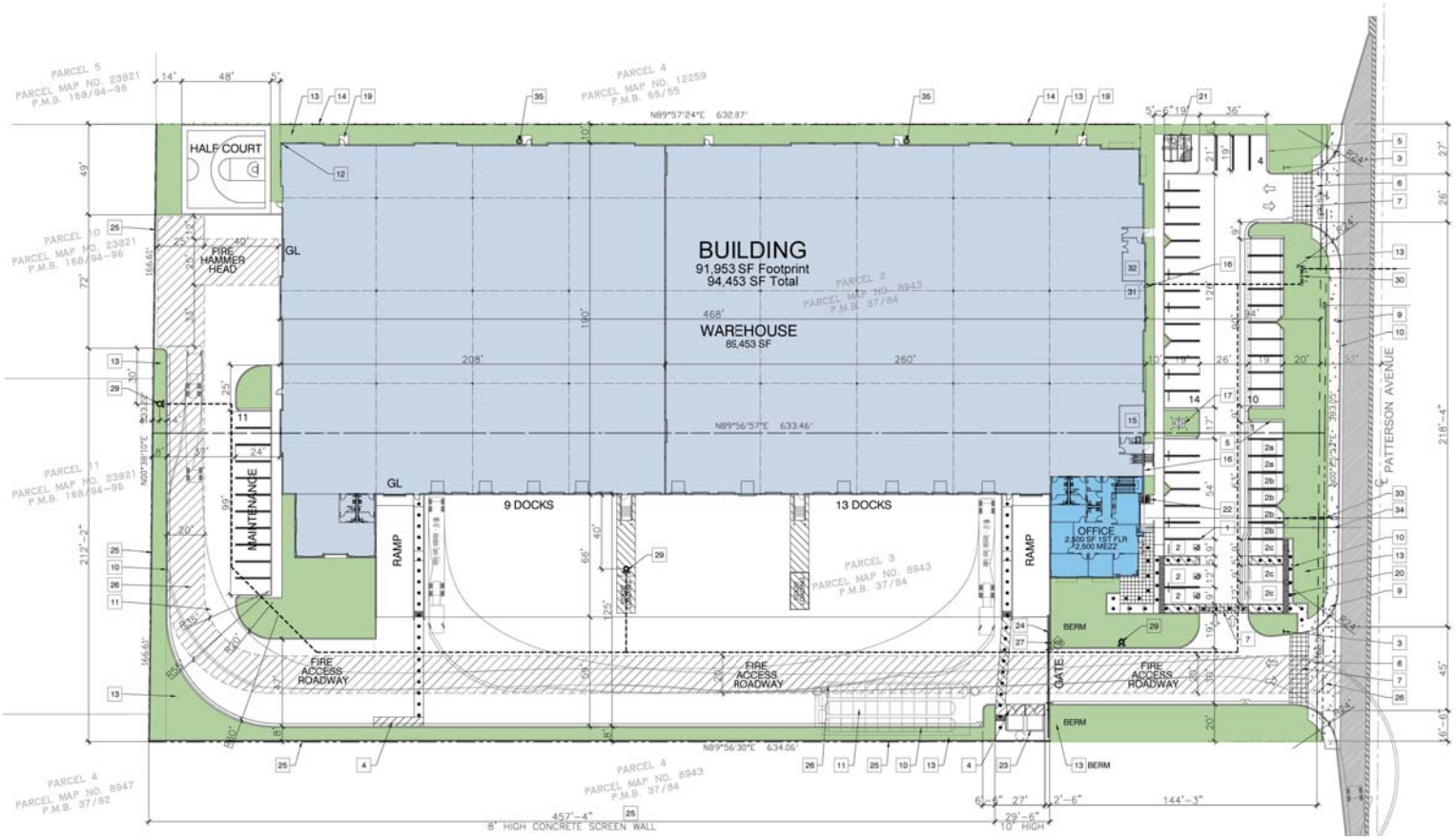
# PATTERSON BUSINESS CENTER
# NOISE IMPACT STUDY
# City of Perris, California



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# NOISE IMPACT STUDY
## City of Perris, California

**Prepared for:**

Mr. Dale Ulman
CGU CAPTIAL MANAGEMENT
302 West Fifth Street, Suite 103
San Pedro, CA 90731

**Prepared by:**

RK ENGINEERING GROUP, INC.
1401 Dove Street, Suite 540
Newport Beach, CA 92660

**Bryan Estrada, AICP**
**Becca Morrison**

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# 1.0 Introduction

## 1.1 Purpose of Analysis and Study Objectives

The purpose of this report is to review potential noise impacts and noise/land use compatibility for the proposed Patterson Business Center Project. This report also provides preliminary recommendations to meet the State of California and City of Perris noise standards.

The following is provided in this report:

- A description of the study area and the proposed project
- Information regarding the fundamentals of noise
- Identification of the regulatory setting and applicable noise standards
- Analysis of the existing noise environment
- Analysis of the project's operational noise impacts
- Analysis of the project's Construction Noise and Vibration impacts
- Summary of recommended project design features to reduce noise level impacts.

## 1.2 Site Location

The proposed Patterson Business Center project site is located along the west side of Patterson Avenue, between Nandina Avenue and Harley Knox Boulevard, in the City of Perris, California. The project site is located approximately 1,495 feet above sea level and the topography is relatively even.

The project site is bounded by existing industrial uses to the north, south, and west, and Patterson Avenue to the east.

The primary sources of ambient noise at the project site include roadway noise from the adjacent roadways, airport noise from the March Air Reserve Base, and industrial noise from the existing industrial uses surrounding the project site.

The project site is located within the Perris Valley Commerce Center Specific Plan planning area of the City of Perris. The nearest sensitive receptors to the project site include the following:

**Receptors 1 - 2** Two (2) existing non-conforming residential dwelling units located approximately 110 feet (~33 meters) northeast of the northeastern

corner of the project site, approximately 50 feet east of the centerline of Patterson Avenue. It is RK's understanding that the dwelling units are currently occupied residences.

The project site location map, including sensitive receptor locations, is provided in Exhibit A.

## 1.3 Project Description

The project consists of constructing and operating a 94,453-square-foot non-refrigerated warehouse building on a 4.84-gross-acre site. As part of the project design, an eight (8) foot high noise barrier wall will be constructed along the southern property line, extending 100 feet in linear length to the west from the southeastern truck entry gate. Table 1 summarizes the proposed project land uses.

The site plan used for this analysis, provided by CARTER GROUP ARCHITECTS INC., is illustrated in Exhibit B.

**Table 1**
**Land Use Summary**

| Land Use | Quantity | Metric |
|---|---|---|
| Unrefrigerated Warehouse | 94,453 | Square Feet |

This report analyzes long-term and short-term noise impacts associated with the day-to-day operation of the project. The primary source of short-term noise is from construction activities. The primary sources of long-term noise impacts include HVAC equipment noise, truck loading and unloading activity noise, and parking lot noise.

## 1.4 Summary of Analysis Results

Table 2 provides a summary of the noise analysis results, per the CEQA impact criteria checklist. With the implementation of the recommended mitigation measures, the project is not expected to result in 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.

**Table 2**
**CEQA Noise Impact Criteria**

| Noise Impact Criteria | Potentially Significant | Potentially Significant Unless Mitigated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| *Would the project result in?* | | | | |
| 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? | | | X | |
| b) Generation of excessive groundborne vibration or groundborne noise levels? | | | X | |
| 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? | | | X | |

## 1.5 Perris Valley Commerce Center Specific Plan EIR Mitigation Measures

The proposed project is located within the Perris Valley Commerce Center Specific Plan (PVCCSP) planning area in the City of Perris, and the project is subject to the mitigation measures listed in the PVCCSP Environmental Impact Report (EIR). The inclusion of these PVCCSP EIR mitigation measures in the project design is considered a condition of approval and is not considered project-specific mitigation under CEQA.

To ensure the project is consistent with the PVCCSP, the project will be required to implement the following measures from the PVCCSP EIR.

**MM Noise 1:** During all project site excavation and grading on-site, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturer's standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the project site.

**MM Noise 2:** During construction, stationary construction equipment, stockpiling and vehicle staging areas will be placed a minimum of 446 feet away from the closest sensitive receptor.

**MM Noise 3:** No combustion-powered equipment, such as pumps or generators, shall be allowed to operate within 446 feet of any occupied residence unless the equipment is surrounded by a noise protection barrier.

**MM Noise 4:** Construction contractors of implementing development projects shall limit haul truck deliveries to the same hours specified for construction equipment. To the extent feasible, haul routes shall not pass sensitive land uses or residential dwellings.

## 1.6 Recommended Project Design Features (DF)

The following recommended project design features include standard rules and requirements, best practices, and recognized design guidelines for reducing noise levels. Design features are assumed to be part of the conditions of the project and integrated into its design.

*Operational Design Features*

**DF-1** All rooftop mounted HVAC mechanical equipment shall be fully shielded from the line of sight of adjacent properties behind a parapet wall or other screening walls.

**DF-2** All interior office space within the project must have sound attenuation features sufficient to reduce the exterior aviation-related noise level to no more than CNEL 45 dB.

# 2.0 Fundamentals of Noise

This section of the report provides basic information about noise and presents some of the terms used within the report.

## 2.1 Sound, Noise and Acoustics

Sound is a disturbance created by a moving or vibrating source and is capable of being detected by the hearing organs. Sound may be thought of as mechanical energy of a moving object transmitted by pressure waves through a medium to a human ear. For traffic, or stationary noise, the medium of concern is air. *Noise* is defined as sound that is loud, unpleasant, unexpected, or unwanted.

## 2.2 Frequency and Hertz

A continuous sound is described by its *frequency* (pitch) and its *amplitude* (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch (bass sounding) and high-frequency sounds are high in pitch (squeak). These oscillations per second (cycles) are commonly referred to as Hertz (Hz). The human ear can hear from the bass pitch starting out at 20 Hz all the way to the high pitch of 20,000 Hz.

## 2.3 Sound Pressure Levels and Decibels

The *amplitude* of a sound determines it loudness. The loudness of sound increases or decreases, as the amplitude increases or decreases. Sound pressure amplitude is measured in units of micro-Newton per square inch meter (N/m2), also called micro-Pascal ($\mu$Pa). One $\mu$Pa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure level (SPL or $L_p$) is used to describe in logarithmic units the ratio of actual sound pressures to a reference pressure squared. These units are called decibels and abbreviated dB.

## 2.4 Addition of Decibels

Because decibels are on a logarithmic scale, sound pressure levels cannot be added or subtracted by simple plus or minus addition. When two (2) sounds of equal SPL are combined, they will produce an SPL 3 dB greater than the original single SPL. In other words, sound energy must be doubled to produce a 3 dB increase.

If two (2) sounds differ by approximately 10 dB the higher sound level is the predominant sound.

## 2.5 Human Response to Changes in Noise Levels

In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz, (A-weighted scale) and it perceives a sound within that range as being more intense than a sound with a higher or lower frequency with the same magnitude. For purposes of this report as well as with most environmental documents, the A-scale weighting is typically reported in terms of A-weighted decibel (dBA). Typically, the human ear can barely perceive the change in noise level of 3 dB. A change in 5 dB is readily perceptible, and a change in 10 dB is perceived as being twice or half as loud[1]. As previously discussed, a doubling of sound energy results in a 3 dB increase in sound, which means that a doubling of sound energy (e.g. doubling the volume of traffic on a highway), would result in a barely perceptible change in sound level.

## 2.6 Noise Descriptors

Noise in our daily environment fluctuates over time. Some noise levels occur in regular patterns, others are random. Some noise levels are constant, while others are sporadic. Noise descriptors were created to describe the different time-varying noise levels. Following are the most commonly used noise descriptors along with brief definitions.

### *A-Weighted Sound Level*

The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear. A numerical method of rating human judgment of loudness.

### *Ambient Noise Level*

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

[1] Source: U.S. DOT Federal Highway Administration. Dec. 2011. Highway Traffic Noise: Analysis and Abatement Guidance.

*Community Noise Equivalent Level (CNEL)*

The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00 PM and after addition of ten (10) decibels to sound levels in the night before 7:00 AM and after 10:00 PM.

*Decibel (dB)*

A unit for measuring the amplitude of a 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 micro-pascals.

*dB(A)*

A-weighted sound level (see definition above).

*Equivalent Sound Level (LEQ)*

The sound level corresponding to a steady noise level over a given sample period with the same amount of acoustic energy as the actual time varying noise level. The energy average noise level during the sample period.

*Habitable Room*

Any room meeting the requirements of the Uniform Building Code or other applicable regulations which is intended to be used for sleeping, living, cooking or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms, and similar spaces.

*L(n)*

The A-weighted sound level exceeded during a certain percentage of the sample time. For example, L10 is the sound level exceeded 10 percent of the sample time. Similarly L50, L90 and L99, etc.

*Noise*

Any unwanted sound or sound which is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. The State Noise Control Act defines noise as "...excessive undesirable sound...".

*Outdoor Living Area*

Outdoor spaces that are associated with residential land uses typically used for passive recreational activities or other noise-sensitive uses. Such spaces include patio areas, barbecue areas, jacuzzi areas, etc. associated with residential uses; outdoor patient recovery or resting areas associated with hospitals, convalescent hospitals, or rest homes; outdoor areas associated with places of worship which have a significant role in services or other noise-sensitive activities; and outdoor school facilities routinely used for educational purposes which may be adversely impacted by noise. Outdoor areas usually not included in this definition are: front yard areas, driveways, greenbelts, maintenance areas and storage areas associated with residential land uses; exterior areas at hospitals that are not used for patient activities; outdoor areas associated with places of worship and principally used for short-term social gatherings; and, outdoor areas associated with school facilities that are not typically associated with educational uses prone to adverse noise impacts (for example, school play yard areas).

*Percent Noise Levels*

See L(n).

*Sound Level (Noise Level)*

The weighted sound pressure level obtained by use of a sound level meter having a standard frequency-filter for attenuating part of the sound spectrum.

*Sound Level Meter*

An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement and determination of noise and sound levels.

*Single Event Noise Exposure Level (SENEL)*

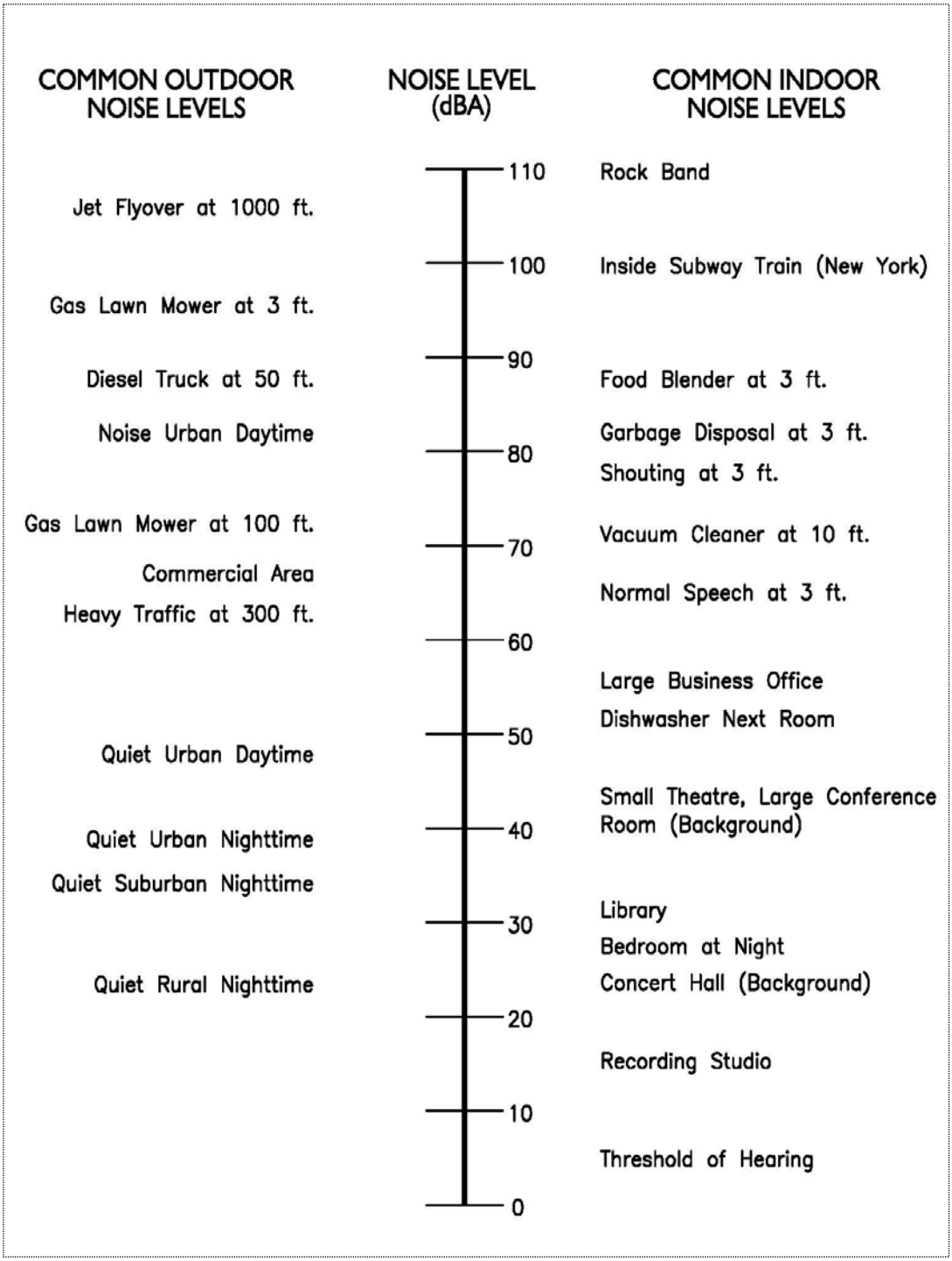
The dBA level which, if it lasted for one (1) second, would produce the same A-weighted sound energy as the actual event.

## 2.7 Sound Propagation

As sound propagates from a source it spreads geometrically. Sound from a small, localized source (i.e., a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates at a rate of 6 dB per doubling of distance. The movement of vehicles down a roadway makes the source of the sound appear to propagate from a line (i.e., line source) rather than a point source. This line source results in the noise propagating from a roadway in a cylindrical spreading versus a spherical spreading that results from a point source. The sound level attenuates for a line source at a rate of 3 dB per doubling of distance.

As noise propagates from the source, it is affected by the ground and atmosphere. Noise models use hard site (reflective surfaces) and soft site (absorptive surfaces) to help calculate predicted noise levels. Hard site conditions assume no excessive ground absorption between the noise source and the receiver. Soft site conditions such as grass, soft dirt or landscaping attenuate noise at an additional rate of 1.5 dB per doubling of distance. When added to the geometric spreading, the excess ground attenuation results in an overall noise attenuation of 3 dB per doubling of distance for a line source and 6.0 dB per doubling of distance for a point source.

**Figure 1**
**Typical Sound Levels from Indoor and Outdoor Noise Sources[2]**




[2] Source: AASHSTO. 1993. Guide on Evaluation and Abatement of Traffic Noise

## 2.8 Vibration Descriptors

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels, damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration and only exists indoors since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

Several different methods are used to quantify vibration amplitude.

*PPV*

Known as the peak particle velocity (PPV) which is the maximum instantaneous peak in vibration velocity, typically given in inches per second.

*RMS*

Known as the root mean squared (RMS) can be used to denote vibration amplitude.

*VdB*

A commonly used abbreviation to describe the vibration level (VdB) for a vibration source.

## 2.9 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Outdoor sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration. To counter the effects of ground-borne vibration, the Federal Transit Administration (FTA) has published guidance relative to vibration impacts. According to the FTA, fragile buildings can be exposed to ground-borne vibration levels of 0.3 inches per second without experiencing structural damage.

## 2.10 Vibration Propagation

There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wavefront, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wavefront. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wavefront. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

## 2.11 Construction Related Vibration Level Prediction[3]

Operational activities are separated into two different categories. The vibration can be transient or continuous in nature. Each category can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of the project area site respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. The thresholds from Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, in the table below provide general guidelines as to the maximum vibration limits for when vibration becomes potentially annoying.

[3] Caltrans Transportation and Construction Vibration Guidance Manual, April 2020

**Table 3**
**Vibration Annoyance Potential Criteria**

| Human Response | PPV (in/sec) | |
|---|---|---|
| | Transient Sources | Continuous/Frequent Intermittent Sources |
| Barely perceptible | 0.04 | 0.01 |
| Distinctly perceptible | 0.25 | 0.04 |
| Strongly perceptible | 0.90 | 0.10 |
| Severe | 2.00 | 0.40 |

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

The Caltrans Transportation and Construction Vibration Guidance Manual, April 2020 provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts. The table below provides general vibration damage potential thresholds:

**Table 4**
**Vibration Damage Potential Threshold Criteria**

| Structure and Condition | PPV (in/sec) | |
|---|---|---|
| | Transient Sources | Continuous/Frequent Intermittent Sources |
| Extremely fragile historic buildings ruin ancient monuments | 0.12 | 0.08 |
| Fragile buildings | 0.20 | 0.10 |
| Historic and some old buildings | 0.50 | 0.25 |
| Older residential structures | 0.50 | 0.30 |
| New residential structures | 1.00 | 0.50 |
| Modern industrial/commercial buildings | 2.00 | 0.50 |

Soil conditions have an impact on how vibration propagates through the ground. The Caltrans Transportation and Construction Vibration Guidance Manual, April 2020 provides suggested "n" values based on soil class. The table below outlines the manual's suggested values and description.

**Table 5**
**Suggested "n" Values Based on Soil Classes**

| Soil Class | Description of Soil Material | Suggested Value of "n" |
|---|---|---|
| I | Weak or soft soils: loose soils, dry or partially saturated peat and muck, mud, loose beach sand, and dune sand. | 1.4 |
| II | Most sands, sandy clays, silty clays, gravel, silts, weathered rock. | 1.3 |
| III | Hard soils: densely compacted sand, dry consolidated clay, consolidated glacial till, some exposed rock. | 1.1 |
| IV | Hard, component rock: bedrock, freshly exposed hard rock. | 1.0 |

# 3.0 Regulatory Setting

The proposed project is located in the City of Perris and noise regulations are imposed by state and local government agencies. The applicable noise regulations are discussed below.

## 3.1 State of California Noise Regulations

The State of California's *2022 Green Building Standards Code Title 24, Part 11* contains mandatory measures for nonresidential building construction in Section 5.507 on Environmental Comfort. These noise standards are applied to new construction in California for controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when non-residential structures are developed in areas where the exterior noise levels exceed 65 dBA CNEL, such as within a noise contour of an airport, freeway, railroad, and other areas where noise contours are not readily available. If the development falls within an airport or freeway 65 dBA CNEL noise contour, the combined sound transmission class (STC) rating of the wall and roof-ceiling assemblies must be at least 50. For those developments in areas where noise contours are not readily available and the noise level exceeds 65 dBA Leq for any hour of operation, a wall and roof-ceiling combined STC rating of 45, and exterior windows with a minimum STC rating of 40 are required (Section 5.507.4.1).

## 3.2 City of Perris Noise Regulations

The City of Perris outlines their noise regulations and standards within the General Plan Noise Element and the Municipal Code Chapter 7.34 – Noise Control.

For purposes of this analysis, the City of Perris's noise element is used to evaluate the project's noise/land use compatibility and ensure the project is consistent with the established plans, policies and programs for noise control within the City. The Perris Municipal Code Chapter 7.34 are provided in Appendix A.

### 3.2.1 General Plan Noise/Land Use Compatibility

The City of Perris General Plan Noise Element has adopted the land use compatibility standards prepared by the State of California Department of Health. The standards are used by the City to identify normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable noise levels for siting various new land uses. Table

6 shows the State of California Department of Health noise/land use compatibility guidelines for the land uses on and adjacent to the project.

**Table 6**
**Noise/Land Use Compatibility Guidelines[1]**

| Land Use Category | Noise Limit (dBA CNEL)[2] | | | |
|---|---|---|---|---|
| | Normally Acceptable | Conditionally Acceptable | Normally Unacceptable | Clearly Unacceptable |
| Residential – Low-Density Single-Family, Duplex, Mobile Homes | < 60 | 60 - 65 | 65 – 75 | > 75 |
| Industrial, Manufacturing Utilities, Agriculture | < 70 | 70 – 80 | > 80 | -- |

[1] Source: City of Perris General Plan Noise Element, Exhibit N-1: Land Use/Noise Compatibility Guidelines.

[2] Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Conditionally Acceptable: New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.

Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.

Clearly Unacceptable: New construction or development should generally not be undertaken.

### 3.2.2 Municipal Code Noise Standards

*Exterior Noise Standards*

Table 7 shows the City of Perris's Residential Noise Standards, as established in Section 7.34.040 of the City's Municipal Code. Per the Municipal Code, it is unlawful for any person to willfully make, cause or suffer, or permit to be made or caused, any loud excessive or offensive noises or sounds which unreasonably disturb the peace and quiet of any residential neighborhood or which are physically annoying to persons of ordinary sensitivity or which are so harsh, prolonged or unnatural or unusual in their use, time or place as to occasion physical discomfort to the inhabitants of the city, or any section thereof.

The City's Municipal Code Chapter 7.34 is provided in Appendix A.

**Table 7**
**City of Perris Residential Noise Standards ($L_{max}$)**

| Location | Time Period | Maximum Noise Level |
|---|---|---|
| Exterior | Daytime (7:00 a.m. – 10:00 p.m.) | 80 dBA |
| | Nighttime (10:00 p.m. – 7:00 a.m.) | 60 dBA |

*Construction Noise Regulation:*

Section 7.34.060 – Construction Noise of the City's Municipal Code states that the following activities shall be prohibited[4]:

> *It is unlawful for any person between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on a legal holiday, with the exception of Columbus Day and Washington's birthday, or on Sundays to erect, construct, demolish, excavate, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise. Construction activity shall not exceed 80 dBA [$L_{max}$] in residential zones in the City.*

Furthermore, Municipal Code Section 18.63 – Enumeration of Prohibited Noises exempts noise associated with construction and repair work so long as these activities occur only on weekdays between the hours of 7:00 a.m. and 6:00 p.m.

[4] Source: City of Perris Municipal Code (Code 1972, § 7.34.060; Ord. No. 1082, §2(part), 2000)

# 4.0 Study Method and Procedures

The following section describes the measurement procedures, measurement locations, and noise modeling procedures and assumptions used in the noise analysis.

## 4.1 Measurement Procedures and Criteria

Noise measurement is taken to determine the existing noise levels. A noise receiver or receptor is any location in the noise analysis in which noise might produce an impact. The following criteria are used to select measurement locations and receptors:

- Locations expected to receive the highest noise impacts, such as the first row of houses
- Locations that are acoustically representative and equivalent of the area of concern
- Human land usage
- Sites clear of major obstruction and contamination

RK conducted the sound level measurement in accordance with Caltrans technical noise specifications. All measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (ANSI S1.4: Specification for Sound Level Meter, 1983)

A Piccolo-II Type 2 integrating-averaging level meter was used to conduct long-term (24-hour) noise measurement at the project site and property boundaries.

The Leq, Lmin, Lmax, L2, L8, L25, and L50 statistical data were recorded over the measurement time period intervals and the information was utilized to define the noise characteristics for the project. The following gives a brief description of the Caltrans Technical Noise Supplement procedures for sound level measurement:

- Microphone for sound level meter was placed five (5) feet above the ground for long-term noise measurement
- Sound level meter was calibrated before and after each measurement
- Following the calibration of equipment, a windscreen was placed over the microphone
- Frequency weighting was set on "A" and slow response
- Temperature and sky conditions were observed and documented

Appendix B includes photos, field sheets, and measured noise data.

## 4.2 Stationary Noise Modeling

On-site stationary noise sources were analyzed using SoundPLAN™ noise modeling software. SoundPLAN™ is a standards-based program that incorporates more than twenty national and international noise modeling guidelines. This project consists of parking lot noise and stationary noise sources which are classified under industrial sources.

Projected noise levels from SoundPLAN™ are based on the following key parameters:

- Developing three-dimensional noise models of the project,
- Predicting the project noise levels at the selected community locations and
- Comparing the predicted noise with the existing community ambient noise levels at the receptor locations.

The sides of the buildings, walls, etc. were modeled as reflective surfaces and also as diffractive bodies. The noise sources are shown as red spheres (point sources) and red surfaces (area sources). A light blue line outlines the perimeter of each operation. The surrounding roads are displayed as grey surfaces.

Most of the ground within the project site and adjacent areas are covered with paved surfaces and field grass and will be run as a hard site to be conservative (Ground Factor=0). The Effective Flow Resistivity for field grass is SoundPLAN default. The elevation profile for the project site is derived from Google Earth and all the receptors are placed at 5 foot above the ground level.

*Sound Power and Sound Pressure Level*

Sound power level is the acoustic energy emitted by a source which produces a sound pressure level at some distance. While the sound power level of a source is fixed, the sound pressure level depends upon the distance from the source and the acoustic characteristics of the area in which it is located.

SoundPLAN requires that the source noise level be input using sound power level and which must be back calculated based on a measured sound pressure level. The sound power level is calculated using SoundPLAN software by calibrating the source noise level to equal the sound pressure level at an equal distance from the source in which the referenced measurement was taken.

### 4.2.1 HVAC Equipment Noise

Future noise levels of on-site HVAC units are determined by using referenced noise levels obtained by RK. These referenced noise levels represent the noise produced by a typical industrial/commercial grade HVAC unit. On-site HVAC units are expected to be located on the south side of the building and are expected to be shielded from the line of sight of the nearest sensitive receptors.

Table 8 indicates the referenced noise levels used for on-site HVAC units.

**Table 8**
**HVAC Referenced Noise Levels ($L_{max}$)**

| Noise Source | Noise Levels (dBA) |
|---|---|
| HVAC Equipment[1] | 101.5 |

[1] Referenced noise levels are representative of a single unit.

To estimate the future noise levels during typical operational conditions, referenced noise levels are input into SoundPLAN and projected to the nearest sensitive receptor locations. Adjusted noise levels are based on the distance of the receptor location relative to the noise source, local topography, and physical barriers, including buildings and sound walls. The noise levels are based on the assumption that the HVAC units operate continuously during both daytime and nighttime hours, when in reality they will only run intermittently throughout the day.

### 4.2.2 Truck Loading Activity Noise

Future noise levels of truck loading activity are determined by using referenced noise levels obtained by RK. Loading dock noise would occur from trucks entering and exiting the site, idling, exhaust, and the use of back-up beepers and air brakes. Loading and unloading noise would occur at a designated loading area near the southern side of the proposed warehouse building.

Table 9 indicates the referenced noise levels for on-site truck loading noise sources.

**Table 9**
**Truck Loading Activity Referenced Noise Levels ($L_{max}$)**

| Noise Source | Noise Levels (dBA) |
|---|---|
| Truck Loading Activity | 101.8 |

To estimate the future noise levels during typical operational conditions, noise levels are input into SoundPLAN and projected to the nearest sensitive receptor locations. Adjusted noise levels are based on the distance of the receptor location relative to the noise source, local topography, and physical barriers including buildings and sound walls. The noise levels are based on the assumption that loading dock activity will occur during both daytime and nighttime hours.

### 4.2.3 Parking Lot Noise

Parking lot noise would occur from vehicles and trucks entering and exiting the site, idling, exhaust, loading and delivery activities, doors slamming, tires screeching, people talking, and the occasional horn honking. Parking lot noise would occur throughout the site and is assessed by using referenced noise levels in the SoundPLAN model. Parking lot noise is based on the type of vehicle and number of movements per hour. Referenced noise levels for parking lot activities are based on the SoundPLAN™ standard *Parkplatzlärmstudie 2007*. Key inputs for parking lot noise include size of area source, number of movements per hour, type of vehicles, and number of parking spaces within each lot.

To estimate the future noise levels during typical operational conditions, referenced noise levels are input into SoundPLAN and projected to the nearest sensitive receptor locations. Adjusted noise levels are based on the distance of the receptor location relative to the noise source, local topography and physical barriers including buildings and sound walls.

## 4.3 Construction Noise Modeling

The construction noise analysis utilizes the Federal Highway Administration (FHWA) Roadway Construction Noise Model, together with several key construction parameters. Key inputs include distance to the sensitive receiver, equipment usage, and baseline parameters for the project site. This study evaluates the potential exterior noise impacts during each phase of construction. Noise levels were projected from the nearest project boundary to the nearest sensitive receptor property line.

- Construction phasing and equipment usage assumptions are referenced from the *Patterson Business Center AQ & GHG Impact Study, by RK Engineering Group.*

## 4.4 Construction Vibration Modeling

The construction vibration assessment is based on the methodology set-forth within the Caltrans Transportation and Construction Induced Vibration Guidance Manual. The vibration impacts from vibratory rollers and compactors, heavy truck loading and bulldozer activity is analyzed. All vibratory activity is analyzed as a continuous and/or frequent event and is required to comply with the applicable guidance thresholds criteria. It is expected that vibration levels will be highest during paving phase. No impact pile driving is expected as part of this project.

Vibratory impacts were calculated from the site area property line to the closest sensitive receptors and structures using the reference vibration levels, soil conditions and the reference equation *PPV= PPV ref (25/D)^n (in/sec)* (from Caltrans Manual) where:

PPV = reference measurement at 25 feet from vibration source
D = distance from equipment to property line
n= vibration attenuation rate through ground (n=1.1 was utilized for this study)

# 5.0 Existing Noise Environment

The existing noise environment for the project site and surrounding areas has been established based on noise measurement data collected by RK. Noise measurement data indicates that the ambient noise consist of environmental noise includes noise from traffic noise propagating from the adjacent roadways, existing March Air Reserve Base activity noise, as well as activities from the surrounding properties are the main sources of ambient noise at the project site and surrounding area.

## 5.1 24-Hour Noise Measurement Results

In order to establish the ambient noise environment, RK conducted one (1) 24-hour noise measurement at the project study area.

Noise levels were measured on February 17, 2022 using a Piccolo-II Type 2 integrating-averaging sound level meter. The information was utilized to establish the noise characteristics of the existing ambient environment.

The noise monitoring location was selected based on the proximity and location to adjacent sensitive receptors. Exhibit C graphically illustrates the location of the long-term measurement.

- Noise measurement was taken at the northeast corner of the project site at approximately 5 feet from the northern property line and approximately 35 feet from the centerline of the Patterson Avenue.

Noise monitoring location represent the existing ambient noise levels near the adjacent noise sensitive land uses and the project site. As previously explained, there are existing non-conforming residential dwelling units located to the northeast of the project site and as shown in Table 10, the existing ambient noise levels at the project site and the surrounding uses are exceeding the City of Perris Residential exterior standards of 65 dBA.

Appendix B includes photographs, field sheets and measured noise data.

Noise measurement is summarized in Table 10 below.

## Table 10
## 24-Hour Noise Measurement Results[1]

| Time | Leq (dBA) | Time | Leq (dBA) |
|---|---|---|---|
| 12:00 AM | 52.3 | 12:00 PM | 65.1 |
| 1:00 AM | 52.0 | 1:00 PM | 60.3 |
| 2:00 AM | 54.3 | 2:00 PM | 60.0 |
| 3:00 AM | 57.3 | 3:00 PM | 69.9 |
| 4:00 AM | 53.8 | 4:00 PM | 51.6 |
| 5:00 AM | 56.4 | 5:00 PM | 51.0 |
| 6:00 AM | 60.0 | 6:00 PM | 58.5 |
| 7:00 AM | 72.3 | 7:00 PM | 52.6 |
| 8:00 AM | 59.0 | 8:00 PM | 55.5 |
| 9:00 AM | 67.9 | 9:00 PM | 58.3 |
| 10:00 AM | 63.5 | 10:00 PM | 56.3 |
| 11:00 AM | 74.8 | 11:00 PM | 54.6 |
| **24-Hour CNEL** | | | **66.7** |

[1] Measurement was taken at the northeast corner of the project site at approximately 5 feet from the northern property line and approximately 35 feet from the centerline of the Patterson Avenue and was recorded on 02/17/2022.

# 6.0 Operational Noise Impacts

This assessment analyzes the anticipated noise levels generated by the project and changes in ambient noise levels. The main sources of noise generated by the project would include on-site operational activities from HVAC equipment noise, truck loading activity, and parking lot activities noise.

Due to the presence of the existing non-conforming residential dwelling units located to the northeast of the project site at approximately 110 feet, noise level impacts are compared to the City of Perris residential noise standards.

The project must demonstrate that noise levels generated by the project site would not be in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

## 6.1 Project Operational Noise Impacts

Project operational activities are analyzed for long-term noise impacts associated with the day-to-day operation of the project. This analysis takes into account of the proposed eight (8) foot noise barrier wall along the southern property line, extending 100 feet in linear length to the west from the southeastern truck entry gate.

HVAC equipment will be located on the roof top of the office building area located to the southeast and southwest corner of the proposed warehouse building. All HVAC equipment are expected to be shielded from the line of sight from the nearest residential sensitive receptors to the northeast.

The project is expected to consist of twenty-two (22) loading docks. The noise analysis conservatively analyzes trucks loading and unloading activities operating during both daytime and nighttime hours. The truck loading and unloading activities are expected to occur on the southern side of the proposed warehouse building and are expected to be shielded from the line of sight of the nearest residential sensitive receptors.

Parking lot activities noise would occur from vehicle engine idling and exhaust, doors slamming, tires screeching, people talking, and the occasional horn honking. The parking lot noise would occur along the eastern side of the project site. All trucks are expected to take access on the southeast driveway.

To be conservative, the noise analysis assumes all stationary noise sources to be in operation during both daytime and nighttime hours.

SoundPLAN calculation worksheets are shown in Appendix C.

*Stationary Source Noise Impacts*

The results of the daytime and nighttime noise impact analysis are shown in Table 11. The noise analysis considers all project noise sources operating simultaneously during both daytime and nighttime hours at the nearest sensitive receptors.

**Table 11**
**Stationary Noise Impact Analysis – Residential**

| | Source | Noise Level (dBA) | |
|---|---|---|---|
| | | $L_{max}$ Daytime | $L_{max}$ Nighttime |
| City of Perris | HVAC-1 | 28.3 | 28.3 |
| | HVAC-2 | 40.0 | 40.0 |
| | Truck Loading Activities | 33.4 | 33.4 |
| | Parking Lot Activities | 39.0 | 38.0 |
| | **Total Combined Project Noise Level** | **43.2** | **42.8** |
| | Existing Ambient Measurement[1] | 73.0 | 67.0 |
| | Total Combined (Existing + Project) Exterior Noise Level | 73.0 | 67.0 |
| | **Change in Noise Levels** | **0.0** | **0.0** |
| | City of Perris Noise Level Criteria | 80.0 | 60.0 |
| | **Noise Level Exceeds Standard (?)** | **No** | **No** |

[1] Lowest measured existing hourly $L_{max}$.

Based on the results of this analysis, noise levels generated by the project is not expected to exceed the City's daytime or nighttime noise standards at the nearest residential property lines.

## 6.2 Roadway Noise Impacts

The project is not expected to cause a substantial increase in ambient noise levels in the vicinity of the site as a result of increased traffic. Typically, it takes a doubling of traffic along a roadway to cause a significant increase in ambient noise levels of more than 3 dBA. Based on traffic count data collected in 2021 at the intersection of Patterson Avenue and Harley Knox Boulevard, traffic volumes along Patterson Avenue in the vicinity of the site are approximately 700 average daily trips (ADT). The *5030 Patterson Avenue Industrial Project Trip Generation & Access Analysis & VMT Screening Study, City of Perris, California (DPR-22-00013)*, conducted by MAT Engineering, Inc., states that the proposed project is only expected to generate a total of 162 ADT. The relatively small amount of traffic added by the project in comparison to existing conditions of the adjacent roadway network would not be significant.

Furthermore, the project is located at an industrial-zoned site, and the surrounding adjacent land uses are zoned as industrial as well. Hence, noise levels resulting from project-related roadway activity is expected to be compatible with surrounding land uses.

Therefore, it is reasonable to conclude that the project would not result in a significant permanent increase in ambient noise levels in the vicinity of the site as a result of increased traffic volumes along adjacent roadways.

## 6.3 March Air Reserve Base Airport

The March Air Reserve Base / Inland Port Airport (MARB/IPA) Land Use Compatibility Plan (MARB/IPA ALUCP) was prepared for and adopted by the Riverside County Airport Land Use Commission (ALUC) in November 13, 2014. The ALUC adopted the Riverside County Airport Land Use Compatibility Plan (ALUCP) Policy Document, which establishes land use, noise and safety policies in the vicinity of airports throughout Riverside County, including compatibility criteria and maps for the influence areas of individual airports.

MARB/IPA is located approximately four hundred feet to the east of the project site. A noise/land use compatibility assessment has been performed based on the project's location to MARB/IPA.

The project site is located within Zone B2 (70 dB Ldn to 75 dB Ldn) noise contour limit; therefore, office space must have sound attenuation features sufficient to reduce the exterior aviation-related noise level to no more than CNEL 45 dB.

## 6.4 Future Interior Noise

A preliminary interior noise analysis has been performed for the office buildings within the project using a typical "windows open" and "windows closed" condition. A "windows open" condition assumes 12 dBA of noise attenuation from the exterior noise level. A "windows closed" condition" assumes 20 dBA of noise attenuation from the exterior noise level.

California standard building shell and windows designs are not expected to provide adequate attenuation to meet interior noise standards with a window open and windows closed condition.

Table 12 indicates the future interior noise levels.

**Table 12**
**Future Interior Noise Levels (dBA CNEL)[1]**

| Source | Exterior Façade Study Location | Exterior Noise Level at Façade[3] | Required Interior Noise Reduction | Interior Noise Level w/Standard Windows (STC ~ 25) | | STC Rating |
|---|---|---|---|---|---|---|
| | | | | "Windows Open" [1] | "Windows Closed" [2] | |
| March Air Reserve Base | Office Use | 75.0 | 30 | 63.0 | 55.0 | 33 |

[1] A minimum of 12 dBA noise reduction is assumed with the "windows open" condition.
[2] A minimum of 20 dBA noise reduction is assumed with the "windows closed" condition.
[3] Exterior noise Standards are based on the March Air Reserve Base Land Use Compatibility Plan Zone B2 noise limits.

## 6.5 Operational Design Features

The following recommended project design features include standard rules and requirements, best practices and recognized design guidelines for reducing noise levels. Design features are assumed to be part of the conditions of the project and integrated into its design:

**DF-1** All rooftop mounted HVAC mechanical equipment shall be fully shielded from the line of sight of adjacent properties behind a parapet wall or other screening walls.

**DF-2** All interior office space within the project must have sound attenuation features sufficient to reduce the exterior aviation-related noise level to no more than CNEL 45 dB.

# 7.0 Construction Noise and Vibration Impacts

Temporary construction noise and vibration impacts have been assessed from the project site to the surrounding adjacent land uses. The degree of construction noise will vary depending on the type of construction activity taking place and the location of the activity relative to the surrounding properties.

The City of Perris Municipal Code, Section 7.34.060 regulates construction noise within City boundaries. Section 7.34.060 states the following:

> *It is unlawful for any person between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on a legal holiday, with the exception of Columbus Day and Washington's birthday, or on Sundays to erect, construct, demolish, excavate, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise. Construction activity shall not exceed 80 dBA [Lmax] in residential zones in the City.*

This assessment analyzes potential noise impacts during all expected phases of construction, including site preparation, grading, building construction, paving, and architectural coating.

Construction phasing and equipment usage assumptions are referenced from the *Patterson Business Center Air Quality and Greenhouse Gas Analysis, City of Perris, by RK Engineering Group.*

## 7.1 Typical Construction Noise Levels

Table 13 shows typical construction noise levels compiled by the Environmental Protection Agency (EPA) for common type construction equipment. Typical construction noise levels are used to estimate potential project construction noise levels at the adjacent sensitive receptors.

**Table 13**
**Typical Construction Noise Levels[1]**

| Type | Noise Levels (dBA) at 50 Feet |
|---|---|
| Earth Moving | |
| Compactors (Rollers) | 73 - 76 |
| Front Loaders | 73 - 84 |
| Backhoes | 73 - 92 |
| Tractors | 75 - 95 |
| Scrapers, Graders | 78 - 92 |
| Pavers | 85 - 87 |
| Trucks | 81 - 94 |
| Materials Handling | |
| Concrete Mixers | 72 - 87 |
| Concrete Pumps | 81 - 83 |
| Cranes (Movable) | 72 - 86 |
| Cranes (Derrick) | 85 - 87 |
| Stationary | |
| Pumps | 68 - 71 |
| Generators | 71 - 83 |
| Compressors | 75 - 86 |
| Impact Equipment | |
| Pneumatic Wrenches | 82 - 87 |
| Jack Hammers, Rock Drills | 80 - 99 |
| Pile Drivers (Peak) | 95-105 |
| Other | |
| Vibrators | 68 - 82 |
| Saws | 71 - 82 |

[1] Referenced Noise Levels from the Environmental Protection Agency (EPA)

## 7.2 Construction Noise Impact Analysis

Noise levels are calculated based on an average distance of equipment to the nearest adjacent property. The project's estimated construction noise levels have been calculated using the Federal Highway Administration Roadway Construction Noise Model Version 1.1.

The nearest residential use to the project site is located approximately 110 feet from the project's northeastern property line. Construction noise levels have been modeled at 110 feet from the nearest project boundary to the nearest residential property line. Noise levels

associated with the two loudest pieces of equipment have been added for a conservative assessment of impacts.

Table 12 shows the worst-case noise level impacts at the adjacent residential homes. Construction noise calculation worksheets are provided in Appendix D.

**Table 14**
**Project Construction Noise Levels**

| Phase | Equipment | Quantity | Equipment Noise Level at 110ft (dBA $L_{max}$) | Maximum Noise Level (dBA $L_{max}$)[1] |
|---|---|---|---|---|
| **Site Preparation** | Rubber Tired Dozers | 3 | 74.9 | 77.2 |
| | Tractors/Loaders/Backhoes | 4 | 77.2 | |
| **Grading** | Excavators | 1 | 73.9 | 78.2 |
| | Graders | 1 | 78.2 | |
| | Rubber Tired Dozers | 1 | 74.9 | |
| | Tractors/Loaders/Backhoes | 3 | 77.2 | |
| **Building Construction** | Cranes | 1 | 73.7 | 77.2 |
| | Forklifts | 3 | 68.2 | |
| | Generator Sets | 1 | 73.8 | |
| | Tractors/Loaders/Backhoes | 3 | 77.2 | |
| | Welders | 1 | 67.2 | |
| **Paving** | Cement and Mortar Mixer | 2 | 72.0 | 77.2 |
| | Pavers | 1 | 70.4 | |
| | Paving Equipment | 2 | 70.4 | |
| | Rollers | 2 | 73.2 | |
| | Tractors/Loaders/Backhoes | 1 | 77.2 | |
| **Architectural Coating** | Air Compressors | 1 | 70.8 | 70.8 |
| Worst-Case Construction Phase Noise Level - Lmax (dBA) | | | | 78.2 |
| City of Perris Construction Noise Threshold | | | | 80.0 |
| Potential significant impact (Yes / No) | | | | No |

[1] Maximum noise level at the property line from one piece of equipment.

As shown in Table 14, the project is expected to reach a maximum noise level of 78.2 dBA $L_{max}$ during the grading phase of construction, which is less than the 80 dBA $L_{max}$ noise

standard in the City of Perris. Hence, the project will result in a less than significant impact during construction.

To help further reduce construction noise impacts, the project will be required to implement the following measures from the PVCCSP EIR.

**MM Noise 1:** During all project site excavation and grading on-site, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturer's standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the project site.

**MM Noise 2:** During construction, stationary construction equipment, stockpiling and vehicle staging areas will be placed a minimum of 446 feet away from the closest sensitive receptor.

**MM Noise 3:** No combustion-powered equipment, such as pumps or generators, shall be allowed to operate within 446 feet of any occupied residence unless the equipment is surrounded by a noise protection barrier.

**MM Noise 4:** Construction contractors of implementing development projects shall limit haul truck deliveries to the same hours specified for construction equipment. To the extent feasible, haul routes shall not pass sensitive land uses or residential dwellings.

## 7.3 Construction Vibration

To determine the vibratory impacts during construction, reference construction equipment vibration levels were utilized and then extrapolated to the façade of the nearest adjacent structures. The nearest adjacent structure is an industrial building located at approximately 35 feet to the west of the project site. All structures surrounding the project site are "new structures". No historical or fragile buildings are known to be located within the vicinity of the site.

The construction of the proposed project is not expected to require the use of substantial vibration inducing equipment or activities, such as pile drivers or blasting. The main sources of vibration impacts during construction of the project would be the operation of

equipment such as bulldozer activity during demolition, loading trucks during grading and excavation, and vibratory rollers during paving.

The construction vibration assessment utilizes the referenced vibration levels and methodology set-forth within the Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, September 2018. Table 15 shows the referenced vibration levels.

**Table 15**
**Typical Construction Vibration Levels[1]**

| Equipment | Peak Particle Velocity (PPV) (inches/second) at 25 feet | Approximate Vibration Level (LV) at 25 feet |
|---|---|---|
| Piledriver (impact) | 1.518 (upper range) | 112 |
| | 0.644 (typical) | 104 |
| Piledriver (sonic) | 0.734 upper range | 105 |
| | 0.170 typical | 93 |
| Clam shovel drop (slurry wall) | 0.202 | 94 |
| Hydro mill | 0.008 in soil | 66 |
| (slurry wall) | 0.017 in rock | 75 |
| Vibratory Roller | 0.210 | 94 |
| Hoe Ram | 0.089 | 87 |
| Large bulldozer | 0.089 | 87 |
| Caisson drill | 0.089 | 87 |
| Loaded trucks | 0.076 | 86 |
| Jackhammer | 0.035 | 79 |
| Small bulldozer | 0.003 | 58 |

[1] Transit Noise and Vibration Impact Assessment, Federal Transit Administration, September 2018.

Table 16 shows the project's construction-related vibration analysis at the nearest structures to the project construction area. Construction impacts are assessed from the closest area on the project site to the nearest adjacent structure.

**Table 16**
**Construction Vibration Impact Analysis**

| Construction Activity | Distance to Nearest Structure (ft) | Duration | Calculated Vibration Level - PPV (in/sec) | Damage Potential Level |
|---|---|---|---|---|
| Large Bulldozer | 35 | Continuous/Frequent | 0.061 | Extremely fragile historic buildings, ruins, ancient monuments |
| Vibratory Roller | 35 | Continuous/Frequent | 0.145 | Fragile buildings |
| Loaded Trucks | 35 | Continuous/Frequent | 0.052 | Extremely fragile historic buildings, ruins, ancient monuments |

As shown in Table 16, project related construction activity is not expected to cause any potential damage to the nearest structures as no historical or fragile buildings are known to be located within the vicinity of the site.

Construction vibration calculation worksheets are shown in Appendix D.

# Exhibits

Exhibit A

# Location Map


**Legend:**

= Project Site Boundary

= Project Site

= Sensitive Receptor Location

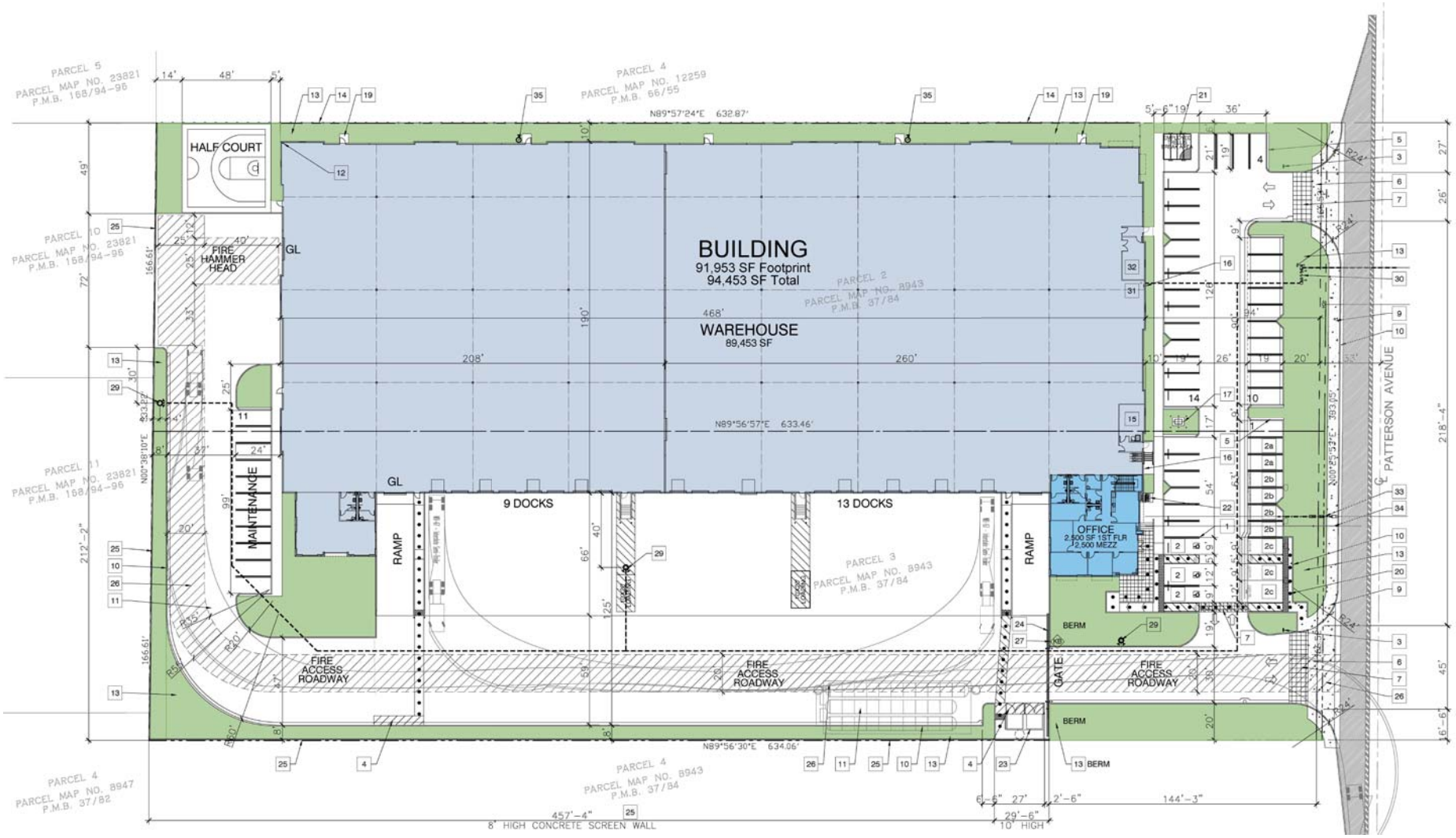
N



RK engineering group, inc.

Exhibit B

# Site Plan




N



RK engineering group, inc.

Exhibit C

# Noise Monitoring Locations

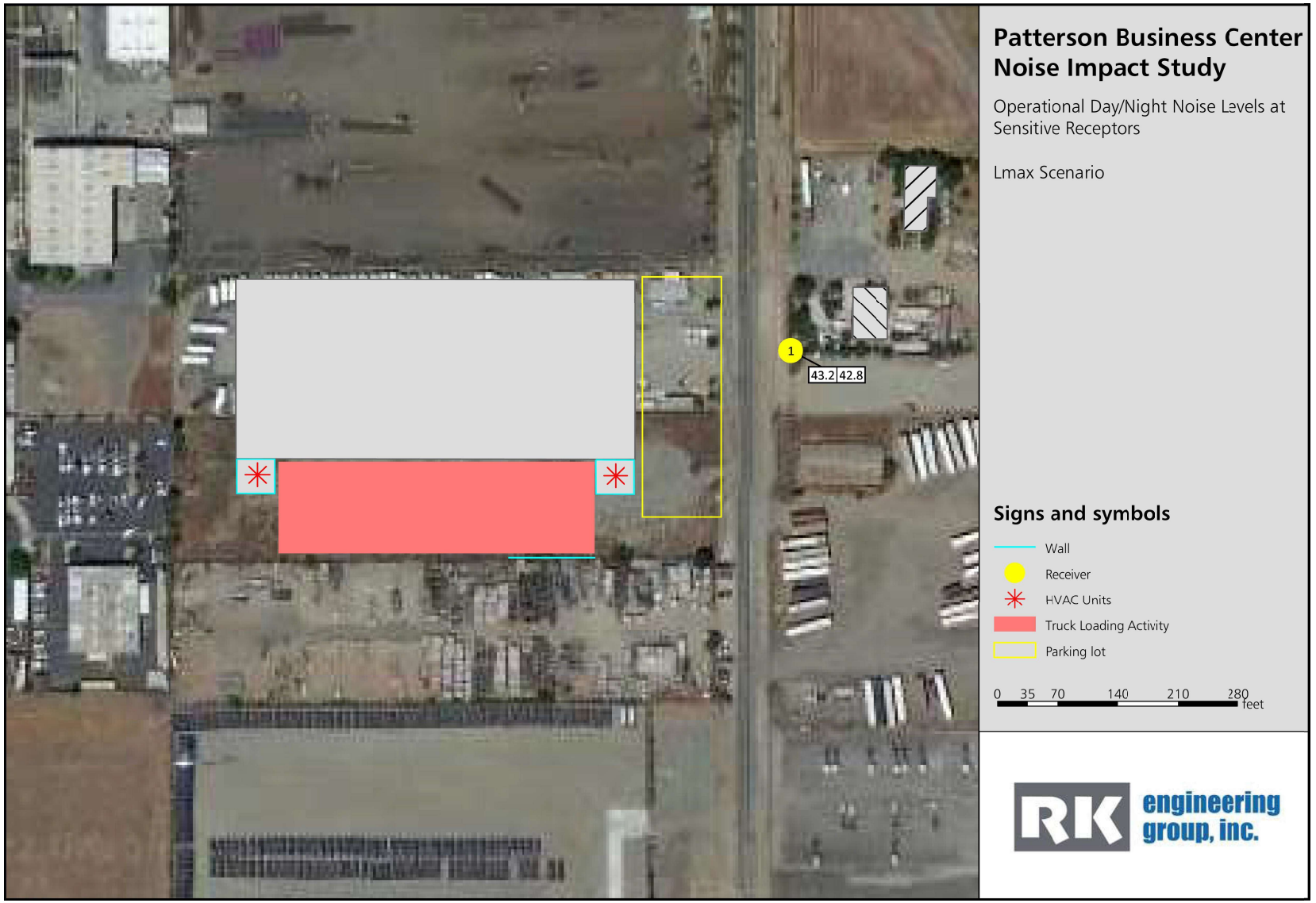

**Legend:**

L-1 = Noise Monitoring Location

N

Exhibit D

# Operational Day/Night Noise Levels (dBA)




N

Exhibit E

# Operational Noise Contours - Daytime

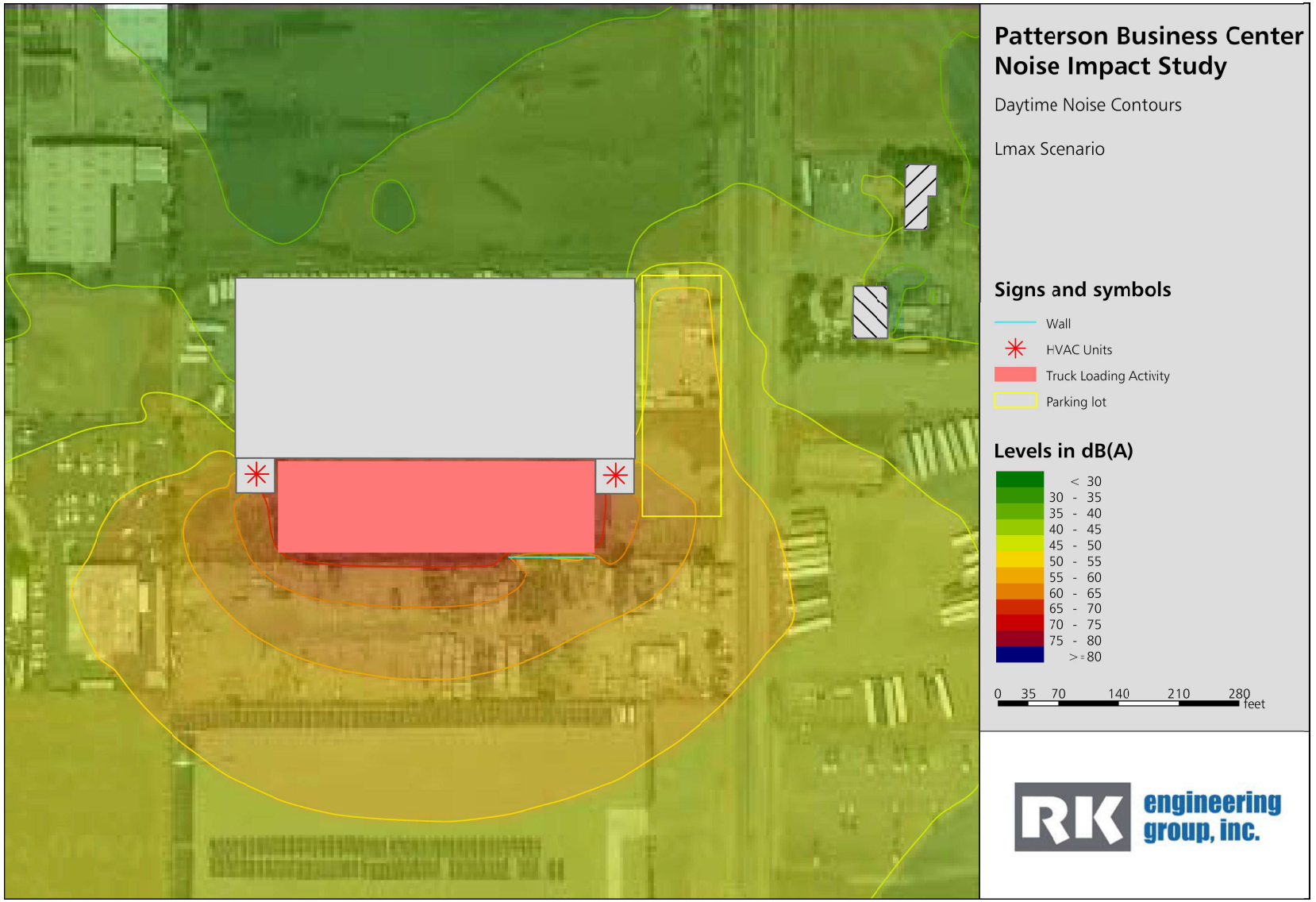



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Exhibit F

# Operational Noise Contours - Nighttime


N

# Appendices

# Appendix A

City of Perris
Municipal Code Noise Control

CHAPTER 7.34. - NOISE CONTROL

Sec. 7.34.010. - Declaration of policy.

Excessive noise levels are detrimental to the health and safety of individuals. Noise is considered a public nuisance, and the city discourages unnecessary, excessive or annoying noises from all sources. Creating, maintaining, causing, or allowing to be created, caused or maintained, any noise or vibration in a manner prohibited by the provisions of the ordinance codified in this chapter is a public nuisance and shall be punishable as a misdemeanor.

(Code 1972, § 7.34.010; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.020. - Definitions.

(a) *General.* The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

*Ambient noise* means the all-encompassing noise associated with a given environment usually being composed of sounds from many sources near and far. For the purpose of this chapter, ambient noise level is the level obtained when the noise level is averaged over a period of five minutes without inclusion of noise from isolated identifiable sources at the location and time of day near that at which a comparison is to be made.

*Decibel (dB)* means an intensity unit which denotes the ratio between two quantities which are proportional to power; the number of decibels corresponding to the ratio is ten times the common logarithm of this ratio.

*Sound amplifying equipment* means any machine or device for the amplification of the human voice, music or any other sound. The term "sound amplifying equipment" does not include standard vehicle radios when used and heard only by the occupants of the vehicle in which the vehicle radio is installed. The term "sound amplifying equipment," as used in this chapter, does not include warning devices on any vehicle used only for traffic safety purposes and shall not include communications equipment used by public or private utilities when restoring utility service following a public emergency or when doing work required to protect person or property from an imminent exposure to danger.

*Sound level* (noise level) in decibels is the value of a sound measurement using the "A" weighting network of a sound level meter. Slow response of the sound level meter needle shall be used except where the sound is impulsive or rapidly varying in nature, in which case, fast response shall be used.

*Sound level meter* means an instrument, including a microphone, an amplifier, an output meter and frequency weighting networks, for the measurement of sound levels, which satisfies the pertinent requirements in American National Standards Institute's specification S1.4-1971 or the most recent revision for type S-2A general purpose sound level meters.

(b) *Supplementary definitions of technical terms.* Definitions of technical terms not defined in this section shall be obtained from the American National Standards Institute's Acoustical Terminology S1-1971 or the most recent revision thereof.

(Code 1972, § 7.34.020; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.030. - Measurement methods.

(a) Sound shall be measured with a sound level meter as defined in section 7.34.020.

(b) Unless otherwise provided, outdoor measurements shall be taken with the microphone located at any point on the property line of the noise source but no closer than five feet from any wall or vertical obstruction and three to five feet above ground level whenever possible.

(c) Unless otherwise provided, indoor measurements shall be taken inside the structure with the microphone located at any point as follows:

(1) No less than three feet above floor level;

(2) No less than five feet from any wall or vertical obstruction; and

(3) Not under common possession and control with the building or portion of the building from which the sound is emanating.

(Code 1972, § 7.34.030; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.040. - Sound amplification.

No person shall amplify sound using sound amplifying equipment contrary to any of the following:

(1) The only amplified sound permitted shall be either music or the human voice, or both.

(2) The volume of amplified sound shall not exceed the noise levels set forth in this subsection when measured outdoors at or beyond the property line of the property from which the sound emanates.

| Time Period | Maximum Noise Level |
|---|---|
| 10:01 p.m.—7:00 a.m. | 60 dBA |
| 7:01 a.m.—10:00 p.m. | 80 dBA |

(Code 1972, § 7.34.040; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.050. - General prohibition.

(a) It unlawful for any person to willfully make, cause or suffer, or permit to be made or caused, any loud excessive or offensive noises or sounds which unreasonably disturb the peace and quiet of any residential neighborhood or which are physically annoying to persons of ordinary sensitivity or which are so harsh, prolonged or unnatural or unusual in their use, time or place as to occasion physical discomfort to the inhabitants of the city, or any section thereof. The standards for dBA noise level in section 7.34.040 shall apply to this section. To the extent that the noise created causes the noise level at the property line to exceed the ambient noise level by more than 1.0 decibels, it shall be presumed that the noise being created also is in violation of this section.

(b) The characteristics and conditions which should be considered in determining whether a violation of the provisions of this section exists should include, but not be limited to, the following:

(1) The level of the noise;

(2) Whether the nature of the noise is usual or unusual;

(3) Whether the origin of the noise is natural or unnatural;

(4) The level of the ambient noise;

(5) The proximity of the noise to sleeping facilities;

(6) The nature and zoning of the area from which the noise emanates and the area where it is received;

(7) The time of day or night the noise occurs;

(8) The duration of the noise; and

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

(Code 1972, § 7.34.050; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.060. - Construction noise.

It is unlawful for any person between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on a legal holiday, with the exception of Columbus Day and Washington's birthday, or on Sundays to erect, construct, demolish, excavate, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise. Construction activity shall not exceed 80 dBA in residential zones in the city.

(Code 1972, § 7.34.060; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.070. - Refuse vehicles and parking lot sweepers.

No person shall operate or permit to be operated a refuse compacting, processing or collection vehicle or parking lot sweeper between the hours of 7:00 p.m. to 7:00 a.m. in any residential area unless a permit has been applied for and granted by the city.

(Code 1972, § 7.34.070; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.080. - Disturbing, excessive, offensive noises; declaration of certain acts constituting.

The following activities, among others, are declared to cause loud, disturbing, excessive or offensive noises in violation of this section and are unlawful, namely:

(1) *Horns, signaling devices, etc.* Unnecessary use or operation of horns, signaling devices or other similar devices on automobiles, motorcycles or any other vehicle.

(2) *Radios, television sets, phonographs, loud speaking amplifiers and similar devices.* The use or operation of any sound production or reproduction device, radio receiving set, musical instrument, drums, phonograph, television set, loudspeakers, sound amplifier, or other similar machine or device for the producing or reproducing of sound, in such a manner as to disturb the peace, quiet or comfort of any reasonable person of normal sensitivity in any area of the city is prohibited. This provision shall not apply to any participant in a licensed parade or to any person who has been otherwise duly authorized by the city to engage in such conduct.

(3) *Animals.*

a. The keeping or maintenance, or the permitting to be kept or maintained, upon any premises owned, occupied or controlled by any person of any animal or animals which by any frequent or long-continued noise shall cause annoyance or discomfort to a reasonable person of normal sensitiveness

in the vicinity.

b. The noise from any such animal or animals that disturbs two or more residents residing in separate residences adjacent to any part of the property on which the subject animal or animals are kept or maintained, or three or more residents residing in separate residences in close proximity to the property on which the subject animal or animals are kept or maintained, shall be prima facie evidence of a violation of this section.

(4) *Hospitals, schools, libraries, rest homes, long-term medical or mental care facilities.* To make loud, disturbing, excessive noises adjacent to a hospital, school, library, rest home or long-term medical or mental care facility, which noise unreasonably interferes with the workings of such institutions or which disturbs or unduly annoys occupants in said institutions.

(5) *Playing of radios on buses and trolleys.* The operation of any radio, phonograph or tape player on an urban transit bus or trolley so as to emit noise that is audible to any other person in the vehicle is prohibited.

(6) *Playing of radios, phonographs and other sound production or reproduction devices in public parks and public parking lots and streets adjacent thereto.* The operation of any radio, phonograph, television set or any other sound production or reproduction device in any public park or any public parking lot, or street adjacent to such park or beach, without the prior written approval of the city manager or the administrator, in such a manner that such radio, phonograph, television set or sound production or reproduction device emits a sound level exceeding those found in the table in section 7.34.040.

(7) *Leaf blowers.*

a. The term "leaf blower" means any portable, hand-held or backpack, engine-powered device with a nozzle that creates a directable airstream which is capable of and intended for moving leaves and light materials.

b. No person shall operate a leaf blower in any residential zoned area between the hours of 7:00 p.m. and 8:00 a.m. on weekdays and 5:00 p.m. and 9:00 a.m. on weekends or on legal holidays.

c. No person may operate any leaf blower at a sound level in excess of 80 decibels measured at a distance of 50 feet or greater from the point of noise origin.

d. Leaf blowers shall be equipped with functional mufflers and an approved sound limiting device required to ensure that the leaf blower is not capable of generating a sound level exceeding any limit prescribed in this section.

(Code 1972, § 7.34.080; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.090. - Burglar alarms.

(a) Audible burglar alarms for structures or motor vehicles are prohibited unless the operation of such burglar alarm can be terminated within 20 minutes of being activated.

(b) Notwithstanding the requirements of this provision, any member of the county sheriff's department, Perris Division, shall have the right to take such steps as may be reasonable and necessary to disconnect any such alarm installed in any building, dwelling or motor vehicle at any time during the period of its activation. On or after 30 days from the effective date of the ordinance codified in this chapter, any building, dwelling or motor vehicle upon which a burglar alarm has been installed shall prominently display the telephone number at which communication may be made with the owner of such building, dwelling or motor vehicle.

(Code 1972, § 7.34.090; Ord. No. 1082, § 2(part), 2000)

Sec. 7.34.100. - Motor vehicles.

(a) Off-highway.

(1) Except as otherwise provided for in this chapter, it shall be unlawful to operate any motor vehicle of any type on any site, other than on a public street or highway as defined in the California Vehicle Code, in any manner so as to cause noise in excess of those noise levels permitted for on-highway motor vehicles as specified in the table for "45-mile-per-hour or less speed limits" contained in section 23130 of the California Vehicle Code and as corrected for distances set forth in subsection (a)(2) of this section.

(2) The maximum noise level as the on-highway vehicle passes may be measured at a distance of other than 50 feet from the centerline of travel, provided the measurement is further adjusted by adding algebraically the application correction as follows:

| Distance (feet) | Correction (decibels) |
|---|---|
| 25 | −6 |
| 28 | −5 |
| 32 | −4 |
| 35 | −3 |
| 40 | −2 |
| 45 | −1 |
| 50 (preferred distance) | 0 |
| 56 | +1 |
| 63 | +2 |
| 70 | +3 |
| 80 | +4 |
| 90 | +5 |

| | |
|---|---|
| 100 | +6 |

(b) Nothing in this section shall apply to authorized emergency vehicles when being used in emergency situations including the blowing of sirens and/or horns.

(Code 1972, § 7.34.100; Ord. No. 1082, § 2(part), 2000)

# Appendix B

Field Data and Photos

# Field Sheet

| | | | |
|---|---|---|---|
| **Project:** | Patterson Business Center Noise Impact Study | **Engineer:** D. Shivaiah | **Date:** 2/17/2022<br>**JN:** 2611-2022-01 |
| **Measurement Address:** | | **City:** | **Site No.:** 1 |
| 5030 Patterson Avenue | | City of Perris | |

**Sound Level Meter:**
Piccolo II
Serial # P0218042101
Serial # P0218092808
Serial # P0221010801
Serial # P0221010802

**Calibrator:**
CA114 Sound Calibrator
Serial # 500732

**Calibration Record:**

| | Input, dB/ | Cali. Date | Time |
|---|---|---|---|
| 1 | 94.0 | | |
| 2 | 94.0 | | |
| 3 | 94.0 | 01/11/2022 | 1:00 PM |
| 4 | 94.0 | | |

**Notes:**

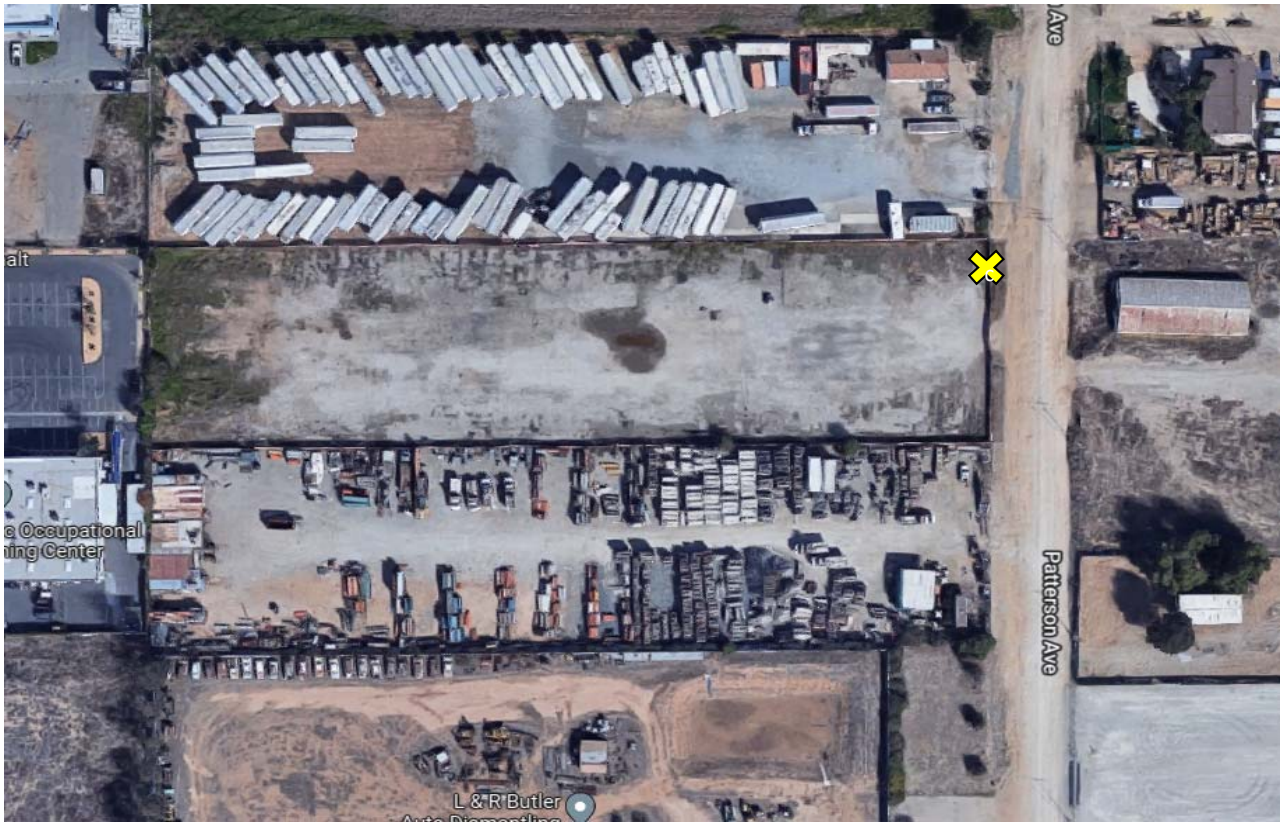
Temp: 74
Windspeed: 11 MPH
Direction: SW
Skies: Clear
Camera:
Photo Nos.

**Meter Settings:**

☒ A-WTD ☐ LINEAR ☒ SLOW ☐ 1/1 OCT ☒ INTERVALS ___60____- MINUTE
☐ C-WTD ☐ IMPULSE ☐ FAST ☐ 1/3 OCT ☒ $L_N$ PERCENTILE VALUES

**Notes:**

Measurement Type:
Long-term X
Short-term




RK engineering group, inc.

# Field Sheet - ST2 Location Photos

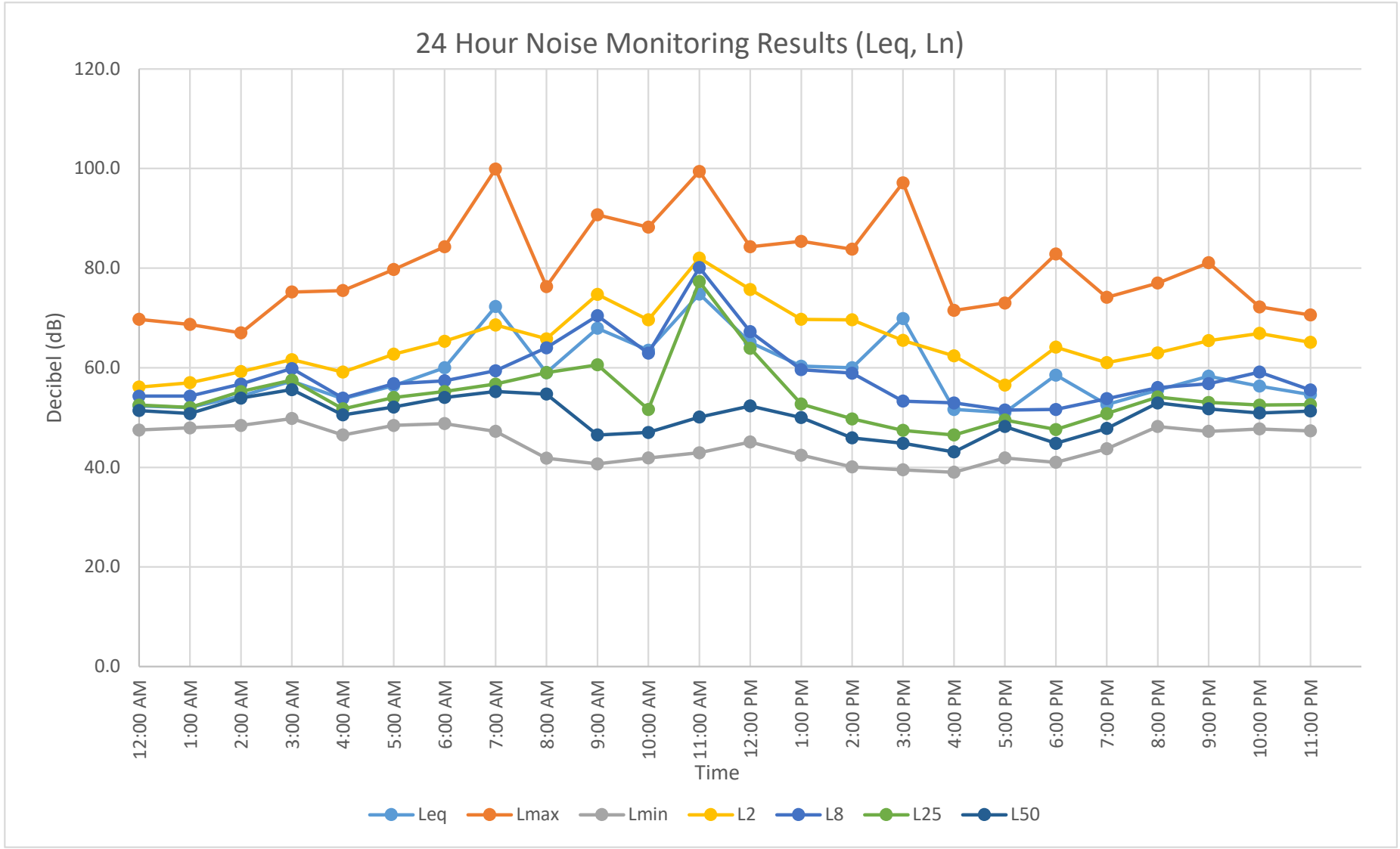
| | | | |
|---|---|---|---|
| **Project:** Patterson Business Center | **Engineer:** D. Shivaiah | **Date:** | 2/17/2022 |
| | | **JN:** | 2611-2022-01 |
| **Measurement Address:** | **City:** City of Perris | **Site No.:** | 1 |

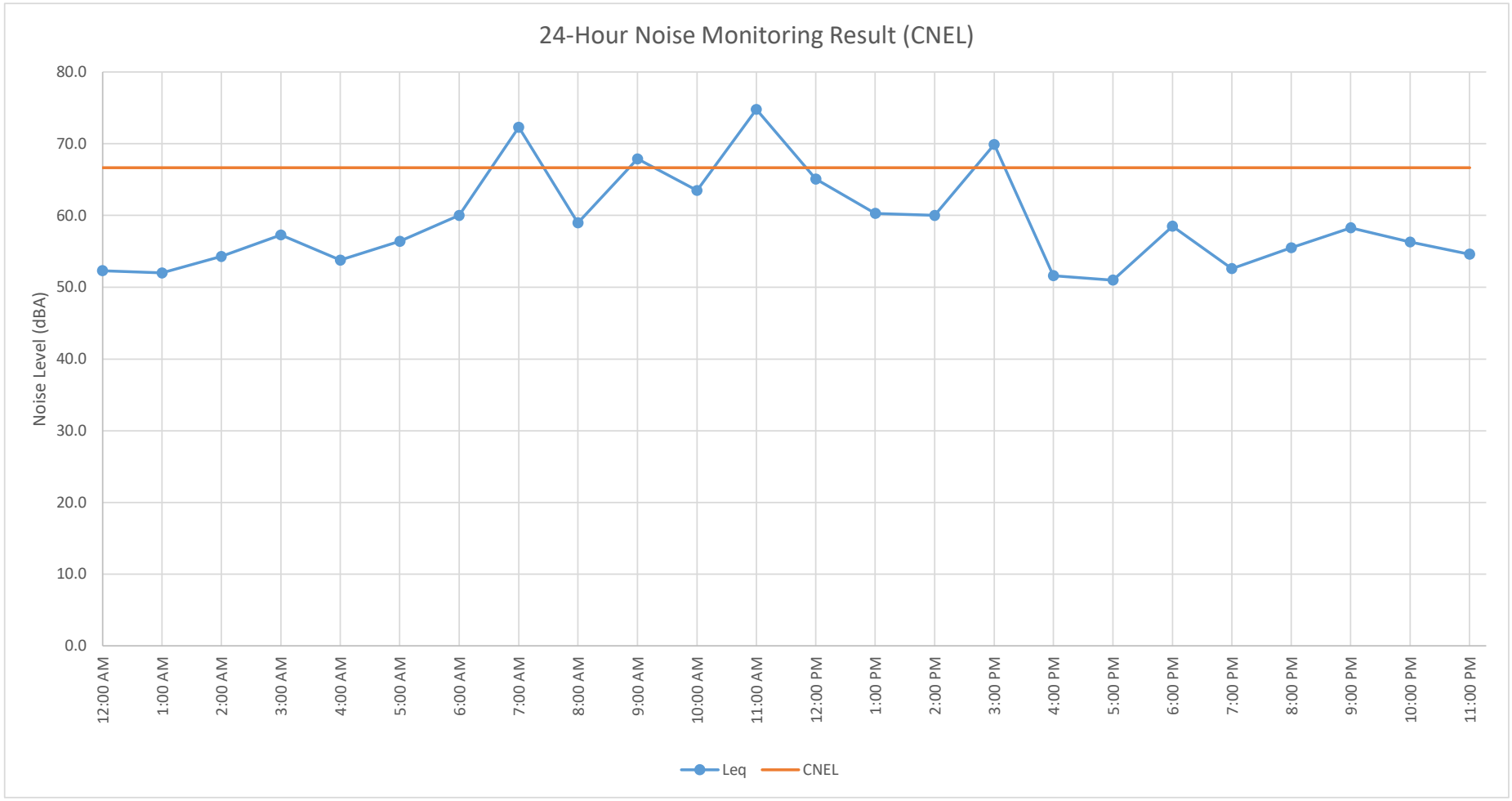
Measurement was taken at project site at approximately 5 feet from the northern property line and approximately 35 feet from the centerline of the Patterson Avenue.

RK engineering group, inc.

| PROJECT: | Patterson Business Center | | | | | JOB #: | 2611-2022-01 |
|---|---|---|---|---|---|---|---|
| NOISE METER | Piccolo II SLM, 24-Hour Measurement | | | | | DATE: | 17-Feb-22 |
| LOCATION: | Measurement was taken at project site at approximately 5 feet from the northern property line and approximately 35 feet from the centerline of the Patterson Avenue. | | | | | BY: | D. Shivaiah |

| Time | Leq | Lmax | Lmin | L2 | L8 | L25 | L50 |
|---|---|---|---|---|---|---|---|
| 12:00 AM | 52.3 | 69.7 | 47.5 | 56.1 | 54.3 | 52.5 | 51.4 |
| 1:00 AM | 52.0 | 68.7 | 47.9 | 57.0 | 54.3 | 52.0 | 50.8 |
| 2:00 AM | 54.3 | 67.0 | 48.4 | 59.2 | 56.7 | 55.2 | 53.9 |
| 3:00 AM | 57.3 | 75.2 | 49.8 | 61.6 | 59.8 | 57.5 | 55.6 |
| 4:00 AM | 53.8 | 75.5 | 46.5 | 59.1 | 53.9 | 51.7 | 50.5 |
| 5:00 AM | 56.4 | 79.7 | 48.4 | 62.7 | 56.8 | 54.0 | 52.1 |
| 6:00 AM | 60.0 | 84.3 | 48.8 | 65.3 | 57.4 | 55.2 | 54.0 |
| 7:00 AM | 72.3 | 99.9 | 47.2 | 68.6 | 59.4 | 56.7 | 55.2 |
| 8:00 AM | 59.0 | 76.3 | 41.8 | 65.8 | 64.0 | 59.0 | 54.7 |
| 9:00 AM | 67.9 | 90.7 | 40.7 | 74.7 | 70.4 | 60.6 | 46.5 |
| 10:00 AM | 63.5 | 88.2 | 41.9 | 69.6 | 62.9 | 51.6 | 47.0 |
| 11:00 AM | 74.8 | 99.4 | 42.9 | 82.0 | 80.1 | 77.3 | 50.1 |
| 12:00 PM | 65.1 | 84.3 | 45.1 | 75.7 | 67.2 | 63.9 | 52.3 |
| 1:00 PM | 60.3 | 85.4 | 42.4 | 69.7 | 59.6 | 52.7 | 50.0 |
| 2:00 PM | 60.0 | 83.8 | 40.1 | 69.6 | 58.9 | 49.7 | 45.9 |
| 3:00 PM | 69.9 | 97.1 | 39.5 | 65.5 | 53.3 | 47.4 | 44.8 |
| 4:00 PM | 51.6 | 71.5 | 39.0 | 62.4 | 52.9 | 46.5 | 43.1 |
| 5:00 PM | 51.0 | 73.0 | 41.9 | 56.5 | 51.5 | 49.5 | 48.2 |
| 6:00 PM | 58.5 | 82.8 | 41.0 | 64.1 | 51.6 | 47.6 | 44.8 |
| 7:00 PM | 52.6 | 74.1 | 43.7 | 61.0 | 53.8 | 50.8 | 47.8 |
| 8:00 PM | 55.5 | 77.0 | 48.2 | 63.0 | 56.0 | 54.1 | 52.9 |
| 9:00 PM | 58.3 | 81.1 | 47.2 | 65.4 | 56.8 | 53.0 | 51.7 |
| 10:00 PM | 56.3 | 72.2 | 47.7 | 66.9 | 59.1 | 52.5 | 50.9 |
| 11:00 PM | 54.6 | 70.6 | 47.3 | 65.1 | 55.5 | 52.6 | 51.3 |
| | | | | | | | |
| Daytime | 66.7 | 99.9 | 39.0 | 72.5 | 69.0 | 65.7 | 50.5 |
| Nighttime | 55.9 | 84.3 | 46.5 | 61.9 | 56.5 | 54.3 | 52.8 |


24 Hour Noise Monitoring Results (Leq, Ln)
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Decibel (dB)
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time
Leq
Lmax
Lmin
L2
L8
L25
L50


24-Hour Noise Monitoring Result (CNEL)
Noise Level (dBA)
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Leq
CNEL

# Appendix C

SoundPLAN Calculation Results

# Contribution levels of the receivers

| Source name | | Level Day | Night |
|---|---|---|---|
| | | dB(A) | |
| Receptor at Residential Use1 | GF | 43.2 | 42.8 |
| Employee Parking Lot | | 39.0 | 38.0 |
| HVAC 1 | | 28.3 | 28.3 |
| HVAC 2 | | 40.0 | 40.0 |
| Truck Loading Activities | | 33.4 | 33.4 |

# Appendix D

Construction and Vibration Calculation Results

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/26/2023
Case Description: Patterson Business Center

---- Receptor #1 ----

| | | Baselines (dBA) | | |
|---|---|---|---|---|
| Description | Land Use | Daytime | Evening | Night |
| Site Preparation | Residential | 71.5 | 71.5 | 67 |

Equipment

| Description | Impact Device | Usage(%) | Spec Lmax (dBA) | Actual Lmax (dBA) | Receptor Distance (feet) | Estimated Shielding (dBA) |
|---|---|---|---|---|---|---|
| Dozer | No | 40 | | 81.7 | 110 | 0 |
| Dozer | No | 40 | | 81.7 | 110 | 0 |
| Dozer | No | 40 | | 81.7 | 110 | 0 |
| Tractor | No | 40 | 84 | | 110 | 0 |
| Tractor | No | 40 | 84 | | 110 | 0 |
| Tractor | No | 40 | 84 | | 110 | 0 |
| Tractor | No | 40 | 84 | | 110 | 0 |

Results
Calculated (dBA)

| Equipment | | *Lmax | Leq |
|---|---|---|---|
| Dozer | | 74.8 | 70.8 |
| Dozer | | 74.9 | 70.9 |
| Dozer | | 74.9 | 70.9 |
| Tractor | | 77.2 | 73.2 |
| Tractor | | 77.2 | 73.2 |
| Tractor | | 77.2 | 73.2 |
| Tractor | | 77.2 | 73.2 |
| | Total | 77.2 | 80.8 |

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/26/2023
Case Description: Patterson Business Center

---- Receptor #1 ----

Baselines (dBA)

| Description | Land Use | Daytime | Evening | Night |
|---|---|---|---|---|
| Grading | Residential | 71.5 | 71.5 | 67 |

Equipment

| Description | Impact Device | Usage(%) | Spec Lmax (dBA) | Actual Lmax (dBA) | Receptor Distance (feet) | Estimated Shielding (dBA) |
|---|---|---|---|---|---|---|
| Excavator | No | 40 | | 80.7 | 110 | 0 |
| Grader | No | 40 | 85 | | 110 | 0 |
| Dozer | No | 40 | | 81.7 | 110 | 0 |
| Tractor | No | 40 | 84 | | 110 | 0 |
| Tractor | No | 40 | 84 | | 110 | 0 |
| Tractor | No | 40 | 84 | | 110 | 0 |

Results

Calculated (dBA)

| Equipment | | *Lmax | Leq |
|---|---|---|---|
| Excavator | | 73.9 | 69.9 |
| Grader | | 78.2 | 74.2 |
| Dozer | | 74.9 | 70.9 |
| Tractor | | 77.2 | 73.2 |
| Tractor | | 77.2 | 73.2 |
| Tractor | | 77.2 | 73.2 |
| | Total | 78.2 | 80.4 |

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/26/2023
Case Description: Patterson Business Center

---- Receptor #1 ----

| | | Baselines (dBA) | | |
|---|---|---|---|---|
| Description | Land Use | Daytime | Evening | Night |
| Building Construction | Residential | 71.5 | 71.5 | 67 |

Equipment

| Description | Impact Device | Usage(%) | Spec Lmax (dBA) | Actual Lmax (dBA) | Receptor Distance (feet) | Estimated Shielding (dBA) |
|---|---|---|---|---|---|---|
| Crane | No | 16 | | 80.6 | 110 | 0 |
| Pickup Truck | No | 40 | | 75 | 110 | 0 |
| Pickup Truck | No | 40 | | 75 | 110 | 0 |
| Pickup Truck | No | 40 | | 75 | 110 | 0 |
| Generator | No | 50 | | 80.6 | 110 | 0 |
| Tractor | No | 40 | 84 | | 110 | 0 |
| Tractor | No | 40 | 84 | | 110 | 0 |
| Tractor | No | 40 | 84 | | 110 | 0 |
| Welder / Torch | No | 40 | | 74 | 110 | 0 |

Results

Calculated (dBA)

| Equipment | | *Lmax | Leq |
|---|---|---|---|
| Crane | | 73.7 | 65.7 |
| Pickup Truck | | 68.2 | 64.2 |
| Pickup Truck | | 68.2 | 64.2 |
| Pickup Truck | | 68.2 | 64.2 |
| Generator | | 73.8 | 70.8 |
| Tractor | | 77.2 | 73.2 |
| Tractor | | 77.2 | 73.2 |
| Tractor | | 77.2 | 73.2 |
| Welder / Torch | | 67.2 | 63.2 |
| | Total | 77.2 | 79.4 |

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/26/2023
Case Description: Patterson Business Center

---- Receptor #1 ----

Baselines (dBA)

| Description | Land Use | Daytime | Evening | Night |
|---|---|---|---|---|
| Paving | Residential | 71.5 | 71.5 | 67 |

Equipment

| Description | Impact Device | Usage(%) | Spec Lmax (dBA) | Actual Lmax (dBA) | Receptor Distance (feet) | Estimated Shielding (dBA) |
|---|---|---|---|---|---|---|
| Concrete Mixer Truck | No | 40 | | 78.8 | 110 | 0 |
| Concrete Mixer Truck | No | 40 | | 78.8 | 110 | 0 |
| Paver | No | 50 | | 77.2 | 110 | 0 |
| Paver | No | 50 | | 77.2 | 110 | 0 |
| Paver | No | 50 | | 77.2 | 110 | 0 |
| Roller | No | 20 | | 80 | 110 | 0 |
| Roller | No | 20 | | 80 | 110 | 0 |
| Tractor | No | 40 | 84 | | 110 | 0 |

Results

Calculated (dBA)

| Equipment | | *Lmax | Leq |
|---|---|---|---|
| Concrete Mixer Truck | | 72 | 68 |
| Concrete Mixer Truck | | 72 | 68 |
| Paver | | 70.4 | 67.4 |
| Paver | | 70.4 | 67.3 |
| Paver | | 70.4 | 67.3 |
| Roller | | 73.2 | 66.2 |
| Roller | | 73.2 | 66.2 |
| Tractor | | 77.2 | 73.2 |
| | Total | 77.2 | 77.6 |

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/26/2023
Case Description: Patterson Business Center

---- Receptor #1 ----

Baselines (dBA)

| Description | Land Use | Daytime | Evening | Night |
|---|---|---|---|---|
| Architectural Coating | Residential | 71.5 | 71.5 | 67 |

Equipment

| Description | Impact Device | Usage(%) | Spec Lmax (dBA) | Actual Lmax (dBA) | Receptor Distance (feet) | Estimated Shielding (dBA) |
|---|---|---|---|---|---|---|
| Compressor (air) | No | 40 | | 77.7 | 110 | 0 |

Results

Calculated (dBA)

| Equipment | | *Lmax | Leq |
|---|---|---|---|
| Compressor (air) | | 70.8 | 66.8 |
| | Total | 70.8 | 66.8 |

*Calculated Lmax is the Loudest value.

| | | | |
|---|---|---|---|
| PROJECT: | Patterson Business Center | JOB #: | 2611-2022-01 |
| SOURCE: | Combined Construction Noise - Site Preparation | DATE: | 06/28/2023 |
| LOCATION: | Nearest sensitive receptors at ~110 feet | BY: | B. Morrison |

## *NOISE LEVEL MEASUREMENTS (dBA)*

| | NOISE SOURCE | LEQ | L(MAX) | L(2) | L(8) | L(25) | L(50) |
|---|---|---|---|---|---|---|---|
| 1 | Tractors/Loaders/ Backhoes | 73.2 | 77.2 | -- | -- | -- | -- |
| 2 | Tractors/Loaders/ Backhoes | 73.2 | 77.2 | -- | -- | -- | -- |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |
| 9 | | | | | | | |
| 10 | | | | | | | |
| 11 | | | | | | | |
| 12 | | | | | | | |
| 13 | | | | | | | |
| 14 | | | | | | | |
| 15 | | | | | | | |
| 16 | | | | | | | |
| 17 | | | | | | | |
| 18 | | | | | | | |
| 19 | | | | | | | |
| 20 | | | | | | | |
| 21 | | | | | | | |
| 22 | | | | | | | |
| 23 | | | | | | | |
| 24 | | | | | | | |
| 25 | | | | | | | |
| 26 | | | | | | | |
| 27 | | | | | | | |
| 28 | | | | | | | |
| 29 | | | | | | | |
| | TOTAL | 76.2 | 80.2 | #VALUE! | #VALUE! | #VALUE! | #VALUE! |

| | | | |
|---|---|---|---|
| PROJECT: | Patterson Business Center | JOB #: | 2611-2022-01 |
| SOURCE: | Combined Construction Noise - Grading | DATE: | 06/28/2023 |
| LOCATION: | Nearest sensitive receptors at ~110 feet | BY: | B. Morrison |

## *NOISE LEVEL MEASUREMENTS (dBA)*

| | NOISE SOURCE | LEQ | L(MAX) | L(2) | L(8) | L(25) | L(50) |
|---|---|---|---|---|---|---|---|
| 1 | Grader | 74.2 | 78.2 | -- | -- | -- | -- |
| 2 | Tractors/Loaders/ Backhoes | 73.2 | 77.2 | -- | -- | -- | -- |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |
| 9 | | | | | | | |
| 10 | | | | | | | |
| 11 | | | | | | | |
| 12 | | | | | | | |
| 13 | | | | | | | |
| 14 | | | | | | | |
| 15 | | | | | | | |
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| 24 | | | | | | | |
| 25 | | | | | | | |
| 26 | | | | | | | |
| 27 | | | | | | | |
| 28 | | | | | | | |
| 29 | | | | | | | |
| | TOTAL | 76.7 | 80.7 | #VALUE! | #VALUE! | #VALUE! | #VALUE! |

| | | | |
|---|---|---|---|
| PROJECT: | Patterson Business Center | JOB #: | 2611-2022-01 |
| SOURCE: | Combined Construction Noise - Building Construction | DATE: | 06/28/2023 |
| LOCATION: | Nearest sensitive receptors at ~110 feet | BY: | B. Morrison |

## *NOISE LEVEL MEASUREMENTS (dBA)*

| | NOISE SOURCE | LEQ | L(MAX) | L(2) | L(8) | L(25) | L(50) |
|---|---|---|---|---|---|---|---|
| 1 | Tractors/Loaders/ Backhoes | 73.2 | 77.2 | -- | -- | -- | -- |
| 2 | Tractors/Loaders/ Backhoes | 73.2 | 77.2 | -- | -- | -- | -- |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |
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| 25 | | | | | | | |
| 26 | | | | | | | |
| 27 | | | | | | | |
| 28 | | | | | | | |
| 29 | | | | | | | |
| | TOTAL | 76.2 | 80.2 | #VALUE! | #VALUE! | #VALUE! | #VALUE! |

| | | | |
|---|---|---|---|
| PROJECT: | Patterson Business Center | JOB #: | 2611-2022-01 |
| SOURCE: | Combined Construction Noise - Paving | DATE: | 06/28/2023 |
| LOCATION: | Nearest sensitive receptors at ~110 feet | BY: | B. Morrison |

## *NOISE LEVEL MEASUREMENTS (dBA)*

| | NOISE SOURCE | LEQ | L(MAX) | L(2) | L(8) | L(25) | L(50) |
|---|---|---|---|---|---|---|---|
| 1 | Tractors/Loaders/ Backhoes | 73.2 | 77.2 | -- | -- | -- | -- |
| 2 | Rollers | 66.2 | 73.2 | -- | -- | -- | -- |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |
| 9 | | | | | | | |
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| 28 | | | | | | | |
| 29 | | | | | | | |
| | TOTAL | 74.0 | 78.7 | #VALUE! | #VALUE! | #VALUE! | #VALUE! |

| | | | |
|---|---|---|---|
| PROJECT: | Patterson Business Center | JOB #: | 2611-2022-01 |
| SOURCE: | Combined Construction Noise - Architectural Coating | DATE: | 06/28/2023 |
| LOCATION: | Nearest sensitive receptors at ~110 feet | BY: | B. Morrison |

*NOISE LEVEL MEASUREMENTS (dBA)*

| | NOISE SOURCE | LEQ | L(MAX) | L(2) | L(8) | L(25) | L(50) |
|---|---|---|---|---|---|---|---|
| 1 | Air Compressors | 66.8 | 70.8 | -- | -- | -- | -- |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |
| 9 | | | | | | | |
| 10 | | | | | | | |
| 11 | | | | | | | |
| 12 | | | | | | | |
| 13 | | | | | | | |
| 14 | | | | | | | |
| 15 | | | | | | | |
| 16 | | | | | | | |
| 17 | | | | | | | |
| 18 | | | | | | | |
| 19 | | | | | | | |
| 20 | | | | | | | |
| 21 | | | | | | | |
| 22 | | | | | | | |
| 23 | | | | | | | |
| 24 | | | | | | | |
| 25 | | | | | | | |
| 26 | | | | | | | |
| 27 | | | | | | | |
| 28 | | | | | | | |
| 29 | | | | | | | |
| | TOTAL | 66.8 | 70.8 | #VALUE! | #VALUE! | #VALUE! | #VALUE! |

**VIBRATION IMPACTS FROM CONSTRUCTION AND OPERATIONS**

| | | | |
|---|---|---|---|
| PROJECT: | Patterson Business Center | JOB #: | 2611-2022-01 |
| ACTIVITY: | Construction Vibration | DATE: | 22-Feb-22 |
| LOCATION: | Receptors at 35 Feet | ENGINEER: | Darshan Shivaiah |

# VIBRATION INPUT/OUTPUT DATA

## OTHER CONSTRUCTION EQUIPMENT

$$PPV = PPV_{ref}(25/D)^{n} \text{ (in/sec)}$$

| | |
|---|---|
| PPV = | **0.061 in/sec** |

| | | |
|---|---|---|
| Equipment Type = | 2 | Large Bulldozer |
| $PPV_{ref}$ = | 0.089 | Reference PPV at 25 ft. |
| D = | 35.00 | Distance from Equipment to receiver in ft. |
| n = | 1.10 | Vibration attenuation rate through the ground |

**EQUIPMENT PPV REFERENCE LEVELS**

| Type | Equipment | Reference PPV |
|---|---|---|
| 1 | Vibratory Roller | 0.210 |
| 2 | Large Bulldozer | 0.089 |
| 3 | Caisson Drilling | 0.089 |
| 4 | Loaded Trucks | 0.076 |
| 5 | Jackhammer | 0.035 |
| 6 | Small Bulldozer | 0.003 |
| 7 | Crack and Seat | 2.400 |

**VIBRATION IMPACTS FROM CONSTRUCTION AND OPERATIONS**

| | | | |
|---|---|---|---|
| PROJECT: | Patterson Business Center | JOB #: | 2611-2022-01 |
| ACTIVITY: | Construction Vibration | DATE: | 22-Feb-22 |
| LOCATION: | Receptors at 35 Feet | ENGINEER: | Darshan Shivaiah |

# VIBRATION INPUT/OUTPUT DATA

## OTHER CONSTRUCTION EQUIPMENT

$$PPV = PPV_{ref}(25/D)^{n} \text{ (in/sec)}$$

| | |
|---|---|
| PPV = | **0.145 in/sec** |

| | | |
|---|---|---|
| Equipment Type = | 1 | Vibratory Roller |
| $PPV_{ref}$ = | 0.210 | Reference PPV at 25 ft. |
| D = | 35.00 | Distance from Equipment to receiver in ft. |
| n = | 1.10 | Vibration attenuation rate through the ground |

**EQUIPMENT PPV REFERENCE LEVELS**

| Type | Equipment | Reference PPV |
|---|---|---|
| 1 | Vibratory Roller | 0.210 |
| 2 | Large Bulldozer | 0.089 |
| 3 | Caisson Drilling | 0.089 |
| 4 | Loaded Trucks | 0.076 |
| 5 | Jackhammer | 0.035 |
| 6 | Small Bulldozer | 0.003 |
| 7 | Crack and Seat | 2.400 |

**VIBRATION IMPACTS FROM CONSTRUCTION AND OPERATIONS**

| | | | |
|---|---|---|---|
| PROJECT: | Patterson Business Center | JOB #: | 2611-2022-01 |
| ACTIVITY: | Construction Vibration | DATE: | 22-Feb-22 |
| LOCATION: | Receptors at 35 Feet | ENGINEER: | Darshan Shivaiah |

# VIBRATION INPUT/OUTPUT DATA

## OTHER CONSTRUCTION EQUIPMENT

$$PPV = PPV_{ref}(25/D)^{n} \text{ (in/sec)}$$

| | |
|---|---|
| PPV = | **0.052 in/sec** |

| | | |
|---|---|---|
| Equipment Type = | 4 | Loaded Trucks |
| $PPV_{ref}$ = | 0.076 | Reference PPV at 25 ft. |
| D = | 35.00 | Distance from Equipment to receiver in ft. |
| n = | 1.10 | Vibration attenuation rate through the ground |

**EQUIPMENT PPV REFERENCE LEVELS**

| Type | Equipment | Reference PPV |
|---|---|---|
| 1 | Vibratory Roller | 0.210 |
| 2 | Large Bulldozer | 0.089 |
| 3 | Caisson Drilling | 0.089 |
| 4 | Loaded Trucks | 0.076 |
| 5 | Jackhammer | 0.035 |
| 6 | Small Bulldozer | 0.003 |
| 7 | Crack and Seat | 2.400 |