69.0 | Lw | 93.2 | | | | | | | | | 8 | r |
| LINESOURCE | | TRUCK10 | 93.2 | 93.2 | 93.2 | 67.9 | 67.9 | 67.9 | Lw | 93.2 | | | | | | | | | 8 | r |
| LINESOURCE | | TRUCK11 | 93.2 | 93.2 | 93.2 | 69.6 | 69.6 | 69.6 | Lw | 93.2 | | | | | | | | | 8 | r |
| LINESOURCE | | TRUCK12 | 93.2 | 93.2 | 93.2 | 69.6 | 69.6 | 69.6 | Lw | 93.2 | | | | | | | | | 8 | r |
| LINESOURCE | | TRUCK13 | 93.2 | 93.2 | 93.2 | 72.8 | 72.8 | 72.8 | Lw | 93.2 | | | | | | | | | 8 | r |

| Name | ID | Height | | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Begin | | End | | x | y | z | Ground |
| | | (ft) | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| LINESOURCE | TRUCK01 | 8.00 | r | | | 6227150.73 | 2359468.88 | 1329.00 | 1321.00 |
| | | | | | | 6226801.77 | 2358897.27 | 1321.15 | 1313.15 |
| | | | | | | 6226800.46 | 2358865.39 | 1320.41 | 1312.41 |
| LINESOURCE | TRUCK02 | 8.00 | r | | | 6226801.77 | 2358897.27 | 1321.15 | 1313.15 |
| | | | | | | 6226580.42 | 2358918.10 | 1321.37 | 1313.37 |
| | | | | | | 6226499.69 | 2358957.16 | 1313.00 | 1305.00 |
| | | | | | | 6226264.01 | 2359013.15 | 1311.00 | 1303.00 |
| | | | | | | 6226213.23 | 2359032.68 | 1311.88 | 1303.88 |
| | | | | | | 6226152.03 | 2359052.21 | 1314.06 | 1306.06 |
| | | | | | | 6224723.65 | 2359983.20 | 1370.92 | 1362.92 |
| LINESOURCE | TRUCK03 | 8.00 | r | | | 6225200.21 | 2359461.07 | 1338.87 | 1330.87 |
| | | | | | | 6224627.29 | 2359837.37 | 1357.50 | 1349.50 |
| LINESOURCE | TRUCK04 | 8.00 | r | | | 6224530.94 | 2359687.63 | 1352.00 | 1344.00 |
| | | | | | | 6224908.54 | 2359442.84 | 1339.91 | 1331.91 |
| LINESOURCE | TRUCK05 | 8.00 | r | | | 6224530.94 | 2359687.63 | 1352.00 | 1344.00 |
| | | | | | | 6224232.76 | 2359884.25 | 1356.68 | 1348.68 |
| | | | | | | 6224086.93 | 2360234.51 | 1363.97 | 1355.97 |
| | | | | | | 6224085.43 | 2360263.97 | 1365.33 | 1357.33 |
| | | | | | | 6224086.09 | 2360293.46 | 1364.87 | 1356.87 |
| | | | | | | 6224088.91 | 2360322.82 | 1363.71 | 1355.71 |
| | | | | | | 6224093.87 | 2360351.90 | 1363.00 | 1355.00 |
| | | | | | | 6224100.95 | 2360380.54 | 1363.26 | 1355.26 |
| | | | | | | 6224110.10 | 2360408.58 | 1369.01 | 1361.01 |
| | | | | | | 6224121.29 | 2360435.88 | 1370.12 | 1362.12 |
| | | | | | | 6224134.44 | 2360462.28 | 1370.75 | 1362.75 |
| | | | | | | 6224149.49 | 2360487.65 | 1371.00 | 1363.00 |
| | | | | | | 6224166.36 | 2360511.85 | 1370.74 | 1362.74 |
| | | | | | | 6224576.51 | 2361136.85 | 1362.45 | 1354.45 |
| LINESOURCE | TRUCK06 | 8.00 | r | | | 6224576.51 | 2361136.85 | 1362.45 | 1354.45 |
| | | | | | | 6226956.72 | 2359600.39 | 1341.65 | 1333.65 |
| | | | | | | 6227150.73 | 2359468.88 | 1329.00 | 1321.00 |
| | | | | | | 6227697.61 | 2359121.22 | 1332.68 | 1324.68 |
| | | | | | | 6227716.67 | 2359108.11 | 1332.26 | 1324.26 |
| | | | | | | 6227734.27 | 2359093.08 | 1325.21 | 1317.21 |
| | | | | | | 6227750.21 | 2359076.31 | 1311.40 | 1303.40 |
| | | | | | | 6227764.32 | 2359057.96 | 1310.00 | 1302.00 |
| | | | | | | 6227776.44 | 2359038.25 | 1310.00 | 1302.00 |
| | | | | | | 6227786.44 | 2359017.38 | 1310.00 | 1302.00 |
| | | | | | | 6227794.21 | 2358995.58 | 1310.00 | 1302.00 |
| | | | | | | 6227799.68 | 2358973.10 | 1310.00 | 1302.00 |
| | | | | | | 6227802.77 | 2358950.16 | 1310.00 | 1302.00 |
| | | | | | | 6227803.46 | 2358927.03 | 1309.99 | 1301.99 |
| | | | | | | 6227801.74 | 2358903.95 | 1309.97 | 1301.97 |
| LINESOURCE | TRUCK07 | 8.00 | r | | | 6227671.90 | 2359137.57 | 1332.54 | 1324.54 |
| | | | | | | 6227322.61 | 2359229.30 | 1325.42 | 1317.42 |
| | | | | | | 6227162.45 | 2359299.61 | 1336.97 | 1328.97 |
| | | | | | | 6224508.74 | 2361033.58 | 1365.51 | 1357.51 |
| LINESOURCE | TRUCK08 | 8.00 | r | | | 6224458.01 | 2360956.28 | 1383.08 | 1375.08 |
| | | | | | | 6224757.50 | 2360760.55 | 1358.30 | 1350.30 |
| | | | | | | 6224220.56 | 2359913.56 | 1357.46 | 1349.46 |
| LINESOURCE | TRUCK09 | 8.00 | r | | | 6224597.30 | 2360865.25 | 1386.52 | 1378.52 |
| | | | | | | 6224128.43 | 2360134.83 | 1363.01 | 1355.01 |
| LINESOURCE | TRUCK10 | 8.00 | r | | | 6224369.03 | 2359794.39 | 1353.33 | 1345.33 |
| | | | | | | 6224964.47 | 2360735.80 | 1377.26 | 1369.26 |
| LINESOURCE | TRUCK11 | 8.00 | r | | | 6225020.09 | 2360699.46 | 1374.17 | 1366.17 |
| | | | | | | 6224629.90 | 2360060.03 | 1364.78 | 1356.78 |
| LINESOURCE | TRUCK12 | 8.00 | r | | | 6224723.65 | 2359983.20 | 1370.92 | 1362.92 |
| | | | | | | 6224629.90 | 2360060.03 | 1364.78 | 1356.78 |
| | | | | | | 6224566.09 | 2360105.95 | 1360.32 | 1352.32 |
| | | | | | | 6224110.24 | 2360408.97 | 1369.02 | 1361.02 |
| LINESOURCE | TRUCK13 | 8.00 | r | | | 6224514.99 | 2359698.15 | 1351.85 | 1343.85 |
| | | | | | | 6224701.54 | 2360001.32 | 1379.25 | 1371.25 |

## 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) | | |
| AREASOURCE | | CAR01 | 81.1 | 81.1 | 81.1 | 50.4 | 50.4 | 50.4 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR02 | 81.1 | 81.1 | 81.1 | 55.6 | 55.6 | 55.6 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR03 | 81.1 | 81.1 | 81.1 | 56.2 | 56.2 | 56.2 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR04 | 81.1 | 81.1 | 81.1 | 55.9 | 55.9 | 55.9 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR05 | 81.1 | 81.1 | 81.1 | 53.2 | 53.2 | 53.2 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR06 | 81.1 | 81.1 | 81.1 | 54.4 | 54.4 | 54.4 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR07 | 81.1 | 81.1 | 81.1 | 56.5 | 56.5 | 56.5 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR08 | 81.1 | 81.1 | 81.1 | 63.0 | 63.0 | 63.0 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR09 | 81.1 | 81.1 | 81.1 | 53.9 | 53.9 | 53.9 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR10 | 81.1 | 81.1 | 81.1 | 53.7 | 53.7 | 53.7 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR11 | 81.1 | 81.1 | 81.1 | 53.4 | 53.4 | 53.4 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR12 | 81.1 | 81.1 | 81.1 | 53.1 | 53.1 | 53.1 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR13 | 81.1 | 81.1 | 81.1 | 52.3 | 52.3 | 52.3 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR14 | 81.1 | 81.1 | 81.1 | 52.3 | 52.3 | 52.3 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR15 | 81.1 | 81.1 | 81.1 | 52.8 | 52.8 | 52.8 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR16 | 81.1 | 81.1 | 81.1 | 58.9 | 58.9 | 58.9 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR17 | 81.1 | 81.1 | 81.1 | 57.8 | 57.8 | 57.8 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR18 | 81.1 | 81.1 | 81.1 | 66.2 | 66.2 | 66.2 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR19 | 81.1 | 81.1 | 81.1 | 56.5 | 56.5 | 56.5 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR20 | 81.1 | 81.1 | 81.1 | 56.2 | 56.2 | 56.2 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR21 | 81.1 | 81.1 | 81.1 | 54.5 | 54.5 | 54.5 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR22 | 81.1 | 81.1 | 81.1 | 56.5 | 56.5 | 56.5 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR23 | 81.1 | 81.1 | 81.1 | 55.0 | 55.0 | 55.0 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR24 | 81.1 | 81.1 | 81.1 | 51.5 | 51.5 | 51.5 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | CAR25 | 81.1 | 81.1 | 81.1 | 54.5 | 54.5 | 54.5 | Lw | 81.1 | | | | | 5 | r |
| AREASOURCE | | DOCK01 | 103.4 | 103.4 | 103.4 | 69.1 | 69.1 | 69.1 | Lw | 103.4 | | | | | 8 | r |
| AREASOURCE | | DOCK02 | 103.4 | 103.4 | 103.4 | 67.9 | 67.9 | 67.9 | Lw | 103.4 | | | | | 8 | r |
| AREASOURCE | | DOCK03 | 103.4 | 103.4 | 103.4 | 65.7 | 65.7 | 65.7 | Lw | 103.4 | | | | | 8 | r |
| AREASOURCE | | DOCK04 | 103.4 | 103.4 | 103.4 | 65.9 | 65.9 | 65.9 | Lw | 103.4 | | | | | 8 | r |
| AREASOURCE | | DOCK05 | 103.4 | 103.4 | 103.4 | 69.6 | 69.6 | 69.6 | Lw | 103.4 | | | | | 8 | r |
| AREASOURCE | | DOCK06 | 103.4 | 103.4 | 103.4 | 76.2 | 76.2 | 76.2 | Lw | 103.4 | | | | | 8 | r |
| AREASOURCE | | DOCK07 | 103.4 | 103.4 | 103.4 | 70.6 | 70.6 | 70.6 | Lw | 103.4 | | | | | 8 | r |
| AREASOURCE | | DOCK08 | 103.4 | 103.4 | 103.4 | 68.2 | 68.2 | 68.2 | Lw | 103.4 | | | | | 8 | r |
| AREASOURCE | | DOCK09 | 103.4 | 103.4 | 103.4 | 68.8 | 68.8 | 68.8 | Lw | 103.4 | | | | | 8 | r |
| AREASOURCE | | DOCK10 | 103.4 | 103.4 | 103.4 | 63.1 | 63.1 | 63.1 | Lw | 103.4 | | | | | 8 | r |
| AREASOURCE | | DOCK11 | 103.4 | 103.4 | 103.4 | 65.8 | 65.8 | 65.8 | Lw | 103.4 | | | | | 8 | r |
| AREASOURCE | | DOCK12 | 103.4 | 103.4 | 103.4 | 63.2 | 63.2 | 63.2 | Lw | 103.4 | | | | | 8 | r |
| AREASOURCE | | DOCK13 | 103.4 | 103.4 | 103.4 | 62.4 | 62.4 | 62.4 | Lw | 103.4 | | | | | 8 | r |
| AREASOURCE | | DOCK14 | 103.4 | 103.4 | 103.4 | 62.6 | 62.6 | 62.6 | Lw | 103.4 | | | | | 8 | r |

| Name | ID | Height | | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Begin | | End | | x | y | z | Ground |
| | | (ft) | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| AREASOURCE | CAR01 | 5.00 | r | | | 6227327.71 | 2359189.20 | 1321.65 | 1316.65 |
| | | | | | | 6227592.51 | 2359115.69 | 1312.44 | 1307.44 |
| | | | | | | 6227623.17 | 2359105.40 | 1313.74 | 1308.74 |
| | | | | | | 6227652.92 | 2359092.71 | 1330.95 | 1325.95 |
| | | | | | | 6227681.57 | 2359077.69 | 1329.13 | 1324.13 |
| | | | | | | 6227708.93 | 2359060.45 | 1317.14 | 1312.14 |
| | | | | | | 6227720.93 | 2359049.74 | 1307.81 | 1302.81 |
| | | | | | | 6227731.24 | 2359037.40 | 1307.23 | 1302.23 |
| | | | | | | 6227739.63 | 2359023.68 | 1307.10 | 1302.10 |
| | | | | | | 6227745.94 | 2359008.89 | 1307.26 | 1302.26 |
| | | | | | | 6227750.02 | 2358993.33 | 1307.50 | 1302.50 |
| | | | | | | 6227742.26 | 2358892.89 | 1307.96 | 1302.96 |
| | | | | | | 6227722.63 | 2358895.63 | 1308.19 | 1303.19 |
| | | | | | | 6227729.93 | 2358984.20 | 1307.94 | 1302.94 |
| | | | | | | 6227728.29 | 2358996.93 | 1308.00 | 1303.00 |
| | | | | | | 6227724.60 | 2359009.22 | 1308.06 | 1303.06 |
| | | | | | | 6227718.97 | 2359020.76 | 1308.07 | 1303.07 |
| | | | | | | 6227711.56 | 2359031.23 | 1308.00 | 1303.00 |
| | | | | | | 6227702.54 | 2359040.36 | 1308.00 | 1303.00 |
| | | | | | | 6227678.71 | 2359056.18 | 1311.00 | 1306.00 |
| | | | | | | 6227653.70 | 2359070.05 | 1316.49 | 1311.49 |
| | | | | | | 6227627.66 | 2359081.91 | 1316.34 | 1311.34 |
| | | | | | | 6227323.14 | 2359169.56 | 1320.62 | 1315.62 |
| AREASOURCE | CAR02 | 5.00 | r | | | 6227105.82 | 2359290.10 | 1324.00 | 1319.00 |
| | | | | | | 6227187.09 | 2359244.44 | 1330.85 | 1325.85 |
| | | | | | | 6227277.48 | 2359207.00 | 1321.00 | 1316.00 |
| | | | | | | 6227269.72 | 2359187.37 | 1320.12 | 1315.12 |
| | | | | | | 6227184.80 | 2359224.81 | 1323.13 | 1318.13 |
| | | | | | | 6227098.06 | 2359273.66 | 1323.60 | 1318.60 |
| AREASOURCE | CAR03 | 5.00 | r | | | 6227078.43 | 2359283.25 | 1323.42 | 1318.42 |
| | | | | | | 6227098.06 | 2359273.66 | 1323.60 | 1318.60 |
| | | | | | | 6227010.40 | 2359137.61 | 1319.29 | 1314.29 |
| | | | | | | 6226994.42 | 2359149.02 | 1319.94 | 1314.94 |

| Name | ID | Height | | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Begin | | End | | x | y | z | Ground |
| | | (ft) | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| AREASOURCE | CAR04 | 5.00 | r | | | 6226964.74 | 2359104.73 | 1319.00 | 1314.00 |
| | | | | | | 6226978.90 | 2359093.78 | 1319.00 | 1314.00 |
| | | | | | | 6226878.91 | 2358936.26 | 1317.54 | 1312.54 |
| | | | | | | 6226861.11 | 2358944.94 | 1318.61 | 1313.61 |
| AREASOURCE | CAR05 | 5.00 | r | | | 6226914.98 | 2358942.66 | 1317.00 | 1312.00 |
| | | | | | | 6227003.55 | 2359077.80 | 1318.82 | 1313.82 |
| | | | | | | 6227040.08 | 2359055.88 | 1318.19 | 1313.19 |
| | | | | | | 6226956.53 | 2358928.05 | 1316.21 | 1311.21 |
| | | | | | | 6226937.35 | 2358940.83 | 1316.61 | 1311.61 |
| | | | | | | 6226931.41 | 2358933.52 | 1316.56 | 1311.56 |
| AREASOURCE | CAR06 | 5.00 | r | | | 6227062.90 | 2359039.90 | 1317.45 | 1312.45 |
| | | | | | | 6227099.43 | 2359018.44 | 1317.00 | 1312.00 |
| | | | | | | 6227040.99 | 2358926.68 | 1316.72 | 1311.72 |
| | | | | | | 6227021.36 | 2358940.37 | 1316.77 | 1311.77 |
| | | | | | | 6227009.03 | 2358927.13 | 1316.00 | 1311.00 |
| | | | | | | 6226993.05 | 2358935.35 | 1316.00 | 1311.00 |
| AREASOURCE | CAR07 | 5.00 | r | | | 6227120.89 | 2359002.46 | 1318.73 | 1313.73 |
| | | | | | | 6227157.87 | 2358981.46 | 1320.09 | 1315.09 |
| | | | | | | 6227123.17 | 2358927.13 | 1315.56 | 1310.56 |
| | | | | | | 6227102.17 | 2358941.29 | 1315.48 | 1310.48 |
| | | | | | | 6227093.49 | 2358926.22 | 1314.79 | 1309.79 |
| | | | | | | 6227075.69 | 2358937.18 | 1314.62 | 1309.62 |
| AREASOURCE | CAR08 | 5.00 | r | | | 6227180.69 | 2358964.57 | 1322.42 | 1317.42 |
| | | | | | | 6227195.30 | 2358954.53 | 1320.88 | 1315.88 |
| | | | | | | 6227177.04 | 2358926.68 | 1315.00 | 1310.00 |
| | | | | | | 6227160.61 | 2358935.81 | 1315.00 | 1310.00 |
| AREASOURCE | CAR09 | 5.00 | r | | | 6227099.43 | 2359230.74 | 1322.51 | 1317.51 |
| | | | | | | 6227138.24 | 2359206.55 | 1320.68 | 1315.68 |
| | | | | | | 6227069.30 | 2359102.45 | 1317.02 | 1312.02 |
| | | | | | | 6227031.40 | 2359126.19 | 1319.00 | 1314.00 |
| AREASOURCE | CAR10 | 5.00 | r | | | 6227162.89 | 2359200.15 | 1320.16 | 1315.16 |
| | | | | | | 6227199.41 | 2359176.41 | 1317.83 | 1312.83 |
| | | | | | | 6227129.10 | 2359064.10 | 1316.53 | 1311.53 |
| | | | | | | 6227091.67 | 2359086.93 | 1317.55 | 1312.55 |
| AREASOURCE | CAR11 | 5.00 | r | | | 6227226.35 | 2359170.02 | 1318.18 | 1313.18 |
| | | | | | | 6227263.79 | 2359146.74 | 1318.46 | 1313.46 |
| | | | | | | 6227185.72 | 2359024.84 | 1320.57 | 1315.57 |
| | | | | | | 6227149.19 | 2359049.49 | 1317.40 | 1312.40 |
| AREASOURCE | CAR12 | 5.00 | r | | | 6227308.53 | 2359128.47 | 1320.00 | 1315.00 |
| | | | | | | 6227317.66 | 2359133.04 | 1320.00 | 1315.00 |
| | | | | | | 6227333.18 | 2359123.45 | 1320.00 | 1315.00 |
| | | | | | | 6227244.16 | 2358987.85 | 1323.00 | 1318.00 |
| | | | | | | 6227208.09 | 2359010.68 | 1321.67 | 1316.67 |
| | | | | | | 6227292.09 | 2359139.89 | 1320.00 | 1315.00 |
| AREASOURCE | CAR13 | 5.00 | r | | | 6227378.84 | 2359112.95 | 1319.22 | 1314.22 |
| | | | | | | 6227384.78 | 2359109.30 | 1318.77 | 1313.77 |
| | | | | | | 6227389.80 | 2359117.06 | 1318.77 | 1313.77 |
| | | | | | | 6227405.32 | 2359106.56 | 1317.00 | 1312.00 |
| | | | | | | 6227303.51 | 2358948.59 | 1317.21 | 1312.21 |
| | | | | | | 6227266.53 | 2358972.79 | 1322.39 | 1317.39 |
| | | | | | | 6227362.86 | 2359123.91 | 1320.09 | 1315.09 |
| AREASOURCE | CAR14 | 5.00 | r | | | 6227449.15 | 2359092.86 | 1320.00 | 1315.00 |
| | | | | | | 6227455.09 | 2359088.30 | 1320.00 | 1315.00 |
| | | | | | | 6227459.19 | 2359094.23 | 1320.00 | 1315.00 |
| | | | | | | 6227475.17 | 2359085.10 | 1320.00 | 1315.00 |
| | | | | | | 6227372.91 | 2358927.13 | 1315.46 | 1310.46 |
| | | | | | | 6227351.45 | 2358941.29 | 1316.95 | 1311.95 |
| | | | | | | 6227342.77 | 2358927.13 | 1316.59 | 1311.59 |
| | | | | | | 6227327.71 | 2358936.72 | 1316.07 | 1311.07 |
| | | | | | | 6227435.45 | 2359102.45 | 1319.89 | 1314.89 |
| AREASOURCE | CAR15 | 5.00 | r | | | 6227520.83 | 2359071.40 | 1314.57 | 1309.57 |
| | | | | | | 6227527.68 | 2359069.12 | 1314.18 | 1309.18 |
| | | | | | | 6227529.96 | 2359075.51 | 1314.25 | 1309.25 |
| | | | | | | 6227545.03 | 2359066.84 | 1313.26 | 1308.26 |
| | | | | | | 6227452.35 | 2358922.57 | 1312.36 | 1307.36 |
| | | | | | | 6227433.63 | 2358939.46 | 1313.04 | 1308.04 |
| | | | | | | 6227428.15 | 2358928.96 | 1312.84 | 1307.84 |
| | | | | | | 6227411.26 | 2358938.55 | 1313.15 | 1308.15 |
| | | | | | | 6227504.39 | 2359081.45 | 1317.49 | 1312.49 |
| AREASOURCE | CAR16 | 5.00 | r | | | 6227587.94 | 2359050.86 | 1311.00 | 1306.00 |
| | | | | | | 6227593.88 | 2359046.29 | 1310.79 | 1305.79 |
| | | | | | | 6227601.18 | 2359053.60 | 1310.58 | 1305.58 |
| | | | | | | 6227615.79 | 2359044.47 | 1310.08 | 1305.08 |
| | | | | | | 6227591.60 | 2359005.66 | 1311.00 | 1306.00 |
| | | | | | | 6227554.16 | 2359030.77 | 1312.33 | 1307.33 |
| | | | | | | 6227572.88 | 2359059.99 | 1311.74 | 1306.74 |
| AREASOURCE | CAR17 | 5.00 | r | | | 6227658.71 | 2359024.38 | 1309.38 | 1304.38 |

| Name | ID | Height | | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Begin | | End | | x | y | z | Ground |
| | | (ft) | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| | | | | | | 6227679.25 | 2359013.42 | 1308.94 | 1303.94 |
| | | | | | | 6227649.12 | 2358967.77 | 1310.00 | 1305.00 |
| | | | | | | 6227613.97 | 2358991.51 | 1310.00 | 1305.00 |
| | | | | | | 6227639.99 | 2359035.79 | 1309.76 | 1304.76 |
| AREASOURCE | CAR18 | 5.00 | r | | | 6227680.17 | 2358967.77 | 1309.25 | 1304.25 |
| | | | | | | 6227697.52 | 2358957.27 | 1308.79 | 1303.79 |
| | | | | | | 6227689.76 | 2358943.57 | 1308.75 | 1303.75 |
| | | | | | | 6227671.95 | 2358951.79 | 1309.34 | 1304.34 |
| AREASOURCE | CAR19 | 5.00 | r | | | 6227687.47 | 2358902.02 | 1308.76 | 1303.76 |
| | | | | | | 6227677.89 | 2358886.96 | 1309.00 | 1303.99 |
| | | | | | | 6227533.61 | 2358980.09 | 1311.89 | 1306.89 |
| | | | | | | 6227544.57 | 2358995.16 | 1312.08 | 1307.08 |
| AREASOURCE | CAR20 | 5.00 | r | | | 6226978.44 | 2359350.82 | 1325.36 | 1320.36 |
| | | | | | | 6226996.25 | 2359338.49 | 1325.00 | 1320.00 |
| | | | | | | 6226908.59 | 2359204.26 | 1320.20 | 1315.20 |
| | | | | | | 6226893.06 | 2359214.31 | 1323.80 | 1318.80 |
| AREASOURCE | CAR21 | 5.00 | r | | | 6226892.61 | 2359351.27 | 1340.50 | 1335.50 |
| | | | | | | 6226928.22 | 2359327.99 | 1335.20 | 1330.20 |
| | | | | | | 6226866.13 | 2359232.11 | 1329.55 | 1324.55 |
| | | | | | | 6226830.97 | 2359254.03 | 1333.50 | 1328.50 |
| AREASOURCE | CAR22 | 5.00 | r | | | 6226876.17 | 2359414.74 | 1340.57 | 1335.57 |
| | | | | | | 6226891.69 | 2359403.32 | 1340.16 | 1335.16 |
| | | | | | | 6226804.04 | 2359269.55 | 1328.01 | 1323.01 |
| | | | | | | 6226788.06 | 2359279.59 | 1324.35 | 1319.35 |
| AREASOURCE | CAR23 | 5.00 | r | | | 6226737.38 | 2359201.98 | 1321.00 | 1316.00 |
| | | | | | | 6226753.36 | 2359192.85 | 1321.00 | 1316.00 |
| | | | | | | 6226631.91 | 2358999.27 | 1319.70 | 1314.70 |
| | | | | | | 6226615.02 | 2359009.31 | 1320.00 | 1315.00 |
| AREASOURCE | CAR24 | 5.00 | r | | | 6226801.75 | 2359208.83 | 1320.76 | 1315.76 |
| | | | | | | 6226836.45 | 2359185.54 | 1320.00 | 1315.00 |
| | | | | | | 6226717.75 | 2358996.53 | 1319.82 | 1314.82 |
| | | | | | | 6226698.57 | 2359011.60 | 1320.00 | 1315.00 |
| | | | | | | 6226691.72 | 2359003.38 | 1319.90 | 1314.90 |
| | | | | | | 6226675.29 | 2359013.88 | 1319.96 | 1314.96 |
| AREASOURCE | CAR25 | 5.00 | r | | | 6226862.93 | 2359169.11 | 1319.59 | 1314.59 |
| | | | | | | 6226880.74 | 2359158.61 | 1319.00 | 1314.00 |
| | | | | | | 6226751.08 | 2358956.35 | 1319.00 | 1314.00 |
| | | | | | | 6226733.27 | 2358965.48 | 1319.19 | 1314.19 |
| AREASOURCE | DOCK01 | 8.00 | r | | | 6224838.46 | 2360688.99 | 1379.57 | 1371.57 |
| | | | | | | 6224875.18 | 2360662.40 | 1380.00 | 1372.00 |
| | | | | | | 6224554.88 | 2360159.79 | 1360.06 | 1352.06 |
| | | | | | | 6224511.36 | 2360188.51 | 1357.00 | 1349.00 |
| AREASOURCE | DOCK02 | 8.00 | r | | | 6224808.08 | 2360776.35 | 1362.03 | 1354.03 |
| | | | | | | 6224858.72 | 2360744.69 | 1378.12 | 1370.12 |
| | | | | | | 6224501.70 | 2360192.71 | 1357.00 | 1349.00 |
| | | | | | | 6224456.13 | 2360223.09 | 1358.81 | 1350.81 |
| AREASOURCE | DOCK03 | 8.00 | r | | | 6224619.44 | 2360813.06 | 1389.35 | 1381.35 |
| | | | | | | 6224708.06 | 2360753.56 | 1360.69 | 1352.69 |
| | | | | | | 6224389.03 | 2360262.34 | 1362.41 | 1354.41 |
| | | | | | | 6224302.94 | 2360319.31 | 1366.92 | 1358.92 |
| AREASOURCE | DOCK04 | 8.00 | r | | | 6224467.52 | 2360906.75 | 1366.79 | 1358.79 |
| | | | | | | 6224556.14 | 2360849.77 | 1387.17 | 1379.17 |
| | | | | | | 6224238.37 | 2360359.82 | 1362.82 | 1354.82 |
| | | | | | | 6224192.79 | 2360388.94 | 1366.08 | 1358.08 |
| | | | | | | 6224228.24 | 2360443.38 | 1365.54 | 1357.54 |
| | | | | | | 6224183.93 | 2360472.50 | 1371.00 | 1363.00 |
| AREASOURCE | DOCK05 | 8.00 | r | | | 6224400.42 | 2361039.68 | 1378.60 | 1370.60 |
| | | | | | | 6224447.26 | 2361016.89 | 1379.15 | 1371.15 |
| | | | | | | 6224187.73 | 2360616.83 | 1369.21 | 1361.21 |
| | | | | | | 6224142.15 | 2360645.95 | 1366.36 | 1358.36 |
| AREASOURCE | DOCK06 | 8.00 | r | | | 6224100.37 | 2360247.15 | 1368.98 | 1360.98 |
| | | | | | | 6224156.08 | 2360328.17 | 1368.09 | 1360.09 |
| | | | | | | 6224202.92 | 2360299.06 | 1375.11 | 1367.11 |
| | | | | | | 6224147.22 | 2360215.50 | 1372.00 | 1364.00 |
| AREASOURCE | DOCK07 | 8.00 | r | | | 6224264.96 | 2360259.81 | 1376.00 | 1368.00 |
| | | | | | | 6224353.58 | 2360201.57 | 1375.00 | 1367.00 |
| | | | | | | 6224235.84 | 2360024.33 | 1370.70 | 1362.70 |
| | | | | | | 6224194.06 | 2360054.71 | 1368.51 | 1360.51 |
| | | | | | | 6224210.52 | 2360085.10 | 1375.93 | 1367.93 |
| | | | | | | 6224167.47 | 2360111.69 | 1369.77 | 1361.77 |
| AREASOURCE | DOCK08 | 8.00 | r | | | 6224418.15 | 2360162.33 | 1368.17 | 1360.17 |
| | | | | | | 6224514.36 | 2360096.49 | 1355.51 | 1347.51 |
| | | | | | | 6224354.84 | 2359848.35 | 1355.27 | 1347.27 |
| | | | | | | 6224254.83 | 2359911.65 | 1357.00 | 1349.00 |
| AREASOURCE | DOCK09 | 8.00 | r | | | 6224581.46 | 2360054.71 | 1361.00 | 1353.00 |
| | | | | | | 6224668.82 | 2359996.48 | 1371.67 | 1363.67 |
| | | | | | | 6224505.50 | 2359748.34 | 1352.18 | 1344.18 |

| Name | ID | Height | | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Begin | | End | | x | y | z | Ground |
| | | (ft) | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| | | | | | | 6224419.41 | 2359804.04 | 1352.11 | 1344.11 |
| AREASOURCE | DOCK10 | 8.00 | r | | | 6224662.49 | 2359848.35 | 1355.18 | 1347.18 |
| | | | | | | 6224715.66 | 2359936.97 | 1362.94 | 1354.94 |
| | | | | | | 6225957.63 | 2359139.38 | 1328.54 | 1320.54 |
| | | | | | | 6225928.51 | 2359093.81 | 1326.72 | 1318.72 |
| | | | | | | 6225246.12 | 2359533.11 | 1353.14 | 1345.14 |
| | | | | | | 6225220.80 | 2359488.80 | 1345.23 | 1337.23 |
| AREASOURCE | DOCK11 | 8.00 | r | | | 6224570.07 | 2359709.09 | 1353.00 | 1345.00 |
| | | | | | | 6224627.04 | 2359796.45 | 1353.70 | 1345.70 |
| | | | | | | 6225185.35 | 2359438.16 | 1337.00 | 1329.00 |
| | | | | | | 6225151.17 | 2359391.32 | 1337.00 | 1329.00 |
| | | | | | | 6224996.72 | 2359495.13 | 1338.74 | 1330.74 |
| | | | | | | 6224967.60 | 2359448.29 | 1338.79 | 1330.79 |
| AREASOURCE | DOCK12 | 8.00 | r | | | 6226242.82 | 2359110.09 | 1328.00 | 1320.00 |
| | | | | | | 6226201.97 | 2359053.29 | 1313.98 | 1305.98 |
| | | | | | | 6224803.02 | 2359968.62 | 1356.73 | 1348.73 |
| | | | | | | 6224837.09 | 2360018.22 | 1357.07 | 1349.07 |
| AREASOURCE | DOCK13 | 8.00 | r | | | 6226781.48 | 2359657.58 | 1352.71 | 1344.71 |
| | | | | | | 6226756.87 | 2359611.87 | 1353.00 | 1345.00 |
| | | | | | | 6224610.49 | 2361002.36 | 1373.80 | 1365.80 |
| | | | | | | 6224638.61 | 2361046.31 | 1372.96 | 1364.96 |
| AREASOURCE | DOCK14 | 8.00 | r | | | 6226767.42 | 2359529.25 | 1354.00 | 1346.00 |
| | | | | | | 6226727.08 | 2359479.38 | 1339.08 | 1331.08 |
| | | | | | | 6224995.24 | 2360597.53 | 1359.09 | 1351.09 |
| | | | | | | 6225027.11 | 2360645.51 | 1357.18 | 1349.18 |

## Barrier(s)

| Name | Sel. | 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) |

## Building(s)

| Name | Sel. | M. | ID | RB | Residents | Absorption | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Begin | | x | y | z | Ground |
| | | | | | | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| BUILDING | | | BUILDING00001 | x | 0 | | 55.00 | r | 6224763.17 | 2360236.53 | 1416.55 | 1361.55 |
| | | | | | | | | | 6224995.24 | 2360597.53 | 1416.55 | 1351.09 |
| | | | | | | | | | 6226848.36 | 2359401.08 | 1416.55 | 1336.00 |
| | | | | | | | | | 6226624.88 | 2359046.96 | 1416.55 | 1315.15 |
| | | | | | | | | | 6226593.94 | 2359064.15 | 1416.55 | 1315.58 |
| | | | | | | | | | 6226537.21 | 2358990.23 | 1416.55 | 1310.65 |
| | | | | | | | | | 6226422.04 | 2359064.15 | 1416.55 | 1317.71 |
| | | | | | | | | | 6226391.09 | 2359014.30 | 1416.55 | 1305.84 |
| | | | | | | | | | 6224837.09 | 2360018.22 | 1416.55 | 1349.07 |
| | | | | | | | | | 6224861.15 | 2360057.75 | 1416.55 | 1351.82 |

# APPENDIX 10.1:

# PROJECT CONSTRUCTION NOISE CALCULATIONS

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# 14324 - Pepper 210

**CadnaA Noise Prediction Model:** 14324-02_Construction.cna
**Date:** 25.01.24
**Analyst:** B. Lawson

## Calculation Configuration

| Configuration | |
|---|---|
| **Parameter** | **Value** |
| **General** | |
| **Max. Error (dB)** | **0.00** |
| **Max. Search Radius (#(Unit,LEN))** | **3048.00** |
| **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** | |
| **Daytime Penalty (dB)** | **0.00** |
| **Recr. Time Penalty (dB)** | **5.00** |
| **Night-time Penalty (dB)** | **10.00** |
| **DTM** | |
| **Standard Height (m)** | **365.76** |
| **Model of Terrain** | **Triangulation** |
| **Reflection** | |
| **max. Order of Reflection** | **1** |
| **Search Radius Src** | **100.00** |
| **Search Radius Rcvr** | **100.00** |
| **Max. Distance Source - Rcvr** | **1000.00 1000.00** |
| **Min. Distance Rvcr - Reflector** | **1.00 1.00** |
| **Min. Distance Source - Reflector** | **0.10** |
| **Industrial (ISO 9613)** | |
| **Lateral Diffraction** | **some Obj** |
| **Obst. within Area Src do not shield** | **On** |
| **Screening** | **Incl. Ground Att. over Barrier** |
| | **Dz with limit (20/25)** |
| **Barrier Coefficients C1,2,3** | **3.0 20.0 0.0** |
| **Temperature (#(Unit,TEMP))** | **10** |
| **rel. Humidity (%)** | **70** |
| **Ground Absorption G** | **0.50** |
| **Wind Speed for Dir. (#(Unit,SPEED))** | **3.0** |
| **Roads (TNM)** | |
| **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 | 51.4 | 51.4 | 58.0 | 57.8 | 52.7 | 0.0 | | | | 5.00 | r | 6223818.04 | 2360027.16 | 1411.49 |
| RECEIVERS | | R2 | 48.8 | 48.8 | 55.5 | 58.4 | 51.9 | 0.0 | | | | 5.00 | r | 6223612.13 | 2360666.53 | 1384.68 |
| RECEIVERS | | R3 | 29.7 | 29.6 | 36.3 | 59.9 | 59.3 | 0.0 | | | | 5.00 | r | 6230332.33 | 2359504.19 | 1299.25 |
| RECEIVERS | | R4 | 45.1 | 45.1 | 51.8 | 69.6 | 66.9 | 0.0 | | | | 5.00 | r | 6225001.22 | 2358523.59 | 1370.59 |
| RECEIVERS | | R5 | 43.9 | 43.9 | 50.6 | 58.6 | 54.7 | 0.0 | | | | 5.00 | r | 6224083.55 | 2358688.48 | 1398.20 |
| RECEIVERS | | R6 | 47.2 | 47.2 | 53.9 | 58.9 | 53.4 | 0.0 | | | | 5.00 | r | 6223867.90 | 2359521.90 | 1410.82 |

## Area Source(s)

| Name | M. | ID | Result. PWL | | | Result. PWL'' | | | Lw / Li | | | Operating Time | | | Height | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Day | Evening | Night | Type | Value | norm. | Day | Special | Night | (ft) | |
| | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | dB(A) | (min) | (min) | (min) | | |
| SITEBOUNDARY | | CONSTRUCTION | 122.6 | 15.6 | 15.6 | 66.4 | -40.6 | -40.6 | PWL-Pt | 115.6 | | | | | 8 | r |

| Name | ID | Height | | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Begin | | End | | x | y | z | Ground |
| | | (ft) | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| SITEBOUNDARY | CONSTRUCTION | 8.00 | r | | | 6224365.16 | 2361291.42 | 0.00 | 1359.19 |
| | | | | | | 6224507.50 | 2361222.64 | 0.00 | 1355.00 |
| | | | | | | 6224508.35 | 2361222.11 | 0.00 | 1355.00 |
| | | | | | | 6224509.20 | 2361221.58 | 0.00 | 1355.00 |
| | | | | | | 6224510.04 | 2361221.04 | 0.00 | 1355.00 |
| | | | | | | 6224510.89 | 2361220.51 | 0.00 | 1355.00 |
| | | | | | | 6224511.73 | 2361219.98 | 0.00 | 1355.00 |
| | | | | | | 6224512.58 | 2361219.44 | 0.00 | 1355.00 |
| | | | | | | 6224513.42 | 2361218.90 | 0.00 | 1355.00 |

| Name | ID | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|
| | | Begin | End | x | y | z | Ground |
| | | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) |
| | | | | 6224514.26 | 2361218.36 | 0.00 | 1355.00 |
| | | | | 6224515.10 | 2361217.82 | 0.00 | 1355.00 |
| | | | | 6224515.94 | 2361217.28 | 0.00 | 1355.00 |
| | | | | 6224516.78 | 2361216.74 | 0.00 | 1355.00 |
| | | | | 6228144.03 | 2358874.50 | 0.00 | 1296.95 |
| | | | | 6227886.83 | 2358877.02 | 0.00 | 1301.00 |
| | | | | 6227844.44 | 2358903.68 | 0.00 | 1301.24 |
| | | | | 6227762.26 | 2358904.21 | 0.00 | 1302.63 |
| | | | | 6227762.13 | 2358884.52 | 0.00 | 1302.60 |
| | | | | 6227728.95 | 2358884.73 | 0.00 | 1303.14 |
| | | | | 6227728.79 | 2358859.33 | 0.00 | 1303.56 |
| | | | | 6227032.98 | 2358863.87 | 0.00 | 1309.86 |
| | | | | 6226923.70 | 2358864.59 | 0.00 | 1310.38 |
| | | | | 6226652.78 | 2358866.36 | 0.00 | 1313.00 |
| | | | | 6226651.79 | 2358866.49 | 0.00 | 1313.00 |
| | | | | 6226650.79 | 2358866.61 | 0.00 | 1313.00 |
| | | | | 6226649.80 | 2358866.74 | 0.00 | 1313.00 |
| | | | | 6226648.81 | 2358866.87 | 0.00 | 1313.00 |
| | | | | 6226647.82 | 2358867.00 | 0.00 | 1313.00 |
| | | | | 6226646.83 | 2358867.13 | 0.00 | 1313.00 |
| | | | | 6226645.84 | 2358867.26 | 0.00 | 1313.00 |
| | | | | 6226644.84 | 2358867.39 | 0.00 | 1313.00 |
| | | | | 6226643.85 | 2358867.52 | 0.00 | 1313.00 |
| | | | | 6226642.86 | 2358867.66 | 0.00 | 1313.00 |
| | | | | 6226641.87 | 2358867.79 | 0.00 | 1313.00 |
| | | | | 6226640.88 | 2358867.92 | 0.00 | 1313.00 |
| | | | | 6226639.89 | 2358868.05 | 0.00 | 1313.00 |
| | | | | 6226638.90 | 2358868.19 | 0.00 | 1313.00 |
| | | | | 6226637.91 | 2358868.32 | 0.00 | 1313.00 |
| | | | | 6226636.91 | 2358868.45 | 0.00 | 1313.00 |
| | | | | 6226635.92 | 2358868.59 | 0.00 | 1313.00 |
| | | | | 6226634.93 | 2358868.72 | 0.00 | 1313.00 |
| | | | | 6226633.94 | 2358868.86 | 0.00 | 1313.00 |
| | | | | 6226632.95 | 2358868.99 | 0.00 | 1313.00 |
| | | | | 6226631.96 | 2358869.13 | 0.00 | 1313.00 |
| | | | | 6226630.97 | 2358869.27 | 0.00 | 1313.00 |
| | | | | 6226629.98 | 2358869.40 | 0.00 | 1313.00 |
| | | | | 6226628.99 | 2358869.54 | 0.00 | 1313.00 |
| | | | | 6226628.00 | 2358869.68 | 0.00 | 1313.00 |
| | | | | 6226627.01 | 2358869.81 | 0.00 | 1313.00 |
| | | | | 6226626.02 | 2358869.95 | 0.00 | 1313.00 |
| | | | | 6226625.03 | 2358870.09 | 0.00 | 1313.00 |
| | | | | 6226624.04 | 2358870.23 | 0.00 | 1313.00 |
| | | | | 6226623.05 | 2358870.37 | 0.00 | 1313.00 |
| | | | | 6226622.06 | 2358870.51 | 0.00 | 1313.00 |
| | | | | 6226621.07 | 2358870.65 | 0.00 | 1313.00 |
| | | | | 6226620.08 | 2358870.79 | 0.00 | 1313.00 |
| | | | | 6226619.08 | 2358870.93 | 0.00 | 1313.00 |
| | | | | 6226618.09 | 2358871.08 | 0.00 | 1313.00 |
| | | | | 6226617.10 | 2358871.22 | 0.00 | 1313.00 |
| | | | | 6226616.11 | 2358871.36 | 0.00 | 1313.00 |
| | | | | 6226615.13 | 2358871.50 | 0.00 | 1313.00 |
| | | | | 6226614.14 | 2358871.65 | 0.00 | 1313.00 |
| | | | | 6226613.15 | 2358871.79 | 0.00 | 1313.00 |
| | | | | 6226612.16 | 2358871.93 | 0.00 | 1313.00 |
| | | | | 6226611.17 | 2358872.08 | 0.00 | 1313.07 |
| | | | | 6226610.18 | 2358872.22 | 0.00 | 1313.15 |
| | | | | 6226609.19 | 2358872.37 | 0.00 | 1313.23 |
| | | | | 6226608.20 | 2358872.52 | 0.00 | 1313.28 |
| | | | | 6226607.21 | 2358872.66 | 0.00 | 1313.32 |
| | | | | 6226606.22 | 2358872.81 | 0.00 | 1313.37 |
| | | | | 6226605.23 | 2358872.96 | 0.00 | 1313.41 |
| | | | | 6226604.24 | 2358873.10 | 0.00 | 1313.46 |
| | | | | 6226603.25 | 2358873.25 | 0.00 | 1313.51 |
| | | | | 6226602.26 | 2358873.40 | 0.00 | 1313.55 |
| | | | | 6226601.27 | 2358873.55 | 0.00 | 1313.60 |
| | | | | 6226600.29 | 2358873.70 | 0.00 | 1313.64 |
| | | | | 6226599.30 | 2358873.85 | 0.00 | 1313.69 |
| | | | | 6226598.31 | 2358874.00 | 0.00 | 1313.73 |
| | | | | 6226597.32 | 2358874.15 | 0.00 | 1313.78 |
| | | | | 6226596.33 | 2358874.30 | 0.00 | 1313.82 |
| | | | | 6226595.34 | 2358874.45 | 0.00 | 1313.87 |
| | | | | 6226594.35 | 2358874.60 | 0.00 | 1313.91 |
| | | | | 6226593.37 | 2358874.75 | 0.00 | 1313.96 |
| | | | | 6226592.38 | 2358874.90 | 0.00 | 1314.00 |
| | | | | 6226591.39 | 2358875.06 | 0.00 | 1314.00 |
| | | | | 6226590.40 | 2358875.21 | 0.00 | 1314.00 |

| Name | ID | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|
| | | Begin | End | x | y | z | Ground |
| | | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) |
| | | | | 6226589.41 | 2358875.36 | 0.00 | 1314.00 |
| | | | | 6226588.42 | 2358875.52 | 0.00 | 1314.00 |
| | | | | 6226587.44 | 2358875.67 | 0.00 | 1314.05 |
| | | | | 6226586.45 | 2358875.83 | 0.00 | 1314.10 |
| | | | | 6226585.46 | 2358875.98 | 0.00 | 1314.16 |
| | | | | 6226584.47 | 2358876.14 | 0.00 | 1314.21 |
| | | | | 6226583.48 | 2358876.29 | 0.00 | 1314.27 |
| | | | | 6226582.50 | 2358876.45 | 0.00 | 1314.31 |
| | | | | 6226581.51 | 2358876.61 | 0.00 | 1314.33 |
| | | | | 6226580.52 | 2358876.76 | 0.00 | 1314.35 |
| | | | | 6226579.53 | 2358876.92 | 0.00 | 1314.36 |
| | | | | 6226578.55 | 2358877.08 | 0.00 | 1314.38 |
| | | | | 6226577.56 | 2358877.24 | 0.00 | 1314.40 |
| | | | | 6226576.57 | 2358877.40 | 0.00 | 1314.41 |
| | | | | 6226575.58 | 2358877.56 | 0.00 | 1314.43 |
| | | | | 6226574.60 | 2358877.72 | 0.00 | 1314.45 |
| | | | | 6226573.61 | 2358877.88 | 0.00 | 1314.46 |
| | | | | 6226572.62 | 2358878.04 | 0.00 | 1314.48 |
| | | | | 6226571.63 | 2358878.20 | 0.00 | 1314.50 |
| | | | | 6226570.65 | 2358878.36 | 0.00 | 1314.51 |
| | | | | 6226569.66 | 2358878.52 | 0.00 | 1314.53 |
| | | | | 6226568.67 | 2358878.68 | 0.00 | 1314.55 |
| | | | | 6226567.69 | 2358878.84 | 0.00 | 1314.57 |
| | | | | 6226566.70 | 2358879.01 | 0.00 | 1314.58 |
| | | | | 6226565.71 | 2358879.17 | 0.00 | 1314.60 |
| | | | | 6226564.73 | 2358879.33 | 0.00 | 1314.62 |
| | | | | 6226563.74 | 2358879.50 | 0.00 | 1314.63 |
| | | | | 6226562.75 | 2358879.66 | 0.00 | 1314.65 |
| | | | | 6226561.77 | 2358879.83 | 0.00 | 1314.67 |
| | | | | 6226560.78 | 2358879.99 | 0.00 | 1314.68 |
| | | | | 6226559.80 | 2358880.16 | 0.00 | 1314.70 |
| | | | | 6226558.81 | 2358880.33 | 0.00 | 1314.71 |
| | | | | 6226557.82 | 2358880.49 | 0.00 | 1314.72 |
| | | | | 6226556.84 | 2358880.66 | 0.00 | 1314.74 |
| | | | | 6226555.85 | 2358880.83 | 0.00 | 1314.75 |
| | | | | 6226554.87 | 2358880.99 | 0.00 | 1314.77 |
| | | | | 6226553.88 | 2358881.16 | 0.00 | 1314.78 |
| | | | | 6226552.89 | 2358881.33 | 0.00 | 1314.80 |
| | | | | 6226551.91 | 2358881.50 | 0.00 | 1314.81 |
| | | | | 6226550.92 | 2358881.67 | 0.00 | 1314.82 |
| | | | | 6226549.94 | 2358881.84 | 0.00 | 1314.84 |
| | | | | 6226548.95 | 2358882.01 | 0.00 | 1314.85 |
| | | | | 6226547.97 | 2358882.18 | 0.00 | 1314.87 |
| | | | | 6226546.98 | 2358882.35 | 0.00 | 1314.88 |
| | | | | 6226546.00 | 2358882.52 | 0.00 | 1314.90 |
| | | | | 6226544.48 | 2358882.79 | 0.00 | 1314.92 |
| | | | | 6226486.90 | 2358920.36 | 0.00 | 1316.00 |
| | | | | 6226363.73 | 2358948.69 | 0.00 | 1316.91 |
| | | | | 6226299.94 | 2358959.62 | 0.00 | 1317.00 |
| | | | | 6225445.23 | 2359192.55 | 0.00 | 1327.23 |
| | | | | 6225067.09 | 2359382.65 | 0.00 | 1329.90 |
| | | | | 6224693.92 | 2359438.51 | 0.00 | 1334.96 |
| | | | | 6224636.99 | 2359390.64 | 0.00 | 1338.37 |
| | | | | 6224571.38 | 2359400.41 | 0.00 | 1342.24 |
| | | | | 6224571.64 | 2359435.03 | 0.00 | 1341.33 |
| | | | | 6224213.41 | 2359437.34 | 0.00 | 1399.07 |
| | | | | 6224191.52 | 2359522.81 | 0.00 | 1398.78 |
| | | | | 6224105.49 | 2359729.36 | 0.00 | 1402.10 |
| | | | | 6223914.10 | 2360189.45 | 0.00 | 1385.53 |
| | | | | 6223915.89 | 2360347.69 | 0.00 | 1375.31 |

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# APPENDIX 10.2:

# NIGHTTIME CONCRETE POUR NOISE CALCULATIONS

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# 14324 - Pepper 210

**CadnaA Noise Prediction Model:** 14324-02_Pour.cna
**Date:** 25.01.24
**Analyst:** B. Lawson

## Calculation Configuration

| Configuration | |
|---|---|
| **Parameter** | **Value** |
| **General** | |
| **Max. Error (dB)** | **0.00** |
| **Max. Search Radius (#(Unit,LEN))** | **3048.00** |
| **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** | |
| **Daytime Penalty (dB)** | **0.00** |
| **Recr. Time Penalty (dB)** | **5.00** |
| **Night-time Penalty (dB)** | **10.00** |
| **DTM** | |
| **Standard Height (m)** | **365.76** |
| **Model of Terrain** | **Triangulation** |
| **Reflection** | |
| **max. Order of Reflection** | **1** |
| **Search Radius Src** | **100.00** |
| **Search Radius Rcvr** | **100.00** |
| **Max. Distance Source - Rcvr** | **1000.00 1000.00** |
| **Min. Distance Rvcr - Reflector** | **1.00 1.00** |
| **Min. Distance Source - Reflector** | **0.10** |
| **Industrial (ISO 9613)** | |
| **Lateral Diffraction** | **some Obj** |
| **Obst. within Area Src do not shield** | **On** |
| **Screening** | **Incl. Ground Att. over Barrier** |
| | **Dz with limit (20/25)** |
| **Barrier Coefficients C1,2,3** | **3.0 20.0 0.0** |
| **Temperature (#(Unit,TEMP))** | **10** |
| **rel. Humidity (%)** | **70** |
| **Ground Absorption G** | **0.50** |
| **Wind Speed for Dir. (#(Unit,SPEED))** | **3.0** |
| **Roads (TNM)** | |
| **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 | 41.1 | -65.7 | 38.1 | 57.8 | 52.7 | 0.0 | | | | 5.00 | r | 6223818.04 | 2360027.16 | 1411.49 |
| RECEIVERS | | R2 | 37.9 | -68.8 | 34.9 | 58.4 | 51.9 | 0.0 | | | | 5.00 | r | 6223612.13 | 2360666.53 | 1384.68 |
| RECEIVERS | | R3 | 25.9 | -77.6 | 22.9 | 59.9 | 59.3 | 0.0 | | | | 5.00 | r | 6230332.33 | 2359504.19 | 1299.25 |
| RECEIVERS | | R4 | 38.2 | -68.5 | 35.2 | 69.6 | 66.9 | 0.0 | | | | 5.00 | r | 6225001.22 | 2358523.59 | 1370.59 |
| RECEIVERS | | R5 | 34.7 | -71.6 | 31.7 | 58.6 | 54.7 | 0.0 | | | | 5.00 | r | 6224083.55 | 2358688.48 | 1398.20 |
| RECEIVERS | | R6 | 37.2 | -69.5 | 34.1 | 58.9 | 53.4 | 0.0 | | | | 5.00 | r | 6223867.90 | 2359521.90 | 1410.82 |

## Area Source(s)

| Name | M. | ID | Result. PWL | | | Result. PWL'' | | | Lw / Li | | | Operating Time | | | Height | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Day | Evening | Night | Type | Value | norm. | Day | Special | Night | (ft) | |
| | | | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | (dBA) | | | dB(A) | (min) | (min) | (min) | | |
| SITEBOUNDARY | | CONSTRUCTION | 107.3 | 0.3 | 0.3 | 51.1 | -55.9 | -55.9 | PWL-Pt | 100.3 | | | | | 8 | r |

| Name | ID | Height | | | | Coordinates | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Begin | | End | | x | y | z | Ground |
| | | (ft) | | (ft) | | (ft) | (ft) | (ft) | (ft) |
| SITEBOUNDARY | CONSTRUCTION | 8.00 | r | | | 6224365.16 | 2361291.42 | 1367.19 | 1359.19 |
| | | | | | | 6224507.50 | 2361222.64 | 1363.00 | 1355.00 |
| | | | | | | 6224508.35 | 2361222.11 | 1363.00 | 1355.00 |
| | | | | | | 6224509.20 | 2361221.58 | 1363.00 | 1355.00 |
| | | | | | | 6224510.04 | 2361221.04 | 1363.00 | 1355.00 |
| | | | | | | 6224510.89 | 2361220.51 | 1363.00 | 1355.00 |
| | | | | | | 6224511.73 | 2361219.98 | 1363.00 | 1355.00 |
| | | | | | | 6224512.58 | 2361219.44 | 1363.00 | 1355.00 |
| | | | | | | 6224513.42 | 2361218.90 | 1363.00 | 1355.00 |

| Name | ID | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|
| | | Begin | End | x | y | z | Ground |
| | | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) |
| | | | | 6224514.26 | 2361218.36 | 1363.00 | 1355.00 |
| | | | | 6224515.10 | 2361217.82 | 1363.00 | 1355.00 |
| | | | | 6224515.94 | 2361217.28 | 1363.00 | 1355.00 |
| | | | | 6224516.78 | 2361216.74 | 1363.00 | 1355.00 |
| | | | | 6228144.03 | 2358874.50 | 1304.95 | 1296.95 |
| | | | | 6227886.83 | 2358877.02 | 1309.00 | 1301.00 |
| | | | | 6227844.44 | 2358903.68 | 1309.24 | 1301.24 |
| | | | | 6227762.26 | 2358904.21 | 1310.63 | 1302.63 |
| | | | | 6227762.13 | 2358884.52 | 1310.60 | 1302.60 |
| | | | | 6227728.95 | 2358884.73 | 1311.14 | 1303.14 |
| | | | | 6227728.79 | 2358859.33 | 1311.56 | 1303.56 |
| | | | | 6227032.98 | 2358863.87 | 1317.86 | 1309.86 |
| | | | | 6226923.70 | 2358864.59 | 1318.38 | 1310.38 |
| | | | | 6226652.78 | 2358866.36 | 1321.00 | 1313.00 |
| | | | | 6226651.79 | 2358866.49 | 1321.00 | 1313.00 |
| | | | | 6226650.79 | 2358866.61 | 1321.00 | 1313.00 |
| | | | | 6226649.80 | 2358866.74 | 1321.00 | 1313.00 |
| | | | | 6226648.81 | 2358866.87 | 1321.00 | 1313.00 |
| | | | | 6226647.82 | 2358867.00 | 1321.00 | 1313.00 |
| | | | | 6226646.83 | 2358867.13 | 1321.00 | 1313.00 |
| | | | | 6226645.84 | 2358867.26 | 1321.00 | 1313.00 |
| | | | | 6226644.84 | 2358867.39 | 1321.00 | 1313.00 |
| | | | | 6226643.85 | 2358867.52 | 1321.00 | 1313.00 |
| | | | | 6226642.86 | 2358867.66 | 1321.00 | 1313.00 |
| | | | | 6226641.87 | 2358867.79 | 1321.00 | 1313.00 |
| | | | | 6226640.88 | 2358867.92 | 1321.00 | 1313.00 |
| | | | | 6226639.89 | 2358868.05 | 1321.00 | 1313.00 |
| | | | | 6226638.90 | 2358868.19 | 1321.00 | 1313.00 |
| | | | | 6226637.91 | 2358868.32 | 1321.00 | 1313.00 |
| | | | | 6226636.91 | 2358868.45 | 1321.00 | 1313.00 |
| | | | | 6226635.92 | 2358868.59 | 1321.00 | 1313.00 |
| | | | | 6226634.93 | 2358868.72 | 1321.00 | 1313.00 |
| | | | | 6226633.94 | 2358868.86 | 1321.00 | 1313.00 |
| | | | | 6226632.95 | 2358868.99 | 1321.00 | 1313.00 |
| | | | | 6226631.96 | 2358869.13 | 1321.00 | 1313.00 |
| | | | | 6226630.97 | 2358869.27 | 1321.00 | 1313.00 |
| | | | | 6226629.98 | 2358869.40 | 1321.00 | 1313.00 |
| | | | | 6226628.99 | 2358869.54 | 1321.00 | 1313.00 |
| | | | | 6226628.00 | 2358869.68 | 1321.00 | 1313.00 |
| | | | | 6226627.01 | 2358869.81 | 1321.00 | 1313.00 |
| | | | | 6226626.02 | 2358869.95 | 1321.00 | 1313.00 |
| | | | | 6226625.03 | 2358870.09 | 1321.00 | 1313.00 |
| | | | | 6226624.04 | 2358870.23 | 1321.00 | 1313.00 |
| | | | | 6226623.05 | 2358870.37 | 1321.00 | 1313.00 |
| | | | | 6226622.06 | 2358870.51 | 1321.00 | 1313.00 |
| | | | | 6226621.07 | 2358870.65 | 1321.00 | 1313.00 |
| | | | | 6226620.08 | 2358870.79 | 1321.00 | 1313.00 |
| | | | | 6226619.08 | 2358870.93 | 1321.00 | 1313.00 |
| | | | | 6226618.09 | 2358871.08 | 1321.00 | 1313.00 |
| | | | | 6226617.10 | 2358871.22 | 1321.00 | 1313.00 |
| | | | | 6226616.11 | 2358871.36 | 1321.00 | 1313.00 |
| | | | | 6226615.13 | 2358871.50 | 1321.00 | 1313.00 |
| | | | | 6226614.14 | 2358871.65 | 1321.00 | 1313.00 |
| | | | | 6226613.15 | 2358871.79 | 1321.00 | 1313.00 |
| | | | | 6226612.16 | 2358871.93 | 1321.00 | 1313.00 |
| | | | | 6226611.17 | 2358872.08 | 1321.07 | 1313.07 |
| | | | | 6226610.18 | 2358872.22 | 1321.15 | 1313.15 |
| | | | | 6226609.19 | 2358872.37 | 1321.23 | 1313.23 |
| | | | | 6226608.20 | 2358872.52 | 1321.28 | 1313.28 |
| | | | | 6226607.21 | 2358872.66 | 1321.32 | 1313.32 |
| | | | | 6226606.22 | 2358872.81 | 1321.37 | 1313.37 |
| | | | | 6226605.23 | 2358872.96 | 1321.41 | 1313.41 |
| | | | | 6226604.24 | 2358873.10 | 1321.46 | 1313.46 |
| | | | | 6226603.25 | 2358873.25 | 1321.51 | 1313.51 |
| | | | | 6226602.26 | 2358873.40 | 1321.55 | 1313.55 |
| | | | | 6226601.27 | 2358873.55 | 1321.60 | 1313.60 |
| | | | | 6226600.29 | 2358873.70 | 1321.64 | 1313.64 |
| | | | | 6226599.30 | 2358873.85 | 1321.69 | 1313.69 |
| | | | | 6226598.31 | 2358874.00 | 1321.73 | 1313.73 |
| | | | | 6226597.32 | 2358874.15 | 1321.78 | 1313.78 |
| | | | | 6226596.33 | 2358874.30 | 1321.82 | 1313.82 |
| | | | | 6226595.34 | 2358874.45 | 1321.87 | 1313.87 |
| | | | | 6226594.35 | 2358874.60 | 1321.91 | 1313.91 |
| | | | | 6226593.37 | 2358874.75 | 1321.96 | 1313.96 |
| | | | | 6226592.38 | 2358874.90 | 1322.00 | 1314.00 |
| | | | | 6226591.39 | 2358875.06 | 1322.00 | 1314.00 |
| | | | | 6226590.40 | 2358875.21 | 1322.00 | 1314.00 |

| Name | ID | Height | | Coordinates | | | |
|---|---|---|---|---|---|---|---|
| | | Begin | End | x | y | z | Ground |
| | | (ft) | (ft) | (ft) | (ft) | (ft) | (ft) |
| | | | | 6226589.41 | 2358875.36 | 1322.00 | 1314.00 |
| | | | | 6226588.42 | 2358875.52 | 1322.00 | 1314.00 |
| | | | | 6226587.44 | 2358875.67 | 1322.05 | 1314.05 |
| | | | | 6226586.45 | 2358875.83 | 1322.10 | 1314.10 |
| | | | | 6226585.46 | 2358875.98 | 1322.16 | 1314.16 |
| | | | | 6226584.47 | 2358876.14 | 1322.21 | 1314.21 |
| | | | | 6226583.48 | 2358876.29 | 1322.27 | 1314.27 |
| | | | | 6226582.50 | 2358876.45 | 1322.31 | 1314.31 |
| | | | | 6226581.51 | 2358876.61 | 1322.33 | 1314.33 |
| | | | | 6226580.52 | 2358876.76 | 1322.35 | 1314.35 |
| | | | | 6226579.53 | 2358876.92 | 1322.36 | 1314.36 |
| | | | | 6226578.55 | 2358877.08 | 1322.38 | 1314.38 |
| | | | | 6226577.56 | 2358877.24 | 1322.40 | 1314.40 |
| | | | | 6226576.57 | 2358877.40 | 1322.41 | 1314.41 |
| | | | | 6226575.58 | 2358877.56 | 1322.43 | 1314.43 |
| | | | | 6226574.60 | 2358877.72 | 1322.45 | 1314.45 |
| | | | | 6226573.61 | 2358877.88 | 1322.46 | 1314.46 |
| | | | | 6226572.62 | 2358878.04 | 1322.48 | 1314.48 |
| | | | | 6226571.63 | 2358878.20 | 1322.50 | 1314.50 |
| | | | | 6226570.65 | 2358878.36 | 1322.51 | 1314.51 |
| | | | | 6226569.66 | 2358878.52 | 1322.53 | 1314.53 |
| | | | | 6226568.67 | 2358878.68 | 1322.55 | 1314.55 |
| | | | | 6226567.69 | 2358878.84 | 1322.57 | 1314.57 |
| | | | | 6226566.70 | 2358879.01 | 1322.58 | 1314.58 |
| | | | | 6226565.71 | 2358879.17 | 1322.60 | 1314.60 |
| | | | | 6226564.73 | 2358879.33 | 1322.62 | 1314.62 |
| | | | | 6226563.74 | 2358879.50 | 1322.63 | 1314.63 |
| | | | | 6226562.75 | 2358879.66 | 1322.65 | 1314.65 |
| | | | | 6226561.77 | 2358879.83 | 1322.67 | 1314.67 |
| | | | | 6226560.78 | 2358879.99 | 1322.68 | 1314.68 |
| | | | | 6226559.80 | 2358880.16 | 1322.70 | 1314.70 |
| | | | | 6226558.81 | 2358880.33 | 1322.71 | 1314.71 |
| | | | | 6226557.82 | 2358880.49 | 1322.72 | 1314.72 |
| | | | | 6226556.84 | 2358880.66 | 1322.74 | 1314.74 |
| | | | | 6226555.85 | 2358880.83 | 1322.75 | 1314.75 |
| | | | | 6226554.87 | 2358880.99 | 1322.77 | 1314.77 |
| | | | | 6226553.88 | 2358881.16 | 1322.78 | 1314.78 |
| | | | | 6226552.89 | 2358881.33 | 1322.80 | 1314.80 |
| | | | | 6226551.91 | 2358881.50 | 1322.81 | 1314.81 |
| | | | | 6226550.92 | 2358881.67 | 1322.82 | 1314.82 |
| | | | | 6226549.94 | 2358881.84 | 1322.84 | 1314.84 |
| | | | | 6226548.95 | 2358882.01 | 1322.85 | 1314.85 |
| | | | | 6226547.97 | 2358882.18 | 1322.87 | 1314.87 |
| | | | | 6226546.98 | 2358882.35 | 1322.88 | 1314.88 |
| | | | | 6226546.00 | 2358882.52 | 1322.90 | 1314.90 |
| | | | | 6226544.48 | 2358882.79 | 1322.92 | 1314.92 |
| | | | | 6226486.90 | 2358920.36 | 1324.00 | 1316.00 |
| | | | | 6226363.73 | 2358948.69 | 1324.91 | 1316.91 |
| | | | | 6226299.94 | 2358959.62 | 1325.00 | 1317.00 |
| | | | | 6225445.23 | 2359192.55 | 1335.23 | 1327.23 |
| | | | | 6225067.09 | 2359382.65 | 1337.90 | 1329.90 |
| | | | | 6224693.92 | 2359438.51 | 1342.96 | 1334.96 |
| | | | | 6224636.99 | 2359390.64 | 1346.37 | 1338.37 |
| | | | | 6224571.38 | 2359400.41 | 1350.24 | 1342.24 |
| | | | | 6224571.64 | 2359435.03 | 1349.33 | 1341.33 |
| | | | | 6224213.41 | 2359437.34 | 1407.07 | 1399.07 |
| | | | | 6224191.52 | 2359522.81 | 1406.78 | 1398.78 |
| | | | | 6224105.49 | 2359729.36 | 1410.10 | 1402.10 |
| | | | | 6223914.10 | 2360189.45 | 1393.53 | 1385.53 |
| | | | | 6223915.89 | 2360347.69 | 1383.31 | 1375.31 |

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