IMPERIAL AND EUCLID RESIDENTIAL DEVELOPMENT
NOISE IMPACT STUDY
City of La Habra

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City of La Habra, California

Prepared for:

COMMUNITY DEVELOPMENT DEPARTMENT
City of La Habra
110 East La Habra Boulevard
La Habra, CA 90631

Prepared by:

RK ENGINEERING GROUP, INC.
4000 Westerly Place, Suite 280
Newport Beach, CA 92660

Bryan Estrada, AICP
Darshan Shivaiah, M.S.

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1.0 Introduction

1.1 Purpose of Analysis and Study Objectives

The purpose of this report is to evaluate the potential noise impacts from the proposed Imperial and Euclid Residential Development (project) and provide recommendations, if necessary, to minimize any project noise impacts.

The assessment was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000, et seq.) and the standards and methodology follow the City of La Habra Municipal Code and General Plan requirements.

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 impact to adjacent receptors
- Analysis of the project's construction noise and vibration impact to adjacent sensitive receptors
- Summary of recommended mitigation measures and project design features to reduce noise level impacts.

1.2 Site Location

The proposed project site is located at 251-351 Imperial Highway, along the north side of Imperial Highway, west of Euclid Street, in the City of La Habra.

The project site is located approximately 256 feet above sea level and the topography generally flat.

The nearest noise sensitive land uses surrounding the project site include the existing residential uses located approximately 25 feet to the north of the site.

The project site location map is provided in Exhibit A.

1.3 Project Description

The project proposes to construct and operate 117 multifamily (condo/townhomes) residential homes on approximately 4.91 acre site. The site plan used for this analysis, provided by KTGY ARCHITECTURE + PLANNING, is illustrated in Exhibit B. Table 1 summarizes the proposed project land uses.

Table 1
Land Use Summary

Project Land Use	Amount	Metric
Multifamily Residential (Condo/Townhomes)	117	Dwelling Units

This report analyzes the short-term noise impacts associated with construction activities and long-term noise impacts associated with the day-to-day operation of the project. The primary source of operational noise includes residential HVAC mechanical equipment noise.

The project is also proposing to build a noise barrier wall (minimum six (6) feet high) surrounding the site along the northern, southern, eastern and western property line.

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 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 The project will install a CMU block wall along the northern and southern, property lines. The noise barrier wall will be a minimum of 6-feet tall and will help shield the adjacent land uses from project noise and future residents of the project site from roadway noise along Imperial Highway.

DF-2 The project will comply with the latest California Building Standards Code for noise insulation and incorporate building construction techniques that achieve the minimum interior noise standard of 45 dBA CNEL for all residential units.

Construction Design Features

DF-3 Construction-related noise activities shall comply with the requirements set forth in the City of La Habra Municipal Code Noise Ordinance 9.32.070.

- Noise sources associated with construction, repair, remodeling, or grading of any real property, provided the activities do not take place between the hours of eight p.m. and seven a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday

DF-4 During construction, the contractor shall ensure all construction equipment is equipped with appropriate noise attenuating devices and equipment shall be maintained so that vehicles and their loads are secured from rattling and banging. Idling equipment shall be turned off when not in use.

DF-5 Locate staging area, generators and stationary construction equipment as far from the nearest residential receptors, as reasonably feasible.

DF-6 No impact pile driving activities are expected to occur on the project site during construction.

2.0 Fundamentals of Noise

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

2.1 Sound, Noise, and Acoustics

The sound is a disturbance created by a moving or vibrating source and is capable of being detected by the hearing organs. The 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 its 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 (μPa). One μPa 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 as 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 3dB 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[1]

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 weighing is typically reported in terms of A-weighted decibel (dBA). Typically, the human ear can barely perceive the change in the 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. 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] Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.

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 in 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...".

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. The 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 the hard site (reflective surfaces) and soft site (absorptive surfaces) to help calculate predicted noise levels. Hard site conditions assume no excessive ground

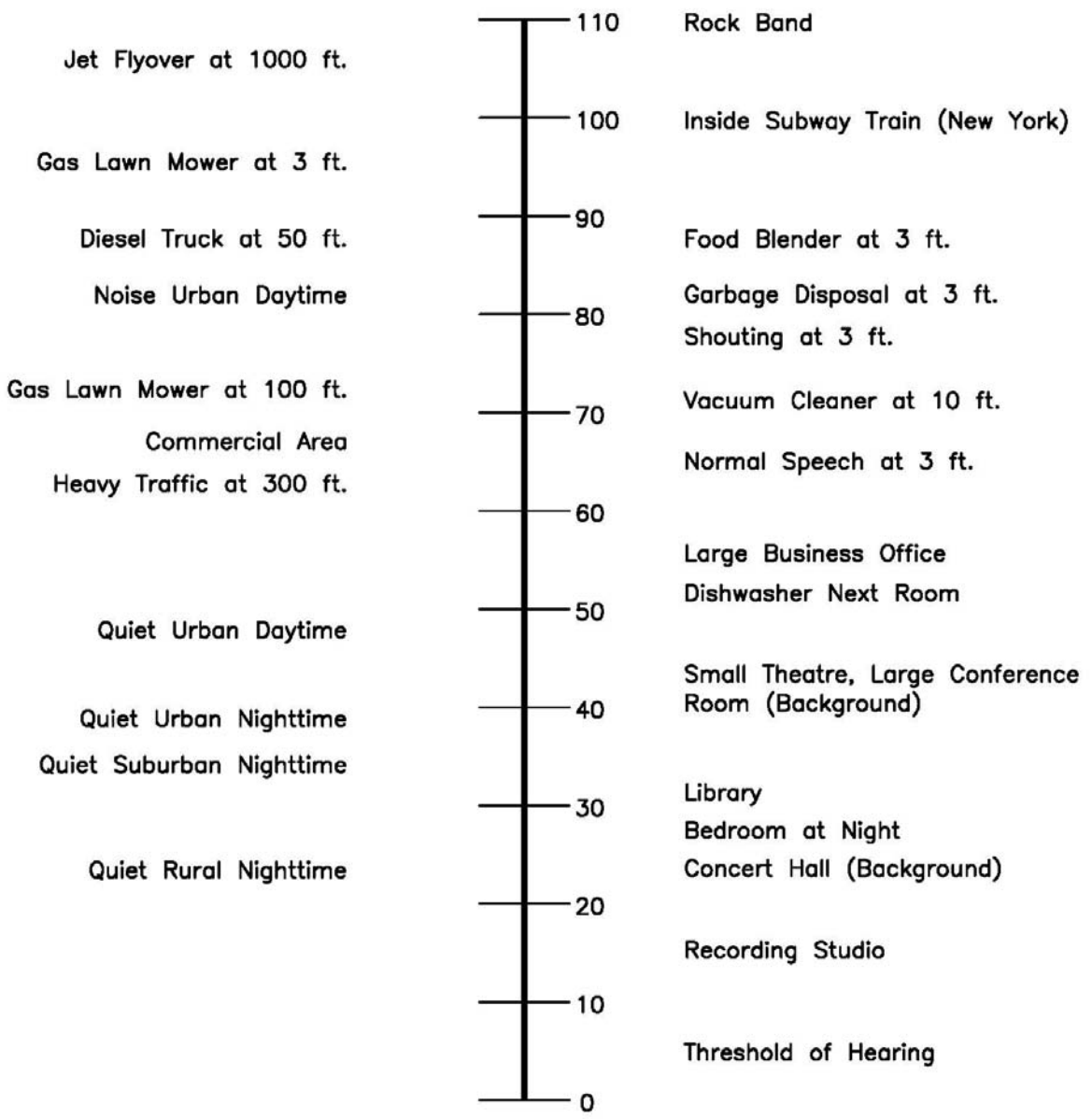
absorption between the noise source and the receiver. Soft site conditions such as grass, soft dirt or landscaping attenuate noise at an additional rate of 1.5 dB per doubling of distance. When added to the geometric spreading, the excess ground attenuation results in an overall noise attenuation of 4.5 dB per doubling of distance for a line source and 6.0 dB per doubling of distance for a point source.

Research has demonstrated that atmospheric conditions can have a significant effect on noise levels when noise receivers are located 200 feet and greater from a noise source. Wind, temperature, air humidity, and turbulence can further impact how far sound can travel.

Figure 1 shows typical sound levels from indoor and outdoor noise sources.

Figure 1[2]

TYPICAL SOUND LEVELS FROM
INDOOR AND OUTDOOR NOISE SOURCES



[2] Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.

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.

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 La Habra and noise regulations are addressed through the various federal, state, and local government agencies. The agencies responsible for regulating noise are discussed below.

3.1 Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three (3) purposes:

- Publicize noise emission standards for interstate commerce
- Assist state and local abatement efforts
- Promote noise education and research

The Federal Office of Noise Abatement and Control (ONAC) was originally tasked with implementing the Noise Control Act. However, it was eventually eliminated leaving other federal agencies and committees to develop noise policies and programs. Some examples of these agencies are as follows: The Department of Transportation (DOT) assumed a significant role in noise control through its various agencies. The Federal Aviation Agency (FAA) is responsible to regulate noise from aircraft and airports. The Federal Highway Administration (FHWA) is responsible to regulate noise from the interstate highway system. The Occupational Safety and Health Administration (OSHA) is responsible for the prohibition of excessive noise exposure to workers.

The Federal government and the State advocate that local jurisdiction use their land use regulatory authority to arrange new development in such a way that "noise sensitive" uses are either prohibited from being constructed adjacent to a highway or, or alternatively that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Since the Federal government and the State have preempted the setting of standards for noise levels that can be emitted by the transportation source, the City is restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

3.2 State Regulations

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the "Land Use Compatibility for Community Noise Environments Matrix." The matrix allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise.

The State of California has established noise insulation standards as outlined in Title 24 and the Uniform Building Code (UBC) which in some cases requires acoustical analyses to outline exterior noise levels and to ensure interior noise levels do not exceed the interior threshold. The State mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable.

3.3 City of La Habra Noise Regulations

The project is required to comply with the noise standards and thresholds established in the City of La Habra Municipal Code. The noise standards from the Municipal code are provided in Appendix A.

3.3.1 City of La Habra Municipal Code Noise Standards

The City of La Habra Municipal Code Noise Ordinance, requires that a project shall not create loud, unnecessary, or unusual noise that disturbs the peace or quiet of any neighborhood, or that causes discomfort or annoyance to any person of normal sensitiveness. Noise standards are defined in Chapter 9.32 Noise Control of the Municipal Code and are applicable to the project site and surrounding noise sensitive uses.

Table 6 shows the exterior noise standards from the City of La Habra Municipal Code Chapter 9.32 Noise Control Section 9.32.050 Noise Standards – Exterior Noise Levels for the project site and surrounding residential land uses.

Table 6
City of La Habra Municipal Code Exterior Noise Standards

Use Categories	Exterior Noise Standard	Time Period
Residential Use	55 dB (A)	7:00 AM – 10:00 PM
	50 dB (A)	10:00 PM – 7:00 AM

It is unlawful for any person at any location to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level:

1. The noise standard for a cumulative period of more than 30 minutes in any hour;

2. The noise standard plus 5 dB for a cumulative period of more than 15 minutes in any hour;

3. The noise standard plus 10 dB for a cumulative period of more than 5 minutes in any hour;

4. The noise standard plus 15 dB for a cumulative period of more than 1 minute in any hour;

5. The noise standard plus 20 dB for any period of time.

3.3.2 Construction Noise Regulation

Section 9.32.070 of the City's municipal code exempts the construction noise provided that the following provisions are met:

- Noise sources associated with construction, repair, remodeling, or grading of any real property, provided the activities do not take place between the hours of eight p.m. and seven a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday.

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 measurements are 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 measurements 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 measurements 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 measurements:

- Microphones for sound level meters were placed five (5) feet above the ground for long-term noise measurements
- Sound level meters were 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

The project is proposing to use LENNOX ML14XC1 Air Conditioner units. In order to determine the future noise levels from a/c units, RK requested the specification sheet from the applicant and obtained the referenced noise level of the proposed a/c units. Table 7 indicates the referenced noise levels for on-site stationary noise sources. The manufacture spec sheet is shown in Appendix B.

Table 7
HVAC Referenced Noise Levels[1]

Source[1]	Noise Levels (dBA)
	L_{eq}
HVAC Equipment	76

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 assume that the stationary sources are operating continuously during both daytime and nighttime hours, when in reality will likely operate only intermittently throughout daily operations.

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 at an average distance of 50 feet for equipment operating over an 8-hour period from to the nearest sensitive receptor property line. While some construction noise activity may occur closer than 50 feet from the property line, noise levels are averaged over an 8-hour period for purposes of assessing impacts.

- Construction phasing and equipment usage assumptions are referenced from the Imperial and Euclid Residential Development AQ & GHG Impact Study, City of La Habra, 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=1.0 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 just environmental noise includes noise from leaves rustling and chirping birds, very minimal traffic noise propagating from the adjacent roadways, as well as activities from the surrounding properties are the main sources of ambient noise at the project site and surrounding area.

5.1 Long-Term (24-Hour) Noise Measurement Results

To determine the existing noise level environment, RK conducted two (2) 24-hour noise measurements at the project study area.

Noise levels were measured on July 8, 2021 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 locations were selected based on the proximity and location to adjacent sensitive receptors. Exhibit C graphically illustrates the location of the long-term measurements.

- Long-term noise monitoring location one (LT-1) was taken along the northern property line approximately 65 feet from the eastern property line.

- Long-term noise monitoring location two (LT-2) was taken along the northern property line approximately 120 feet from the western property line.

Long-term noise measurement results are summarized in Tables 8 and 9. Appendix C includes photographs, field sheets and measured noise data.

Noise measurements were conducted at the above selected locations to determine the existing ambient noise environment at the nearest sensitive residential receptors, located to the north of the project site. Utilizing the existing noise levels, this assessment analyzes the increase in ambient noise levels due to anticipated noise levels generated by the project. The future exterior roadway noise levels impacting the project site are conservatively estimated using the City of La Habra General Plan roadway capacity volumes.

Table 8
24 Noise Measurement Results LT-1[1]

Time	Leq (dBA)	Time	Leq (dBA)
12:00 AM	43.1	12:00 PM	59.2
1:00 AM	41.5	1:00 PM	63.7
2:00 AM	42.2	2:00 PM	64.0
3:00 AM	40.1	3:00 PM	57.1
4:00 AM	42.6	4:00 PM	58.7
5:00 AM	50.7	5:00 PM	51.3
6:00 AM	59.9	6:00 PM	50.6
7:00 AM	58.6	7:00 PM	51.7
8:00 AM	60.3	8:00 PM	49.3
9:00 AM	59.6	9:00 PM	49.3
10:00 AM	59.4	10:00 PM	46.6
11:00 AM	61.0	11:00 PM	45.2
		Lowest daytime Hourly Leq	**46.6**
		Lowest Nighttime Hourly Leq	**40.1**

[1] LT-1 was taken along the northern property line approximately 65 feet from the eastern property line. LT-1 was recorded on 07/08/2021.

Table 9
24 Noise Measurement Results, LT-2[1]

Time	Leq (dBA)	Time	Leq (dBA)
12:00 AM	44.8	12:00 PM	52.2
1:00 AM	41.1	1:00 PM	53.8
2:00 AM	41.9	2:00 PM	54.5
3:00 AM	40.1	3:00 PM	52.5
4:00 AM	43.4	4:00 PM	54.1
5:00 AM	46.1	5:00 PM	50.2
6:00 AM	49.6	6:00 PM	49.7
7:00 AM	50.6	7:00 PM	47.3
8:00 AM	50.2	8:00 PM	47.0
9:00 AM	50.4	9:00 PM	45.7
10:00 AM	50.9	10:00 PM	45.0
11:00 AM	50.1	11:00 PM	43.7
		Lowest daytime Hourly Leq	**45.0**
		Lowest Nighttime Hourly Leq	**40.1**

[1] LT-2 was taken along the northern property line approximately 120 feet from the western property line.LT-2 was recorded on 07/08/2021.

6.0 Operational Noise Impacts

This assessment analyzes the anticipated noise levels generated by the project and impacts caused by changes to the ambient environment. The main sources of noise generated by the project would include on-site operational activities from HVAC equipment noise. Noise level impacts are compared to the City of La Habra 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 Stationary Source Noise Impacts

On-site stationary noise impacts are assessed at the adjacent sensitive receptor property lines surrounding the project site. Sensitive land uses surrounding the proposed project site include; existing residential uses to the north.

Project operational activities are analyzed for long-term noise impacts associated with the day-to-day operation of the project; including mechanical HVAC equipment to the nearest adjacent property lines.

The project is also proposing to build a minimum of six (6) foot noise barrier wall along the northern, southern, eastern and western property line and the noise study has taken the proposed wall into account during the analysis as a noise barrier.

HVAC equipment will be generally located on the exterior ground floor area of each unit. The closest HVAC units are expected to be located approximately 15 feet from the northern and southern property line, approximately 17 feet from the eastern property line and approximately 40 feet from the western property line.

SoundPLAN calculation worksheets are shown in Appendix D.

Daytime Stationary Source Noise Impacts

The results of the daytime noise impact analysis are shown in the Tables 10 and are graphically illustrated on Exhibit E.

The noise analysis considers all project noise sources operating simultaneously during daytime (7 a.m. to 10 p.m.) hours at the nearest residential uses to the north.

Table 10
Daytime Noise Impact Analysis (dBA)

Receptor	Land Use	Location	Daytime Exterior Noise Level dBA				
			Project Noise Contribution (Leq)	Daytime Hourly Leq[1]	Combined Noise Levels	City of La Habra Noise Level Criteria (Leq)	Noise Level Exceeds Standard (?)
Receiver – 1	Residential	North	47.5	45.0	49.4	55.0	No
Receiver – 2	Residential	North	47.1	45.0	49.2		No
Receiver – 3	Residential	North	44.1	46.6	48.5		No
Receiver – 4	Residential	North	46.6	46.6	49.6		No

[1] Lowest Daytime hourly Leq.

Based on the results of this analysis, noise levels generated by the project are not expected to exceed the City's daytime noise standards of 55 dBA at the adjacent property lines.

Nighttime Stationary Source Noise Impacts

The results of the nighttime noise impact analysis are shown in the Tables 11 and are graphically illustrated on Exhibit F.

The nighttime noise analysis considers all project noise sources operating simultaneously during nighttime (10 p.m. to 7 a.m.) hours at the nearest residential uses to the north.

Table 11
Nighttime Noise Impact Analysis (dBA)

Receptor	Land Use	Location	Nighttime Exterior Noise Level dBA				
			Project Noise Contribution (Leq)	Nighttime Hourly Leq[1]	Combined Noise Levels	City of La Habra Noise Level Criteria (Leq)	Noise Level Exceeds Standard (?)
Receiver – 1	Residential	North	47.5	40.1	48.2	50.0	No
Receiver – 2	Residential	North	47.1	40.1	47.9		No
Receiver – 3	Residential	North	44.1	40.1	45.6		No
Receiver – 4	Residential	North	46.6	40.1	47.5		No

[1] Lowest Nighttime hourly Leq.

Based on the results of this analysis, noise levels generated by the project are not expected to exceed the City's nighttime noise standards of 50 dBA at the adjacent property lines.

6.2 Existing Noise Environment

The project site is currently consisting of light industrial use and used auto sales garage. The existing ambient noise levels at the adjacent residential uses to the north mainly includes noise from the existing on-site operational activities from the light industrial use and the used auto sales garage.

The proposed project is expected to replace the existing light industrial and commercial uses with multifamily residential homes. Typically, noise levels generated from residential uses are expected to be less than that of industrial and commercial uses. The residential project is considered to be compatible with the adjacent residential uses from noise/land use perspective, and the future ambient noise levels at the adjacent residential uses are expected to be less than the existing noise levels. As a result, the project will have a less than significant impact on the existing noise environment.

6.3 Operation 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 The project will install a CMU block wall along the northern and southern, property lines. The noise barrier wall will be a minimum of 6-feet tall and will help shield the adjacent land uses from project noise and future residents of the project site from roadway noise along Imperial Highway.

DF-2 The project will comply with the latest California Building Standards Code for noise insulation and incorporate building construction techniques that achieve the minimum interior noise standard of 45 dBA CNEL for all residential units.

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.

Section 9.32.070 of the City's municipal code exempts the construction noise provided that the following provisions are met:

- Noise sources associated with construction, repair, remodeling, or grading of any real property, provided the activities do not take place between the hours of eight p.m. and seven a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday

This section provides an analysis of estimated construction noise levels at 50 feet, at the adjacent residential properties. Although construction activity is exempt from the noise standards in the City's Municipal Code, CEQA requires that potential noise impacts still be disclosed for informational purposes.

Construction phasing and equipment usage assumptions are referenced from the *Imperial and Euclid Residential Development AQ & GHG Impact Study, City of La Habra, July 2021, by RK Engineering Group.*

7.1 Typical Construction Noise Levels

Table 12 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 12
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

This assessment analyzes potential noise impacts during all expected phases of construction, including; demolition, site preparation, grading, building construction, paving, and architectural coating. Noise levels are calculated based on an average distance of equipment over an 8-hour period 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. Tables 13 show the noise level impacts at 50 feet. Construction noise calculation worksheets are provided in Appendix E.

Table 13
Project Construction Noise Levels – at 50 Feet

Phase	Equipment	Quantity	Equipment Noise Level at 50ft (dBA Leq)	Combined Noise Level (dBA Leq)
Demolition	Concrete/Industrial Saws	1	82.6	86.4
	Excavators	3	76.7	
	Rubber Tired Dozers	2	77.7	
Site Preparation	Rubber Tired Dozers	3	77.7	87.6
	Tractors/Loaders/Backhoes	4	80.0	
Grading	Excavators	1	76.7	87.3
	Graders	1	81.0	
	Rubber Tired Dozers	1	77.7	
	Tractors/Loaders/Backhoes	3	80.0	
Building Construction	Cranes	1	72.6	86.3
	Forklifts	3	71.0	
	Generator Sets	1	77.6	
	Tractors/Loaders/Backhoes	3	80.0	
	Welders	1	70.0	
Paving	Pavers	2	74.2	81.2
	Paving Equipment	2	74.2	
	Rollers	2	73.0	
Architectural Coating	Air Compressors	1	73.7	73.7
Worst Case Construction Phase Noise Level - Leq (dBA)				87.6

As shown in Table 13, the project is expected to generate noise levels which range from 73.7 dBA to 87.6 dBA at 50 feet. Construction noise calculation worksheets are provided in Appendix E.

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 sensitive receptors are the adjacent commercial buildings located to the east and 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 and site preparation, 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 14 shows the FTA referenced vibration levels.

Table 14
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
Hydromill	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, May 2006.

Table 15 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 15
Construction Vibration Impact Analysis

Construction Activity	Distance to Nearest Structure (ft)	Duration	Calculated Vibration Level - PPV (in/sec)	Damage Potential Level	Annoyance Criteria Level
Large Bulldozer	25	Continuous/Frequent	0.089	Extremely fragile historic buildings, ruins, ancient monuments	Distinctly Perceptible
Vibratory Roller	25	Continuous/Frequent	0.210	Historic and old buildings	Strongly Perceptible
Loaded Trucks	25	Continuous/Frequent	0.076	No Impact	Distinctly Perceptible

As shown in Table 15, project related construction activity is not expected to cause any potential damage to the nearest structures. The annoyance potential of vibration from construction activities would range from "distinctly perceptible" to "strongly perceptible". Construction vibration calculation worksheets are shown in Appendix E.

7.4 Construction Project 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 the site design and construction management plan.

DF-3 Construction-related noise activities shall comply with the requirements set forth in the City of La Habra Municipal Code Noise Ordinance 9.32.070.

- Noise sources associated with construction, repair, remodeling, or grading of any real property, provided the activities do not take place between the hours of eight p.m. and seven a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday

DF-4 During construction, the contractor shall ensure all construction equipment is equipped with appropriate noise attenuating devices and equipment shall be maintained so that vehicles and their loads are secured from rattling and banging. Idling equipment shall be turned off when not in use.

DF-5 Locate staging area, generators and stationary construction equipment as far from the nearest residential receptors, as reasonably feasible.

DF-6 No impact pile driving activities are expected to occur on the project site during construction. If impact pile driving is required, a follow-up noise and vibration impact assessment shall be conducted and vibration monitoring program shall be performed, prior to start of any pile driving activity.

Exhibits

Exhibit A

Location Map

N

Exhibit B
Site Plan

N

Exhibit C

Noise Monitoring Locations

Legend:

(LT-1) = Long Term (24-Hr) Noise Monitoring Location

N

RK engineering group, inc.

SoundPLAN Project Noise Level Results

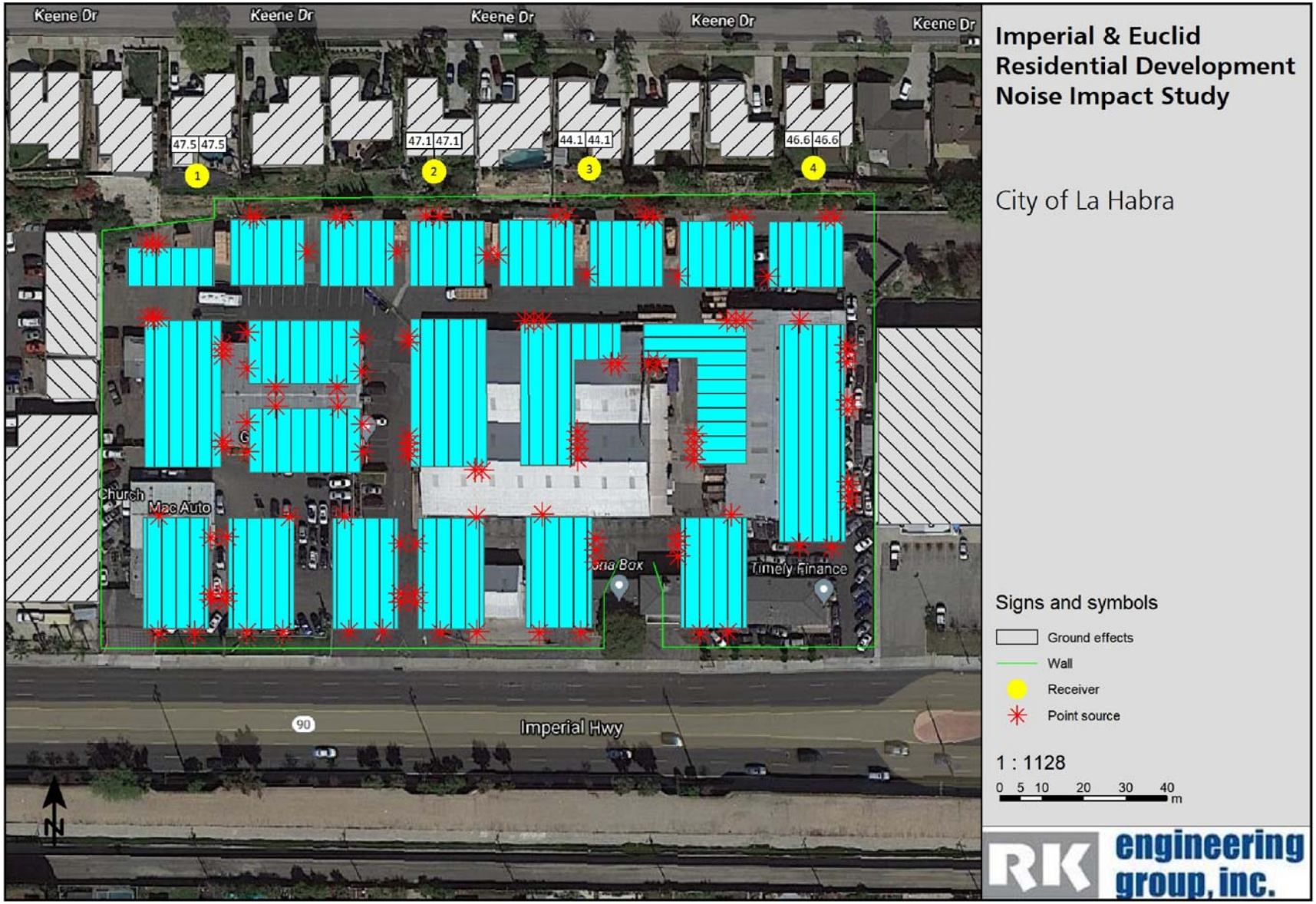


Exhibit E

Project Noise Level Contours - Daytime

Project Noise Level Contours - Nighttime

Appendices

Appendix A

City of La Habra
General Plan Noise Element and
Municipal Code Noise Control

Chapter 9.32 NOISE CONTROL

9.32.010 Declaration of policy.

A. In order to control unnecessary, excessive and annoying sounds emanating from areas of the city, it is declared to be the policy of the city to prohibit such sounds generated from all sources as specified in the ordinance codified in this chapter.

B. It is determined that certain sound levels are detrimental to the public health, welfare and safety, and contrary to public interest, therefore, the city council does ordain and declare that creating, maintaining, causing or allowing to create, maintain or cause any noise in a manner prohibited by or not in conformity with the provisions of this chapter, is a public nuisance and shall be punishable as such. (Ord. 923 § 1(A), 1975; Ord. 880 § 1, 1973)

9.32.020 Definitions.

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

A. “Ambient noise level” means the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

B. “Cumulative period” means an additive period of time composed of individual time segments which may be continuous or interrupted.

C. “Decibel” (dB) means a unit which denotes the ratio between two quantities which are proportional to power: the number of decibels corresponding to the ratio of two amounts of power is ten times the logarithm to the base ten of this ratio.

D. “Emergency machinery, vehicles or work” means any machinery vehicle or work used, employed or performed in an effort to protect, provide or restore safe conditions in the community or for the citizenry, or work by private or public utilities when restoring utility service.

E. “Fixed noise source” means a stationary device which creates sounds while fixed or motionless, including, but not limited to, industrial and commercial machinery and equipment, pumps, fans, compressors, generators, air conditioners and refrigeration equipment.

F. “Grading” means any excavating or filling of earth material or any combination thereof conducted to prepare a site for construction or other improvements thereon.

G. “Impact noise” means the noise produced by the collision of one mass in motion with a second mass which may be either in motion or at rest.

H. “Licensed” means the issuance of a formal license or a permit by the appropriate jurisdictional authority, or where no permits or licenses are issued, the sanctioning of the activity by the jurisdiction as noted in public records.

I. “Mobile noise source” means any noise source other than a fixed source.

J. “Noise level” means the “A” weighted sound pressure level in decibels obtained by using a sound level meter at slow response with a reference pressure of twenty micronewtons per square meter. The unit measurement shall be designated as dB(A).

K. “Noise variance board” means an administrative board of five members appointed by the board of supervisors of the county of Orange, per Title 4, Division 6, Article 1 of the codified ordinances of the county of Orange.

L. “Person” means a person, firm, association, copartnership, joint venture, corporation or any entity, public or private in nature.

M. “Simple noise tone” means a noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished.

N. “Sound level meter” means an instrument meeting American National Standard Institutes Standards S1.4-1971 for Type 1 or Type 2 sound level meters or an instrument and the associated recording and analyzing equipment which will provide equivalent data.

O. “Sound pressure level” of a sound, in decibels, means twenty times the logarithm to the base ten of the ratio of the pressure of the sound to a reference pressure, which reference pressure shall be explicitly stated.

P. “Residential property” means a parcel of real property which is zoned, developed, and used for residential purposes, other than transient uses such as hotels and motels. (Ord. 923 § 1(B), (C), (D), 1975; Ord. 880 § 2, 1973)

9.32.030 Noise level measurement criteria.

Any noise level measurements made pursuant to the provisions of this chapter shall be performed using a sound level meter as defined in subsection N of Section 9.32.020. (Ord. 880 § 3, 1973)

9.32.040 Assignment of residential properties to noise zones.

The residential properties described in this section are assigned to the following noise zones:

Noise Zone 1: All residential properties, whether incorporated or unincorporated. (Ord. 923 § 1(E), 1975; Ord. 880 § 4, 1973)

9.32.050 Noise standards—Exterior.

A. The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone:

Noise Standards

Noise Zone	Noise Level	Time Period
1	55 dB(A)	7:00 a.m.—10:00 p.m.
	50 dB(A)	10:00 p.m.—7:00 a.m.

B. It is unlawful for any person at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level, when measured on any other residential property either incorporated or unincorporated, to exceed:

1. The noise standard for a cumulative period of more than thirty minutes in any hour; or
2. The noise standard plus five dB(A) for a cumulative period of more than fifteen minutes in any hour; or
3. The noise standard plus ten dB(A) for a cumulative period of more than five minutes in any hour; or
4. The noise standard plus fifteen dB(A) for a cumulative period of more than one minute in any hour; or
5. The noise standard plus twenty dB(A) for any period of time.

C. In the event the ambient noise level exceeds any of the five noise limit categories set forth in subsection B1 through B5 of this section, the cumulative period applicable to the category shall be increased to reflect the ambient noise level. Furthermore, the maximum permissible noise level shall never exceed the maximum ambient noise level.

D. Each of the noise limits specified in subsection A shall be reduced by five dB(A) for impact or simple tone noises, or for noises consisting of speech or music. (Ord. 923 § 1(F), 1975; Ord. 880 § 5, 1973)

9.32.060 Noise standards—Interior.

A. The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone:

Noise Standards

Noise Zone	Noise Level	Time Period
1	55 dB(A)	7:00 a.m.—10:00 p.m.
	45 dB(A)	10:00 p.m.—7:00 a.m.

B. It is unlawful for any person at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level, when measured within any other dwelling unit on any residential property to exceed:

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

C. In the event the ambient noise level exceeds any of the three noise limit categories set forth in subsection A1 through A3 of this section, the cumulative period applicable to the category shall be increased to reflect the ambient noise level. Furthermore, the maximum permissible noise level shall never exceed the maximum ambient noise level.

D. Each of the noise limits specified in subsection A shall be reduced by five dB(A) for impact or simple tone noises, or for noises consisting of speech or music. (Ord. 923 § 1(G), 1975; Ord. 880 § 6, 1973)

9.32.070 Activities exempt from chapter provisions.

The following activities shall be exempted from the provisions of this chapter except as regulated under Sections 12.28.090 and 12.28.100 of this code:

A. School bands, school athletic and school entertainment events;

B. Outdoor gatherings, public dances, shows and sporting and entertainment events provided the events are conducted pursuant to a permit issued by the city pursuant to Chapter 5.32 relative to the staging of said events;

C. Activities conducted on public parks, public playgrounds, and public or private school grounds;

D. Any mechanical device, apparatus or equipment used, related to or connected with emergency machinery, vehicle or work;

E. Noise sources associated with construction, repair, remodeling, or grading of any real property, provided the activities do not take place between the hours of eight p.m. and seven a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday;

F. All mechanical devices, apparatus or equipment which are utilized for the protection or salvage of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions;

G. Mobile noise sources associated with agricultural operations provided such operations do not take place between the hours of eight p.m. and seven a.m. on weekdays, including Saturday or at any time on Sunday or a federal holiday;

H. Mobile noise sources associated with agricultural pest control through pesticide application; provided, that the application is made in accordance with restricted material permits issued by or regulations enforced by the agricultural commissioner;

I. Noise sources associated with the maintenance of real property provided the activities take place between the hours of seven a.m. and eight p.m. on any day except Sunday or federal holiday, or between the hours of nine a.m. and

eight p.m. on Sunday or federal holiday;

J. Any activity to the extent regulation thereof has been preempted by state or federal law. (Ord. 1367 § 1, 1989; Ord. 923 § 1(H), 1975)

9.32.080 Noise level—Near schools, hospitals and churches.

It is unlawful for any person to create any noise which causes the noise level at any school, hospital or church while the same is in use, to exceed the noise limits as specified in Section 9.32.050 prescribed for the assigned noise zone in which the school, hospital or church is located, or which noise level unreasonably interferes with the use of such institutions or which unreasonably disturbs or annoys patients in the hospital, provided conspicuous signs are displayed in three separate locations within one-tenth of a mile of the institution indicating the presence of a school, church or hospital. (Ord. 923 § 1, 1975; Ord. 880 § 9, 1973)

9.32.090 Noise level—Location of measurement.

The location selected for measuring exterior noise levels shall be at any point on the affected residential property. Interior noise measurement shall be made within the affected residential unit. The measurement shall be made at a point at least four feet from the wall, ceiling or floor nearest the noise source. (Ord. 923 § 1, 1975; Ord. 880 § 11, 1973)

9.32.100 Enforcement authority—Interference with prohibited.

A. The county health officer and his/her duly authorized representatives are directed to enforce the provisions of this chapter. The county health officer and his/her duly authorized representatives are authorized, pursuant to Penal Code Section 836.5, to arrest any person without a warrant when they have reasonable cause to believe that such person has committed a misdemeanor in their presence.

B. No person shall interfere with, oppose or resist any authorized person charged with enforcement of this chapter while such person is engaged in the performance of his/her duty. (Ord. 923 § 1, 1975; Ord. 880 § 12, 1973)

9.32.110 Variance—Application—Fee—Applicants remain subject to prosecution.

A. The owner or operator of a noise source which violates any of the provisions of this chapter may file an application with the health officer for a variance from the provisions thereof wherein the owner or operator shall set forth all actions taken to comply with the provisions, the reasons why immediate compliance cannot be achieved, a proposed method of achieving compliance, and a proposed time schedule for its accomplishment. The application shall be accompanied by a fee as set by resolution of the city council and on file in the office of the city clerk. A separate application shall be filed for each noise source; provided, however, that several mobile sources under common ownership, or several fixed sources on a single property may be combined into one application.

B. Upon receipt of the application and fee, the health officer shall refer it with his/her recommendations thereon within thirty days to the noise variance board for action thereon in accordance with the provisions of this chapter.

C. An applicant for a variance shall remain subject to prosecution under the terms of this chapter until a variance is granted. (Ord. 1213 §§ 2, 3, 1983; Ord. 923 § 1, 1975; Ord. 880 § 13, 1973)

9.32.120 Variance—Authority to grant—Terms and conditions—Violation unlawful.

The noise variance board shall evaluate all applications for variance from the requirements of this chapter and may grant the variances with respect to time for compliance, subject to such terms, conditions and requirements as it may deem reasonable to achieve maximum compliance with the provisions of this chapter. The terms, conditions and requirements may include, but shall not be limited to, limitations on noise levels and operating hours. Each such variance shall set forth in detail the approved method of achieving maximum compliance and a time schedule for its accomplishment. In its determinations the board shall consider the magnitude of nuisance caused by the offensive noise; the uses of property within the area of impingement by the noise; the time factors related to study, design, financing and construction of remedial work; the economic factors related to age and useful life of equipment; and the general public

interest and welfare. Any variance granted by the board shall be by resolution and shall be transmitted to the health officer for enforcement. Any violation of the terms of the variance shall be unlawful. (Ord. 923 § 1, 1975; Ord. 880 § 14, 1973)

9.32.130 Variances—Appeals.

A. Within fifteen days following the decision of the variance board on an application the applicant, the health officer, or any member of the city council, may appeal the decision to the city council by filing a notice of appeal with the secretary of the variance board. In the case of an appeal by the applicant for a variance, the notice of appeal shall be accompanied by a fee to be computed by the secretary on the basis of the estimated cost of preparing the materials required to be forwarded to the city council as discussed hereafter in this section. If the actual cost of such preparation differs from the estimated cost, appropriate payments shall be made either to or by the secretary.

B. Within fifteen days following receipt of a notice of appeal and the appeal fee, the secretary of the variance board shall forward to the city council copies of the application for variance; the recommendation of the health officer; the notice of appeal; and all evidence concerning the application received by the variance board and its decision thereon. In addition, any person may file with the city council written arguments supporting or attacking the decision and the city council may in its discretion hear oral arguments thereon. The city clerk shall mail to the applicant a notice of the date set for hearing of the appeal. The notice shall be mailed at least ten days prior to the hearing date.

C. Within sixty days following its receipt of the notice of the appeal, the city council shall either affirm, modify or reverse the decision of the variance board. Such decision shall be based upon the city council's evaluation of the matters submitted to the city council in light of the powers conferred on the variance board and the factors to be considered, both as enumerated in Sections 9.32.110 and 9.32.120. As part of its decision the council may direct the variance board to conduct further proceedings on the application. Failure of the city council to affirm, modify or reverse the decision of the variance board within the sixty-day period shall constitute an affirmance of the decision. (Ord. 923 § 14, 1975)

Appendix B

HVAC Specification Sheets

MENU

PRODUCT SPECIFICATIONS

6

Feature	MERIT SERIES  **ML14XC1 Air Conditioner**
Rating	★★★★½ (4.5)
Energy Efficiency	Up to 16 SEER
Stages of Cooling	Single-Stage
Sound Rating	As low as 76 dB
ENERGY STAR® Certified	✔
Environmentally Responsible	R-410A Refrigerant
Cabinet	PermaGuard™ Cabinet

Full Line of Scroll Compressors	✔
Compressor/Parts Warranty	5-Year Limited Warranty on covered components including compressor. This product may be eligible for valuable 10-Year Limited Extended Warranty coverage with product registration.

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Appendix C

Field Data and Photos

Field Sheet

Project:	Imperial and Euclid Residential Development	**Engineer:**	D. Shivaiah	**Date:**	7/8/2021
				JN:	1445-2020-04
Measurement Address:		**City:**		**Site No.:**	1
251-351 Imperial Highway			La Habra		

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	07/07/2021	3:00 PM
4	94.0	07/07/2021	3:05 PM

Notes:

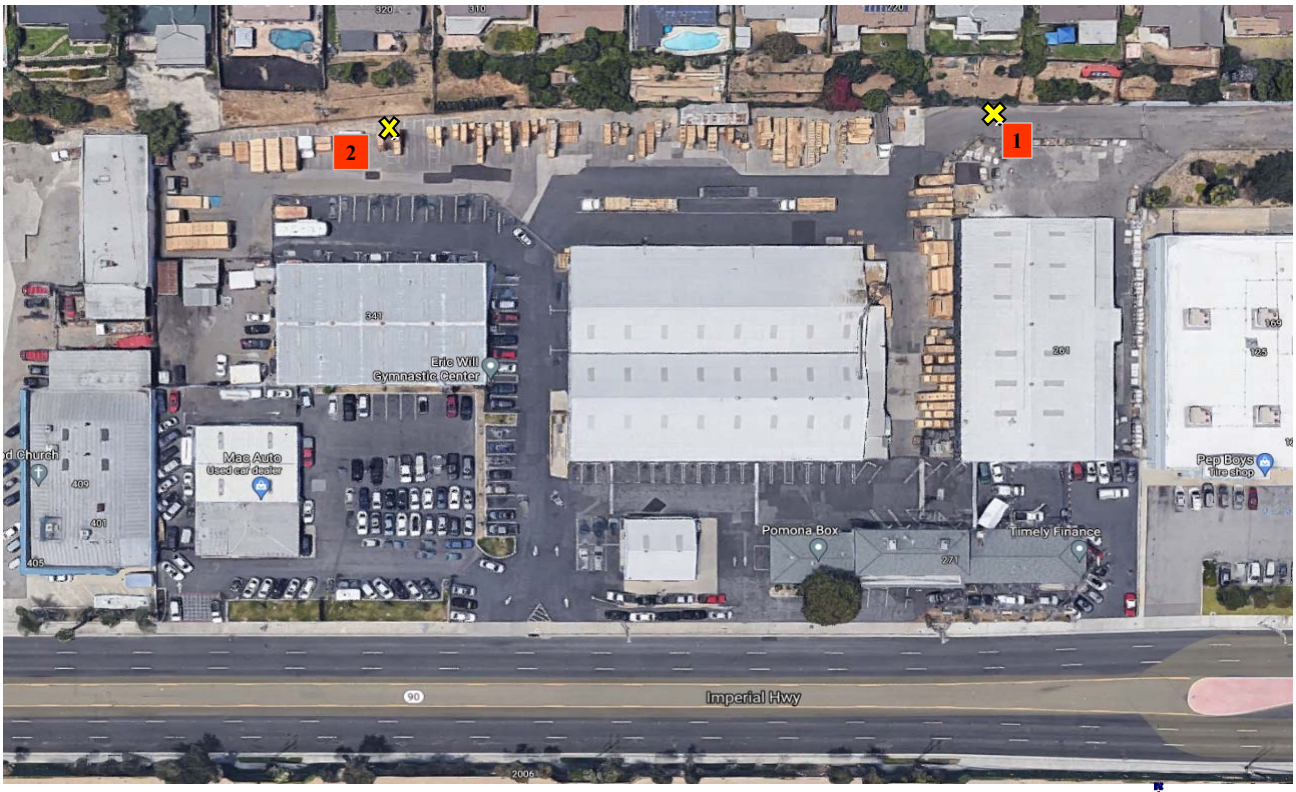
Temp:	79
Windspeed:	8 MPH
Direction:	SSW
Skies:	Clear
Camera:	
Photo Nos.	

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



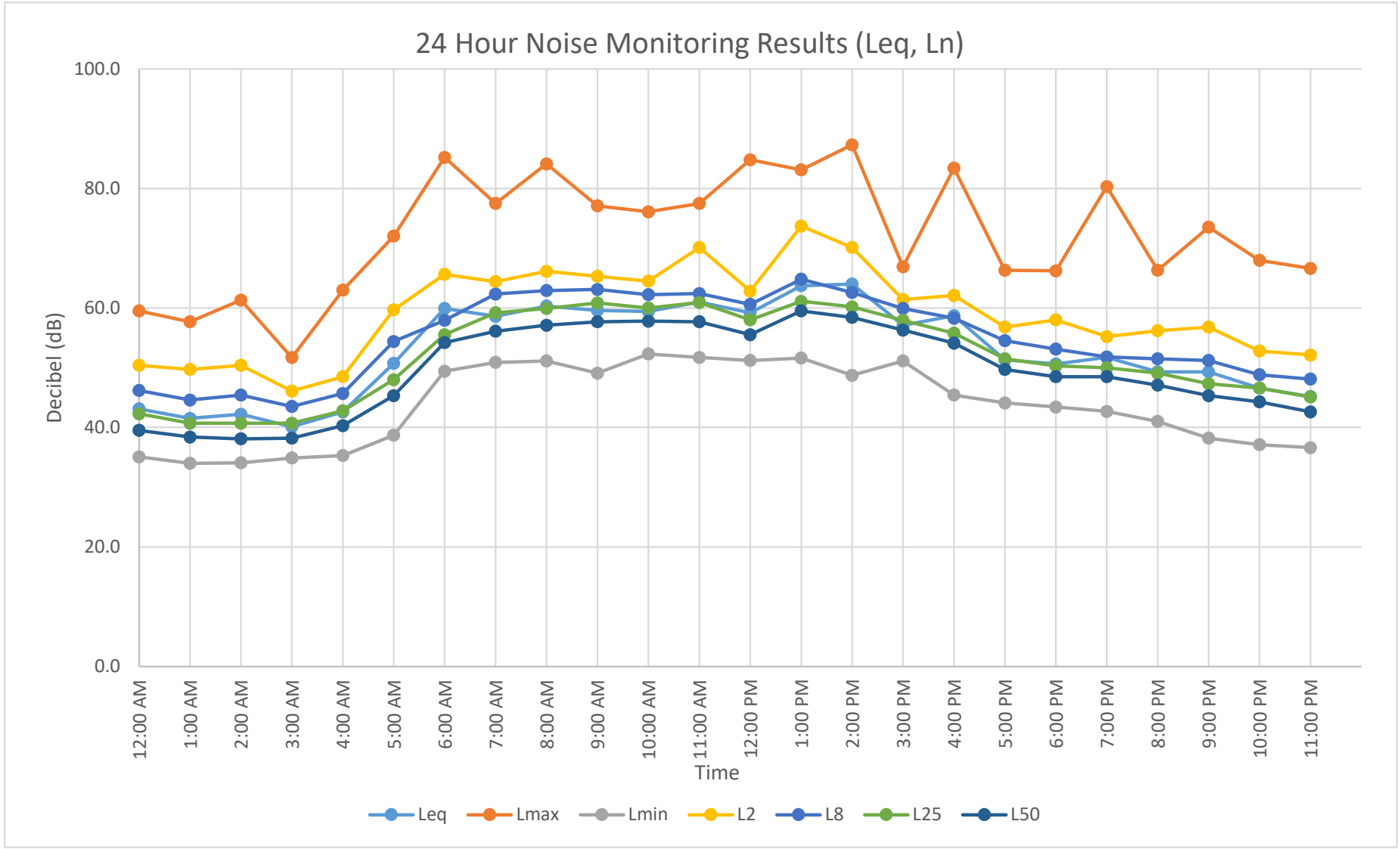
RK engineering group, inc.

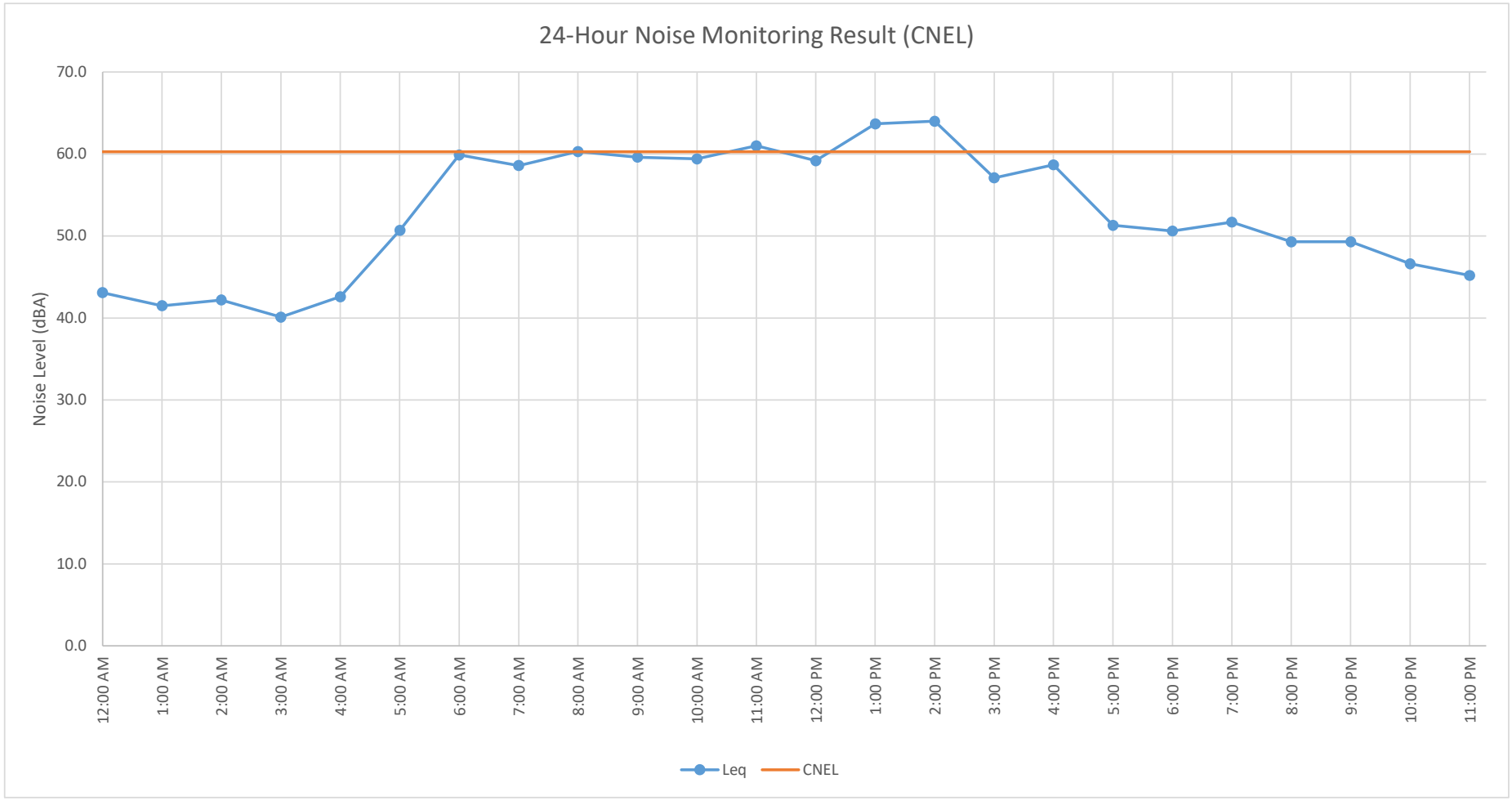
Field Sheet - ST1 Location Photos

Project:	Imperial & Euclid Residential Development	**Engineer:** D. Shivaiah	**Date:** 7/8/2021
			JN: 1445-2020-04
Measurement Address:		**City:** La Habra	**Site No.:** 1
Along the northern property line approximately 65 feet from the eastern property line.			

RK engineering group, inc.

PROJECT:	Imperial & Residential Development					JOB #:	1445-2020-04
NOISE METER	Piccolo II SLM, 24-Hour Measurement					DATE:	08-Jul-21
LOCATION:	Along the northern property line approximately 65 feet from the eastern property line.					BY:	D. Shivaiah
Time	Leq	Lmax	Lmin	L2	L8	L25	L50
12:00 AM	43.1	59.5	35.1	50.4	46.2	42.3	39.5
1:00 AM	41.5	57.7	34.0	49.7	44.6	40.7	38.4
2:00 AM	42.2	61.3	34.1	50.4	45.4	40.7	38.1
3:00 AM	40.1	51.7	34.9	46.1	43.5	40.7	38.2
4:00 AM	42.6	63.0	35.3	48.5	45.7	42.8	40.3
5:00 AM	50.7	72.0	38.7	59.7	54.4	48.0	45.3
6:00 AM	59.9	85.2	49.4	65.6	57.9	55.5	54.2
7:00 AM	58.6	77.5	50.9	64.4	62.3	59.2	56.1
8:00 AM	60.3	84.1	51.1	66.1	62.9	59.9	57.1
9:00 AM	59.6	77.1	49.1	65.3	63.1	60.8	57.7
10:00 AM	59.4	76.1	52.3	64.5	62.2	60.0	57.8
11:00 AM	61.0	77.5	51.7	70.1	62.4	60.9	57.7
12:00 PM	59.2	84.8	51.2	62.8	60.6	58.0	55.5
1:00 PM	63.7	83.1	51.6	73.7	64.8	61.1	59.5
2:00 PM	64.0	87.3	48.7	70.1	62.6	60.2	58.4
3:00 PM	57.1	66.9	51.1	61.4	59.9	57.9	56.3
4:00 PM	58.7	83.4	45.4	62.1	58.3	55.8	54.1
5:00 PM	51.3	66.3	44.1	56.8	54.5	51.5	49.7
6:00 PM	50.6	66.2	43.4	58.0	53.1	50.3	48.5
7:00 PM	51.7	80.3	42.7	55.2	51.8	50.0	48.5
8:00 PM	49.3	66.3	41.0	56.2	51.5	49.1	47.1
9:00 PM	49.3	73.5	38.2	56.8	51.2	47.3	45.3
10:00 PM	46.6	68.0	37.1	52.8	48.8	46.6	44.3
11:00 PM	45.2	66.6	36.6	52.1	48.1	45.1	42.6
Daytime	58.9	87.3	37.1	66.0	60.4	57.8	55.5
Nighttime	51.8	85.2	34.0	58.1	51.5	48.1	46.5


24 Hour Noise Monitoring Results (Leq, Ln)
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

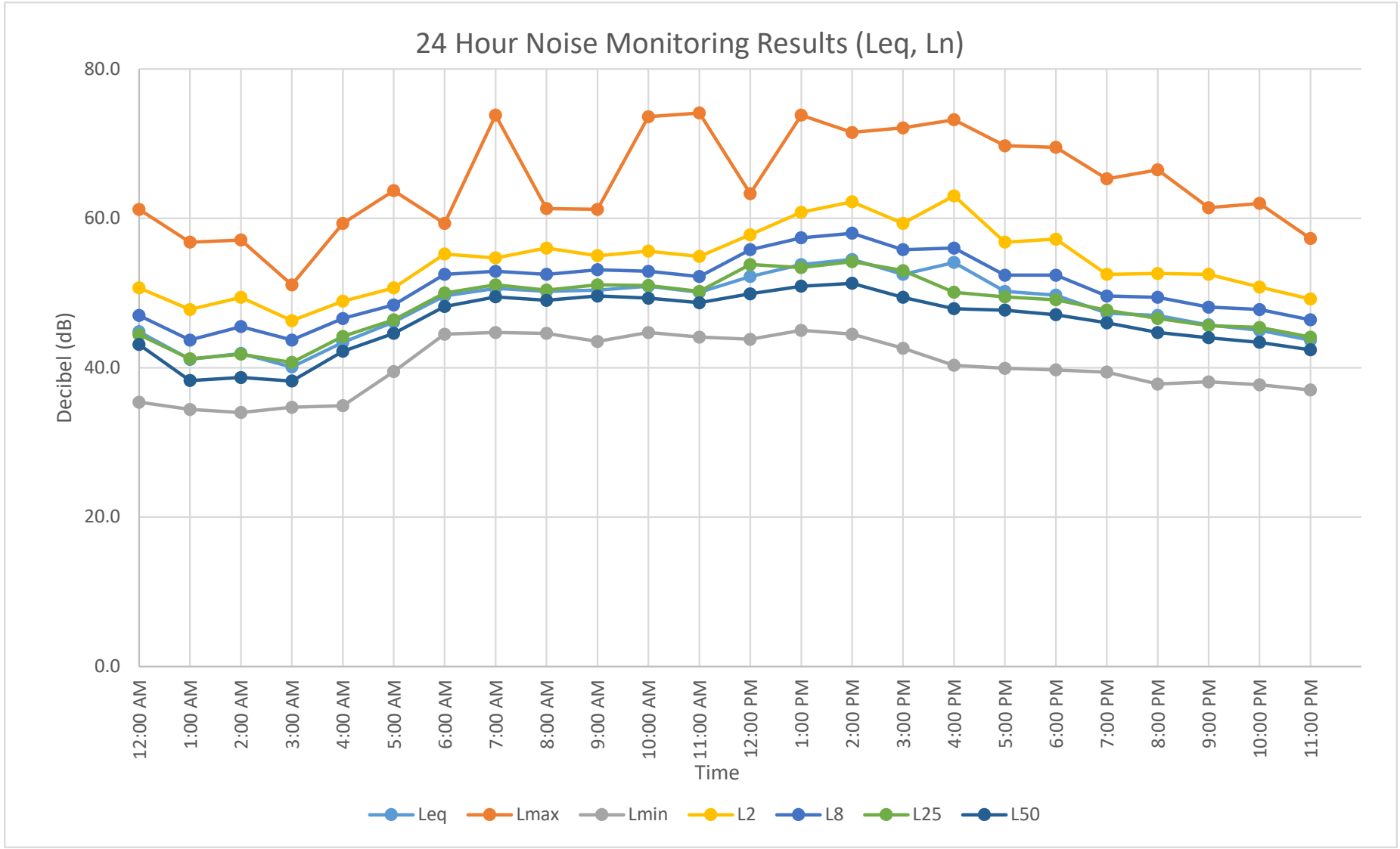

24-Hour Noise Monitoring Result (CNEL)
Noise Level (dBA)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Leq
CNEL

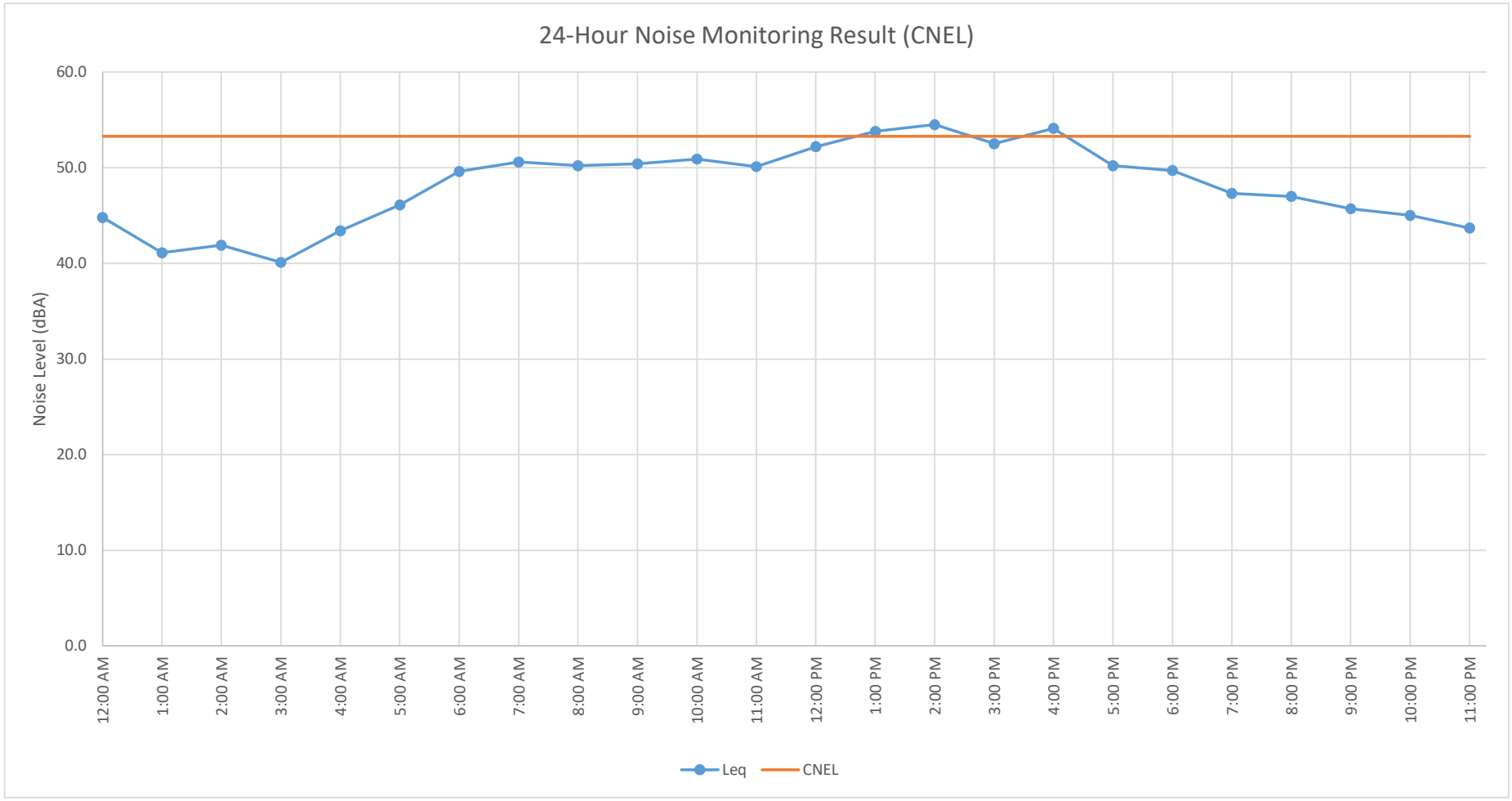
Field Sheet - ST2 Location Photos

Project:	Imperial & Euclid Residential Development	**Engineer:** D. Shivaiah	**Date:** 7/8/2021
			JN: 1445-2020-04
Measurement Address:		**City:** La Habra	**Site No.:** 2
Along the northern property line approximately 120 feet from the western property line.			

RK engineering group, inc.

PROJECT:	Imperial & Residential Development					JOB #:	1445-2020-04
NOISE METER	Piccolo II SLM, 24-Hour Measurement					DATE:	08-Jul-21
LOCATION:	Along the northern property line approximately 120 feet from the western property line.					BY:	D. Shivaiah
Time	Leq	Lmax	Lmin	L2	L8	L25	L50
12:00 AM	44.8	61.2	35.4	50.7	47.0	44.4	43.1
1:00 AM	41.1	56.8	34.4	47.8	43.7	41.2	38.3
2:00 AM	41.9	57.1	34.0	49.4	45.5	41.8	38.7
3:00 AM	40.1	51.1	34.7	46.3	43.7	40.7	38.2
4:00 AM	43.4	59.3	34.9	48.9	46.6	44.2	42.2
5:00 AM	46.1	63.7	39.5	50.7	48.4	46.4	44.6
6:00 AM	49.6	59.3	44.5	55.2	52.5	50.0	48.2
7:00 AM	50.6	73.8	44.7	54.7	52.9	51.1	49.5
8:00 AM	50.2	61.3	44.6	56.0	52.5	50.4	49.0
9:00 AM	50.4	61.2	43.5	55.0	53.1	51.1	49.6
10:00 AM	50.9	73.6	44.7	55.6	52.9	51.0	49.3
11:00 AM	50.1	74.1	44.1	54.9	52.2	50.2	48.7
12:00 PM	52.2	63.3	43.8	57.8	55.8	53.8	49.9
1:00 PM	53.8	73.8	45.0	60.8	57.4	53.4	50.9
2:00 PM	54.5	71.5	44.5	62.2	58.0	54.2	51.3
3:00 PM	52.5	72.1	42.6	59.3	55.8	53.0	49.4
4:00 PM	54.1	73.2	40.3	63.0	56.0	50.1	47.9
5:00 PM	50.2	69.7	39.9	56.8	52.4	49.5	47.7
6:00 PM	49.7	69.5	39.7	57.2	52.4	49.1	47.1
7:00 PM	47.3	65.3	39.4	52.5	49.6	47.7	46.0
8:00 PM	47.0	66.5	37.8	52.6	49.4	46.6	44.7
9:00 PM	45.7	61.4	38.1	52.5	48.1	45.6	44.0
10:00 PM	45.0	62.0	37.7	50.8	47.8	45.4	43.4
11:00 PM	43.7	57.3	37.0	49.2	46.4	44.1	42.4
Daytime	51.1	74.1	37.7	57.8	53.9	50.9	48.6
Nighttime	44.9	63.7	34.0	50.6	47.7	45.2	43.3


24 Hour Noise Monitoring Results (Leq, Ln)
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)
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 D

Noise Analysis Results
(SoundPLAN Results Sheets)

Noise emissions of industry sources

Source name	Reference	Level		Corrections		
		Day	Night	Cwall	CI	CT
		dB(A)	dB(A)	dB	dB	dB
HVAC-1	Lw/unit	76.0	76.0	-	-	-
HVAC-2	Lw/unit	76.0	76.0	-	-	-
HVAC-3	Lw/unit	76.0	76.0	-	-	-
HVAC-4	Lw/unit	76.0	76.0	-	-	-
HVAC-5	Lw/unit	76.0	76.0	-	-	-
HVAC-6	Lw/unit	76.0	76.0	-	-	-
HVAC-7	Lw/unit	76.0	76.0	-	-	-
HVAC-8	Lw/unit	76.0	76.0	-	-	-
HVAC-9	Lw/unit	76.0	76.0	-	-	-
HVAC-10	Lw/unit	76.0	76.0	-	-	-
HVAC-11	Lw/unit	76.0	76.0	-	-	-
HVAC-12	Lw/unit	76.0	76.0	-	-	-
HVAC-13	Lw/unit	76.0	76.0	-	-	-
HVAC-14	Lw/unit	76.0	76.0	-	-	-
HVAC-15	Lw/unit	76.0	76.0	-	-	-
HVAC-16	Lw/unit	76.0	76.0	-	-	-
HVAC-17	Lw/unit	76.0	76.0	-	-	-
HVAC-18	Lw/unit	76.0	76.0	-	-	-
HVAC-19	Lw/unit	76.0	76.0	-	-	-
HVAC-20	Lw/unit	76.0	76.0	-	-	-
HVAC-21	Lw/unit	76.0	76.0	-	-	-
HVAC-22	Lw/unit	76.0	76.0	-	-	-
HVAC-23	Lw/unit	76.0	76.0	-	-	-
HVAC-24	Lw/unit	76.0	76.0	-	-	-
HVAC-25	Lw/unit	76.0	76.0	-	-	-
HVAC-26	Lw/unit	76.0	76.0	-	-	-
HVAC-27	Lw/unit	76.0	76.0	-	-	-
HVAC-28	Lw/unit	76.0	76.0	-	-	-
HVAC-29	Lw/unit	76.0	76.0	-	-	-
HVAC-30	Lw/unit	76.0	76.0	-	-	-
HVAC-31	Lw/unit	76.0	76.0	-	-	-
HVAC-32	Lw/unit	76.0	76.0	-	-	-
HVAC-33	Lw/unit	76.0	76.0	-	-	-
HVAC-34	Lw/unit	76.0	76.0	-	-	-
HVAC-35	Lw/unit	76.0	76.0	-	-	-
HVAC-36	Lw/unit	76.0	76.0	-	-	-
HVAC-37	Lw/unit	76.0	76.0	-	-	-
HVAC-38	Lw/unit	76.0	76.0	-	-	-
HVAC-39	Lw/unit	76.0	76.0	-	-	-
HVAC-40	Lw/unit	76.0	76.0	-	-	-
HVAC-41	Lw/unit	76.0	76.0	-	-	-
HVAC-42	Lw/unit	76.0	76.0	-	-	-
HVAC-43	Lw/unit	76.0	76.0	-	-	-
HVAC-44	Lw/unit	76.0	76.0	-	-	-
HVAC-45	Lw/unit	76.0	76.0	-	-	-
HVAC-46	Lw/unit	76.0	76.0	-	-	-
HVAC-47	Lw/unit	76.0	76.0	-	-	-
HVAC-48	Lw/unit	76.0	76.0	-	-	-
HVAC-49	Lw/unit	76.0	76.0	-	-	-
HVAC-50	Lw/unit	76.0	76.0	-	-	-
HVAC-51	Lw/unit	76.0	76.0	-	-	-
HVAC-52	Lw/unit	76.0	76.0	-	-	-
HVAC-53	Lw/unit	76.0	76.0	-	-	-
HVAC-54	Lw/unit	76.0	76.0	-	-	-
HVAC-55	Lw/unit	76.0	76.0	-	-	-
HVAC-56	Lw/unit	76.0	76.0	-	-	-
HVAC-57	Lw/unit	76.0	76.0	-	-	-
HVAC-58	Lw/unit	76.0	76.0	-	-	-
HVAC-59	Lw/unit	76.0	76.0	-	-	-
HVAC-60	Lw/unit	76.0	76.0	-	-	-
HVAC-61	Lw/unit	76.0	76.0	-	-	-
HVAC-62	Lw/unit	76.0	76.0	-	-	-
HVAC-63	Lw/unit	76.0	76.0	-	-	-
HVAC-64	Lw/unit	76.0	76.0	-	-	-
HVAC-65	Lw/unit	76.0	76.0	-	-	-

Noise emissions of industry sources

Source name	Reference	Level		Corrections		
		Day	Night	Cwall	CI	CT
		dB(A)	dB(A)	dB	dB	dB
HVAC-66	Lw/unit	76.0	76.0	-	-	-
HVAC-67	Lw/unit	76.0	76.0	-	-	-
HVAC-68	Lw/unit	76.0	76.0	-	-	-
HVAC-69	Lw/unit	76.0	76.0	-	-	-
HVAC-70	Lw/unit	76.0	76.0	-	-	-
HVAC-71	Lw/unit	76.0	76.0	-	-	-
HVAC-72	Lw/unit	76.0	76.0	-	-	-
HVAC-73	Lw/unit	76.0	76.0	-	-	-
HVAC-74	Lw/unit	76.0	76.0	-	-	-
HVAC-75	Lw/unit	76.0	76.0	-	-	-
HVAC-76	Lw/unit	76.0	76.0	-	-	-
HVAC-77	Lw/unit	76.0	76.0	-	-	-
HVAC-78	Lw/unit	76.0	76.0	-	-	-
HVAC-79	Lw/unit	76.0	76.0	-	-	-
HVAC-80	Lw/unit	76.0	76.0	-	-	-
HVAC-81	Lw/unit	76.0	76.0	-	-	-
HVAC-82	Lw/unit	76.0	76.0	-	-	-
HVAC-83	Lw/unit	76.0	76.0	-	-	-
HVAC-84	Lw/unit	76.0	76.0	-	-	-
HVAC-85	Lw/unit	76.0	76.0	-	-	-
HVAC-86	Lw/unit	76.0	76.0	-	-	-
HVAC-87	Lw/unit	76.0	76.0	-	-	-
HVAC-88	Lw/unit	76.0	76.0	-	-	-
HVAC-89	Lw/unit	76.0	76.0	-	-	-
HVAC-90	Lw/unit	76.0	76.0	-	-	-
HVAC-91	Lw/unit	76.0	76.0	-	-	-
HVAC-92	Lw/unit	76.0	76.0	-	-	-
HVAC-93	Lw/unit	76.0	76.0	-	-	-
HVAC-94	Lw/unit	76.0	76.0	-	-	-
HVAC-95	Lw/unit	76.0	76.0	-	-	-
HVAC-96	Lw/unit	76.0	76.0	-	-	-
HVAC-97	Lw/unit	76.0	76.0	-	-	-
HVAC-98	Lw/unit	76.0	76.0	-	-	-
HVAC-99	Lw/unit	76.0	76.0	-	-	-
HVAC-100	Lw/unit	76.0	76.0	-	-	-
HVAC-101	Lw/unit	76.0	76.0	-	-	-
HVAC-102	Lw/unit	76.0	76.0	-	-	-
HVAC-103	Lw/unit	76.0	76.0	-	-	-
HVAC-104	Lw/unit	76.0	76.0	-	-	-
HVAC-105	Lw/unit	76.0	76.0	-	-	-
HVAC-106	Lw/unit	76.0	76.0	-	-	-
HVAC-107	Lw/unit	76.0	76.0	-	-	-
HVAC-108	Lw/unit	76.0	76.0	-	-	-
HVAC-109	Lw/unit	76.0	76.0	-	-	-
HVAC-110	Lw/unit	76.0	76.0	-	-	-
HVAC-111	Lw/unit	76.0	76.0	-	-	-
HVAC-112	Lw/unit	76.0	76.0	-	-	-
HVAC-113	Lw/unit	76.0	76.0	-	-	-
HVAC-114	Lw/unit	76.0	76.0	-	-	-
HVAC-115	Lw/unit	76.0	76.0	-	-	-
HVAC-116	Lw/unit	76.0	76.0	-	-	-
HVAC-117	Lw/unit	76.0	76.0	-	-	-

Receiver list

No.	Receiver name	Building side	Floor	Limit		Level w/o NP		Level w NP		Difference		Conflict	
				Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
				dB(A)		dB(A)		dB(A)		dB		dB	
1	Residential to the North-1	-	GF	-	-	52.4	52.4	47.5	47.5	-4.9	-4.9	-	-
2	Residential to the North-2	-	GF	-	-	53.8	53.8	47.1	47.1	-6.7	-6.7	-	-
3	Residential to the North-3	-	GF	-	-	53.4	53.4	44.1	44.1	-9.3	-9.3	-	-
4	Residential to the North-4	-	GF	-	-	52.4	52.4	46.6	46.6	-5.9	-5.9	-	-

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP		Level w NP	
		Day	Night	Day	Night
		dB(A)		dB(A)	
Residential to the North-1 GF		52.4	52.4	47.5	47.5
HVAC-1	-	43.6	43.6	37.3	37.3
HVAC-2	-	44.0	44.0	37.8	37.8
HVAC-3	-	44.6	44.6	38.6	38.6
HVAC-4	-	46.1	46.1	40.5	40.5
HVAC-5	-	45.3	45.3	39.9	39.9
HVAC-6	-	36.8	36.8	34.8	34.8
HVAC-7	-	36.2	36.2	34.4	34.4
HVAC-8	-	29.2	29.2	28.5	28.5
HVAC-9	-	31.2	31.2	30.3	30.3
HVAC-10	-	24.9	24.9	24.5	24.5
HVAC-11	-	24.6	24.6	24.3	24.3
HVAC-12	-	22.7	22.7	22.4	22.4
HVAC-13	-	22.5	22.5	22.3	22.3
HVAC-14	-	21.2	21.2	21.2	21.2
HVAC-15	-	21.1	21.1	21.1	21.1
HVAC-16	-	19.8	19.8	19.8	19.8
HVAC-17	-	19.7	19.7	19.7	19.7
HVAC-18	-	30.3	30.3	28.3	28.3
HVAC-19	-	30.1	30.1	28.2	28.2
HVAC-20	-	29.9	29.9	28.2	28.2
HVAC-21	-	22.9	22.9	22.9	22.9
HVAC-22	-	22.4	22.4	22.4	22.4
HVAC-23	-	22.0	22.0	22.0	22.0
HVAC-24	-	15.9	15.9	15.9	15.9
HVAC-25	-	15.6	15.6	15.6	15.6
HVAC-26	-	28.9	28.9	28.9	28.9
HVAC-27	-	34.3	34.3	34.0	34.0
HVAC-28	-	13.8	13.8	13.8	13.8
HVAC-29	-	11.5	11.5	11.5	11.5
HVAC-30	-	11.2	11.2	11.2	11.2
HVAC-31	-	11.5	11.5	11.5	11.5
HVAC-32	-	25.0	25.0	25.0	25.0
HVAC-33	-	23.1	23.1	23.1	23.1
HVAC-34	-	15.3	15.3	15.3	15.3
HVAC-35	-	12.6	12.6	12.6	12.6
HVAC-36	-	10.1	10.1	10.1	10.1
HVAC-37	-	9.6	9.6	9.6	9.6
HVAC-38	-	11.1	11.1	11.1	11.1
HVAC-39	-	11.1	11.1	11.1	11.1
HVAC-40	-	11.1	11.1	11.1	11.1
HVAC-41	-	11.2	11.2	11.2	11.2
HVAC-42	-	13.1	13.1	13.1	13.1
HVAC-43	-	12.5	12.5	12.5	12.5
HVAC-44	-	7.9	7.9	7.9	7.9
HVAC-45	-	7.9	7.9	7.9	7.9
HVAC-46	-	8.6	8.6	8.6	8.6
HVAC-47	-	10.0	10.0	10.0	10.0
HVAC-48	-	9.1	9.1	9.1	9.1
HVAC-49	-	4.8	4.8	4.8	4.8
HVAC-50	-	4.6	4.6	4.6	4.6
HVAC-51	-	5.4	5.4	5.4	5.4
HVAC-52	-	5.4	5.4	5.4	5.4
HVAC-53	-	5.5	5.5	5.5	5.5
HVAC-54	-	5.4	5.4	5.4	5.4
HVAC-55	-	5.9	5.9	5.9	5.9
HVAC-56	-	6.0	6.0	6.0	6.0
HVAC-57	-	6.1	6.1	6.1	6.1
HVAC-58	-	6.2	6.2	6.2	6.2
HVAC-59	-	1.6	1.6	1.6	1.6
HVAC-60	-	2.7	2.7	2.7	2.7
HVAC-61	-	7.9	7.9	7.9	7.9
HVAC-62	-	7.8	7.8	7.8	7.8
HVAC-63	-	7.8	7.8	7.8	7.8

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP		Level w NP	
		Day	Night	Day	Night
		dB(A)		dB(A)	
HVAC-64	-	7.7	7.7	7.7	7.7
HVAC-65	-	2.0	2.0	2.0	2.0
HVAC-66	-	1.9	1.9	1.9	1.9
HVAC-67	-	1.9	1.9	1.9	1.9
HVAC-68	-	1.5	1.5	1.5	1.5
HVAC-69	-	1.4	1.4	1.4	1.4
HVAC-70	-	0.8	0.8	0.8	0.8
HVAC-71	-	0.8	0.8	0.8	0.8
HVAC-72	-	0.7	0.7	0.7	0.7
HVAC-73	-	-1.4	-1.4	-1.4	-1.4
HVAC-74	-	9.0	9.0	9.0	9.0
HVAC-75	-	4.7	4.7	4.7	4.7
HVAC-76	-	5.3	5.3	5.3	5.3
HVAC-77	-	10.2	10.2	10.2	10.2
HVAC-78	-	9.1	9.1	9.1	9.1
HVAC-79	-	9.1	9.1	9.1	9.1
HVAC-80	-	11.5	11.5	11.5	11.5
HVAC-81	-	11.3	11.3	11.3	11.3
HVAC-82	-	13.5	13.5	13.5	13.5
HVAC-83	-	11.2	11.2	11.2	11.2
HVAC-84	-	4.9	4.9	4.9	4.9
HVAC-85	-	4.7	4.7	4.7	4.7
HVAC-86	-	5.3	5.3	5.3	5.3
HVAC-87	-	4.9	4.9	4.9	4.9
HVAC-88	-	10.0	10.0	10.0	10.0
HVAC-89	-	6.2	6.2	6.2	6.2
HVAC-90	-	6.5	6.5	6.5	6.5
HVAC-91	-	6.6	6.6	6.6	6.6
HVAC-92	-	6.5	6.5	6.5	6.5
HVAC-93	-	6.4	6.4	6.4	6.4
HVAC-94	-	9.5	9.5	9.5	9.5
HVAC-95	-	3.9	3.9	3.9	3.9
HVAC-96	-	3.8	3.8	3.8	3.8
HVAC-97	-	8.5	8.5	8.5	8.5
HVAC-98	-	8.1	8.1	8.1	8.1
HVAC-99	-	3.2	3.2	3.2	3.2
HVAC-100	-	3.1	3.1	3.1	3.1
HVAC-101	-	3.9	3.9	3.9	3.9
HVAC-102	-	4.9	4.9	4.9	4.9
HVAC-103	-	4.1	4.1	4.1	4.1
HVAC-104	-	6.5	6.5	6.5	6.5
HVAC-105	-	5.4	5.4	5.4	5.4
HVAC-106	-	5.3	5.3	5.3	5.3
HVAC-107	-	5.4	5.4	5.4	5.4
HVAC-108	-	-1.0	-1.0	-1.0	-1.0
HVAC-109	-	-0.9	-0.9	-0.9	-0.9
HVAC-110	-	18.6	18.6	16.2	16.2
HVAC-111	-	13.2	13.2	11.3	11.3
HVAC-112	-	9.9	9.9	8.6	8.6
HVAC-113	-	10.3	10.3	8.6	8.6
HVAC-114	-	7.7	7.7	6.8	6.8
HVAC-115	-	5.4	5.4	4.5	4.5
HVAC-116	-	4.0	4.0	3.1	3.1
HVAC-117	-	-1.7	-1.7	-1.7	-1.7
Residential to the North-2	GF	53.8	53.8	47.1	47.1
HVAC-1	-	25.4	25.4	18.4	18.4
HVAC-2	-	25.2	25.2	18.8	18.8
HVAC-3	-	21.2	21.2	15.2	15.2
HVAC-4	-	33.8	33.8	31.7	31.7
HVAC-5	-	34.1	34.1	31.9	31.9
HVAC-6	-	40.8	40.8	36.5	36.5
HVAC-7	-	41.7	41.7	37.1	37.1
HVAC-8	-	49.4	49.4	41.1	41.1
HVAC-9	-	49.4	49.4	41.3	41.3

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP		Level w NP	
		Day	Night	Day	Night
		dB(A)		dB(A)	
HVAC-10	-	39.2	39.2	34.0	34.0
HVAC-11	-	37.3	37.3	32.9	32.9
HVAC-12	-	32.4	32.4	28.9	28.9
HVAC-13	-	32.1	32.1	28.8	28.8
HVAC-14	-	29.4	29.4	27.9	27.9
HVAC-15	-	29.1	29.1	27.7	27.7
HVAC-16	-	24.3	24.3	23.4	23.4
HVAC-17	-	24.1	24.1	23.3	23.3
HVAC-18	-	12.4	12.4	12.3	12.3
HVAC-19	-	13.1	13.1	12.3	12.3
HVAC-20	-	13.1	13.1	12.3	12.3
HVAC-21	-	11.9	11.9	11.4	11.4
HVAC-22	-	12.3	12.3	11.9	11.9
HVAC-23	-	12.2	12.2	11.9	11.9
HVAC-24	-	11.7	11.7	11.5	11.5
HVAC-25	-	11.1	11.1	10.8	10.8
HVAC-26	-	10.7	10.7	10.5	10.5
HVAC-27	-	11.2	11.2	10.7	10.7
HVAC-28	-	11.5	11.5	10.9	10.9
HVAC-29	-	12.5	12.5	12.4	12.4
HVAC-30	-	15.4	15.4	15.2	15.2
HVAC-31	-	15.1	15.1	15.0	15.0
HVAC-32	-	10.5	10.5	10.3	10.3
HVAC-33	-	10.0	10.0	9.8	9.8
HVAC-34	-	12.7	12.7	12.1	12.1
HVAC-35	-	11.6	11.6	11.5	11.5
HVAC-36	-	20.3	20.3	15.5	15.5
HVAC-37	-	18.7	18.7	14.2	14.2
HVAC-38	-	15.0	15.0	10.9	10.9
HVAC-39	-	14.8	14.8	10.7	10.7
HVAC-40	-	15.6	15.6	11.9	11.9
HVAC-41	-	15.8	15.8	12.0	12.0
HVAC-42	-	20.0	20.0	13.8	13.8
HVAC-43	-	19.6	19.6	13.6	13.6
HVAC-44	-	10.9	10.9	10.5	10.5
HVAC-45	-	10.9	10.9	10.4	10.4
HVAC-46	-	15.9	15.9	15.8	15.8
HVAC-47	-	15.7	15.7	15.6	15.6
HVAC-48	-	15.5	15.5	15.4	15.4
HVAC-49	-	10.9	10.9	10.6	10.6
HVAC-50	-	12.2	12.2	12.0	12.0
HVAC-51	-	9.0	9.0	8.8	8.8
HVAC-52	-	10.8	10.8	10.7	10.7
HVAC-53	-	9.2	9.2	8.9	8.9
HVAC-54	-	11.4	11.4	11.2	11.2
HVAC-55	-	11.1	11.1	10.5	10.5
HVAC-56	-	11.1	11.1	10.5	10.5
HVAC-57	-	11.1	11.1	10.4	10.4
HVAC-58	-	11.3	11.3	10.6	10.6
HVAC-59	-	9.8	9.8	9.8	9.8
HVAC-60	-	11.4	11.4	9.9	9.9
HVAC-61	-	11.9	11.9	11.1	11.1
HVAC-62	-	11.7	11.7	10.8	10.8
HVAC-63	-	11.7	11.7	10.7	10.7
HVAC-64	-	10.1	10.1	9.6	9.6
HVAC-65	-	7.7	7.7	7.3	7.3
HVAC-66	-	6.6	6.6	6.4	6.4
HVAC-67	-	6.5	6.5	6.3	6.3
HVAC-68	-	6.1	6.1	5.9	5.9
HVAC-69	-	6.0	6.0	5.8	5.8
HVAC-70	-	5.8	5.8	5.7	5.7
HVAC-71	-	5.7	5.7	5.7	5.7
HVAC-72	-	5.6	5.6	5.6	5.6
HVAC-73	-	4.3	4.3	4.3	4.3
HVAC-74	-	8.6	8.6	8.6	8.6

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP		Level w NP	
		Day	Night	Day	Night
		dB(A)		dB(A)	
HVAC-75	-	3.5	3.5	3.3	3.3
HVAC-76	-	3.6	3.6	3.5	3.5
HVAC-77	-	7.9	7.9	7.7	7.7
HVAC-78	-	5.9	5.9	5.7	5.7
HVAC-79	-	5.9	5.9	5.7	5.7
HVAC-80	-	6.1	6.1	6.0	6.0
HVAC-81	-	6.0	6.0	5.9	5.9
HVAC-82	-	5.5	5.5	5.2	5.2
HVAC-83	-	8.9	8.9	8.8	8.8
HVAC-84	-	5.2	5.2	5.1	5.1
HVAC-85	-	5.5	5.5	5.4	5.4
HVAC-86	-	5.9	5.9	5.5	5.5
HVAC-87	-	5.7	5.7	5.6	5.6
HVAC-88	-	9.7	9.7	9.6	9.6
HVAC-89	-	12.9	12.9	9.5	9.5
HVAC-90	-	11.8	11.8	8.9	8.9
HVAC-91	-	10.9	10.9	7.4	7.4
HVAC-92	-	7.4	7.4	5.3	5.3
HVAC-93	-	7.7	7.7	6.0	6.0
HVAC-94	-	8.8	8.8	6.8	6.8
HVAC-95	-	5.1	5.1	5.1	5.1
HVAC-96	-	5.1	5.1	5.1	5.1
HVAC-97	-	11.5	11.5	11.2	11.2
HVAC-98	-	10.9	10.9	10.9	10.9
HVAC-99	-	7.1	7.1	7.1	7.1
HVAC-100	-	6.2	6.2	6.2	6.2
HVAC-101	-	9.3	9.3	9.3	9.3
HVAC-102	-	8.7	8.7	8.7	8.7
HVAC-103	-	9.1	9.1	9.1	9.1
HVAC-104	-	11.2	11.2	10.8	10.8
HVAC-105	-	10.5	10.5	10.5	10.5
HVAC-106	-	10.4	10.4	10.4	10.4
HVAC-107	-	10.2	10.2	10.2	10.2
HVAC-108	-	4.8	4.8	4.8	4.8
HVAC-109	-	5.3	5.3	5.3	5.3
HVAC-110	-	18.9	18.9	15.7	15.7
HVAC-111	-	41.3	41.3	35.1	35.1
HVAC-112	-	24.4	24.4	20.0	20.0
HVAC-113	-	26.6	26.6	19.6	19.6
HVAC-114	-	16.7	16.7	15.4	15.4
HVAC-115	-	13.1	13.1	12.3	12.3
HVAC-116	-	9.8	9.8	8.9	8.9
HVAC-117	-	4.0	4.0	4.0	4.0
Residential to the North-3	GF	53.4	53.4	44.1	44.1
HVAC-1	-	14.3	14.3	13.2	13.2
HVAC-2	-	20.7	20.7	13.7	13.7
HVAC-3	-	20.5	20.5	14.1	14.1
HVAC-4	-	27.8	27.8	26.4	26.4
HVAC-5	-	28.0	28.0	26.5	26.5
HVAC-6	-	30.6	30.6	28.4	28.4
HVAC-7	-	31.0	31.0	28.6	28.6
HVAC-8	-	35.0	35.0	30.9	30.9
HVAC-9	-	35.8	35.8	31.0	31.0
HVAC-10	-	47.4	47.4	35.9	35.9
HVAC-11	-	48.1	48.1	36.3	36.3
HVAC-12	-	45.4	45.4	33.9	33.9
HVAC-13	-	44.4	44.4	33.5	33.5
HVAC-14	-	37.5	37.5	32.1	32.1
HVAC-15	-	36.8	36.8	31.9	31.9
HVAC-16	-	31.3	31.3	28.4	28.4
HVAC-17	-	30.9	30.9	28.2	28.2
HVAC-18	-	9.0	9.0	7.8	7.8
HVAC-19	-	9.0	9.0	7.8	7.8
HVAC-20	-	8.9	8.9	7.8	7.8

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP		Level w NP	
		Day	Night	Day	Night
		dB(A)		dB(A)	
HVAC-21	-	7.2	7.2	5.7	5.7
HVAC-22	-	7.1	7.1	5.6	5.6
HVAC-23	-	7.0	7.0	5.6	5.6
HVAC-24	-	5.0	5.0	4.7	4.7
HVAC-25	-	6.5	6.5	6.3	6.3
HVAC-26	-	7.3	7.3	6.8	6.8
HVAC-27	-	6.0	6.0	5.6	5.6
HVAC-28	-	7.5	7.5	7.2	7.2
HVAC-29	-	8.9	8.9	8.8	8.8
HVAC-30	-	11.7	11.7	10.3	10.3
HVAC-31	-	11.2	11.2	10.6	10.6
HVAC-32	-	5.4	5.4	5.1	5.1
HVAC-33	-	6.3	6.3	6.1	6.1
HVAC-34	-	7.7	7.7	7.5	7.5
HVAC-35	-	9.8	9.8	9.1	9.1
HVAC-36	-	10.3	10.3	9.4	9.4
HVAC-37	-	9.6	9.6	9.0	9.0
HVAC-38	-	8.4	8.4	7.9	7.9
HVAC-39	-	8.3	8.3	7.8	7.8
HVAC-40	-	8.6	8.6	8.1	8.1
HVAC-41	-	8.7	8.7	8.2	8.2
HVAC-42	-	10.4	10.4	9.5	9.5
HVAC-43	-	10.2	10.2	9.4	9.4
HVAC-44	-	8.5	8.5	8.3	8.3
HVAC-45	-	8.6	8.6	8.3	8.3
HVAC-46	-	18.2	18.2	16.4	16.4
HVAC-47	-	18.8	18.8	16.5	16.5
HVAC-48	-	19.8	19.8	16.4	16.4
HVAC-49	-	14.2	14.2	14.0	14.0
HVAC-50	-	12.9	12.9	12.6	12.6
HVAC-51	-	13.4	13.4	12.8	12.8
HVAC-52	-	13.5	13.5	12.9	12.9
HVAC-53	-	13.3	13.3	12.7	12.7
HVAC-54	-	13.6	13.6	13.0	13.0
HVAC-55	-	13.3	13.3	11.7	11.7
HVAC-56	-	13.3	13.3	11.8	11.8
HVAC-57	-	13.5	13.5	12.1	12.1
HVAC-58	-	13.4	13.4	12.0	12.0
HVAC-59	-	13.4	13.4	12.5	12.5
HVAC-60	-	13.8	13.8	12.7	12.7
HVAC-61	-	14.4	14.4	13.7	13.7
HVAC-62	-	14.2	14.2	13.5	13.5
HVAC-63	-	14.0	14.0	13.3	13.3
HVAC-64	-	13.1	13.1	11.6	11.6
HVAC-65	-	9.2	9.2	8.5	8.5
HVAC-66	-	10.6	10.6	10.2	10.2
HVAC-67	-	10.5	10.5	10.1	10.1
HVAC-68	-	9.7	9.7	9.5	9.5
HVAC-69	-	9.6	9.6	9.4	9.4
HVAC-70	-	8.5	8.5	8.4	8.4
HVAC-71	-	8.4	8.4	8.2	8.2
HVAC-72	-	8.2	8.2	8.1	8.1
HVAC-73	-	6.5	6.5	6.0	6.0
HVAC-74	-	3.8	3.8	3.6	3.6
HVAC-75	-	2.9	2.9	2.7	2.7
HVAC-76	-	3.2	3.2	3.0	3.0
HVAC-77	-	6.1	6.1	5.9	5.9
HVAC-78	-	5.1	5.1	4.9	4.9
HVAC-79	-	5.1	5.1	4.8	4.8
HVAC-80	-	5.2	5.2	4.9	4.9
HVAC-81	-	5.1	5.1	4.9	4.9
HVAC-82	-	5.9	5.9	5.7	5.7
HVAC-83	-	7.9	7.9	7.7	7.7
HVAC-84	-	3.8	3.8	3.5	3.5
HVAC-85	-	4.0	4.0	3.8	3.8

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP		Level w NP	
		Day	Night	Day	Night
		dB(A)		dB(A)	
HVAC-86	-	4.8	4.8	4.4	4.4
HVAC-87	-	4.8	4.8	4.6	4.6
HVAC-88	-	9.3	9.3	8.9	8.9
HVAC-89	-	8.7	8.7	8.1	8.1
HVAC-90	-	7.3	7.3	7.1	7.1
HVAC-91	-	7.2	7.2	7.0	7.0
HVAC-92	-	7.5	7.5	7.4	7.4
HVAC-93	-	7.2	7.2	7.0	7.0
HVAC-94	-	8.0	8.0	7.8	7.8
HVAC-95	-	4.8	4.8	4.5	4.5
HVAC-96	-	5.1	5.1	4.5	4.5
HVAC-97	-	10.6	10.6	10.0	10.0
HVAC-98	-	10.4	10.4	9.9	9.9
HVAC-99	-	5.4	5.4	4.6	4.6
HVAC-100	-	6.4	6.4	5.5	5.5
HVAC-101	-	10.1	10.1	9.8	9.8
HVAC-102	-	10.0	10.0	9.7	9.7
HVAC-103	-	9.9	9.9	9.6	9.6
HVAC-104	-	10.8	10.8	10.2	10.2
HVAC-105	-	12.6	12.6	9.0	9.0
HVAC-106	-	12.5	12.5	8.8	8.8
HVAC-107	-	12.7	12.7	9.3	9.3
HVAC-108	-	6.3	6.3	5.5	5.5
HVAC-109	-	5.8	5.8	5.4	5.4
HVAC-110	-	11.7	11.7	10.0	10.0
HVAC-111	-	14.9	14.9	12.0	12.0
HVAC-112	-	20.4	20.4	16.7	16.7
HVAC-113	-	19.5	19.5	16.9	16.9
HVAC-114	-	41.3	41.3	33.9	33.9
HVAC-115	-	20.4	20.4	17.0	17.0
HVAC-116	-	15.5	15.5	14.1	14.1
HVAC-117	-	6.5	6.5	6.2	6.2
Residential to the North-4	GF	52.4	52.4	46.6	46.6
HVAC-1	-	9.8	9.8	5.4	5.4
HVAC-2	-	9.5	9.5	5.4	5.4
HVAC-3	-	9.3	9.3	5.5	5.5
HVAC-4	-	20.9	20.9	20.9	20.9
HVAC-5	-	21.0	21.0	21.0	21.0
HVAC-6	-	22.4	22.4	22.4	22.4
HVAC-7	-	22.6	22.6	22.6	22.6
HVAC-8	-	24.5	24.5	24.2	24.2
HVAC-9	-	24.8	24.8	24.4	24.4
HVAC-10	-	28.2	28.2	26.7	26.7
HVAC-11	-	28.7	28.7	27.0	27.0
HVAC-12	-	34.4	34.4	31.2	31.2
HVAC-13	-	32.3	32.3	28.7	28.7
HVAC-14	-	42.6	42.6	37.6	37.6
HVAC-15	-	43.8	43.8	38.4	38.4
HVAC-16	-	48.1	48.1	41.4	41.4
HVAC-17	-	47.7	47.7	41.2	41.2
HVAC-18	-	8.1	8.1	8.1	8.1
HVAC-19	-	8.0	8.0	8.0	8.0
HVAC-20	-	8.0	8.0	8.0	8.0
HVAC-21	-	3.0	3.0	3.0	3.0
HVAC-22	-	2.9	2.9	2.9	2.9
HVAC-23	-	2.8	2.8	2.8	2.8
HVAC-24	-	1.8	1.8	1.8	1.8
HVAC-25	-	1.8	1.8	1.8	1.8
HVAC-26	-	5.0	5.0	5.0	5.0
HVAC-27	-	2.9	2.9	2.9	2.9
HVAC-28	-	5.5	5.5	5.5	5.5
HVAC-29	-	2.5	2.5	2.5	2.5
HVAC-30	-	9.5	9.5	9.5	9.5
HVAC-31	-	5.4	5.4	5.4	5.4

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP		Level w NP	
		Day	Night	Day	Night
		dB(A)		dB(A)	
HVAC-32	-	3.1	3.1	3.1	3.1
HVAC-33	-	2.3	2.3	2.3	2.3
HVAC-34	-	4.9	4.9	4.9	4.9
HVAC-35	-	6.2	6.2	6.2	6.2
HVAC-36	-	6.9	6.9	6.9	6.9
HVAC-37	-	6.8	6.8	6.8	6.8
HVAC-38	-	5.3	5.3	5.3	5.3
HVAC-39	-	6.4	6.4	6.4	6.4
HVAC-40	-	5.4	5.4	5.4	5.4
HVAC-41	-	5.4	5.4	5.4	5.4
HVAC-42	-	3.3	3.3	3.3	3.3
HVAC-43	-	6.5	6.5	6.5	6.5
HVAC-44	-	5.4	5.4	5.4	5.4
HVAC-45	-	5.1	5.1	5.1	5.1
HVAC-46	-	11.8	11.8	11.8	11.8
HVAC-47	-	11.9	11.9	11.9	11.9
HVAC-48	-	11.8	11.8	11.8	11.8
HVAC-49	-	8.6	8.6	8.6	8.6
HVAC-50	-	10.7	10.7	10.7	10.7
HVAC-51	-	11.2	11.2	11.2	11.2
HVAC-52	-	11.2	11.2	11.2	11.2
HVAC-53	-	11.3	11.3	11.3	11.3
HVAC-54	-	11.2	11.2	11.2	11.2
HVAC-55	-	10.7	10.7	10.7	10.7
HVAC-56	-	8.2	8.2	8.2	8.2
HVAC-57	-	8.4	8.4	8.4	8.4
HVAC-58	-	8.6	8.6	8.6	8.6
HVAC-59	-	11.0	11.0	11.0	11.0
HVAC-60	-	12.5	12.5	12.5	12.5
HVAC-61	-	15.5	15.5	15.5	15.5
HVAC-62	-	16.3	16.3	16.3	16.3
HVAC-63	-	21.0	21.0	21.0	21.0
HVAC-64	-	17.6	17.6	17.6	17.6
HVAC-65	-	18.9	18.9	18.9	18.9
HVAC-66	-	18.4	18.4	18.4	18.4
HVAC-67	-	17.9	17.9	17.9	17.9
HVAC-68	-	16.1	16.1	16.1	16.1
HVAC-69	-	17.2	17.2	17.2	17.2
HVAC-70	-	14.0	14.0	14.0	14.0
HVAC-71	-	13.7	13.7	13.7	13.7
HVAC-72	-	13.4	13.4	13.4	13.4
HVAC-73	-	6.7	6.7	6.7	6.7
HVAC-74	-	3.1	3.1	3.1	3.1
HVAC-75	-	-2.3	-2.3	-2.3	-2.3
HVAC-76	-	0.1	0.1	0.1	0.1
HVAC-77	-	1.0	1.0	1.0	1.0
HVAC-78	-	0.7	0.7	0.7	0.7
HVAC-79	-	0.7	0.7	0.7	0.7
HVAC-80	-	0.7	0.7	0.7	0.7
HVAC-81	-	0.6	0.6	0.6	0.6
HVAC-82	-	2.3	2.3	2.3	2.3
HVAC-83	-	3.2	3.2	3.2	3.2
HVAC-84	-	0.6	0.6	0.6	0.6
HVAC-85	-	1.0	1.0	1.0	1.0
HVAC-86	-	1.5	1.5	1.5	1.5
HVAC-87	-	1.8	1.8	1.8	1.8
HVAC-88	-	6.3	6.3	6.3	6.3
HVAC-89	-	5.1	5.1	5.1	5.1
HVAC-90	-	4.0	4.0	4.0	4.0
HVAC-91	-	3.9	3.9	3.9	3.9
HVAC-92	-	4.1	4.1	4.1	4.1
HVAC-93	-	4.0	4.0	4.0	4.0
HVAC-94	-	5.8	5.8	5.8	5.8
HVAC-95	-	2.3	2.3	2.3	2.3
HVAC-96	-	2.6	2.6	2.6	2.6

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP		Level w NP	
		Day	Night	Day	Night
		dB(A)		dB(A)	
HVAC-97	-	8.4	8.4	8.4	8.4
HVAC-98	-	11.7	11.7	11.7	11.7
HVAC-99	-	3.3	3.3	3.3	3.3
HVAC-100	-	4.0	4.0	4.0	4.0
HVAC-101	-	11.0	11.0	11.0	11.0
HVAC-102	-	10.9	10.9	10.9	10.9
HVAC-103	-	10.8	10.8	10.8	10.8
HVAC-104	-	10.1	10.1	10.1	10.1
HVAC-105	-	8.6	8.6	8.6	8.6
HVAC-106	-	9.0	9.0	9.0	9.0
HVAC-107	-	8.5	8.5	8.5	8.5
HVAC-108	-	4.6	4.6	4.6	4.6
HVAC-109	-	4.7	4.7	4.7	4.7
HVAC-110	-	5.7	5.7	3.9	3.9
HVAC-111	-	8.1	8.1	6.3	6.3
HVAC-112	-	10.1	10.1	8.5	8.5
HVAC-113	-	9.7	9.7	8.5	8.5
HVAC-114	-	11.9	11.9	10.8	10.8
HVAC-115	-	16.0	16.0	14.9	14.9
HVAC-116	-	22.9	22.9	19.1	19.1
HVAC-117	-	7.0	7.0	7.0	7.0

Appendix E

Construction and Vibration Analysis Results

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/28/2021
Case Description: Imperial & Euclid Residential Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Demolition	Residential	55	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	50	0
Excavator	No	40		80.7	50	0
Dozer	No	40		81.7	50	0
Excavator	No	40		80.7	50	0
Excavator	No	40		80.7	50	0
Dozer	No	40		81.7	50	0

Results

	Calculated (dBA)	
Equipment	*Lmax	Leq
Concrete Saw	89.6	82.6
Excavator	80.7	76.7
Dozer	81.7	77.7
Excavator	80.7	76.7
Excavator	80.7	76.7
Dozer	81.7	77.7
Total	89.6	86.4

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/28/2021
Case Description: Imperial & Euclid Residential Development

				---- Receptor #1 ----			
		Baselines (dBA)					
Description	Land Use	Daytime	Evening	Night			
Site Preparation	Residential	55	50	50			

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	50	0
Tractor	No	40	84		50	0
Dozer	No	40		81.7	50	0
Dozer	No	40		81.7	50	0
Tractor	No	40	84		50	0
Tractor	No	40	84		50	0
Tractor	No	40	84		50	0

Calculated (dBA)

Equipment		*Lmax	Leq
Dozer		81.7	77.7
Tractor		84	80
Dozer		81.7	77.7
Dozer		81.7	77.7
Tractor		84	80
Tractor		84	80
Tractor		84	80
	Total	84	87.6

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/28/2021
Case Description: Imperial & Euclid Residential Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Grading	Residential	55	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	50	0
Grader	No	40	85		50	0
Dozer	No	40		81.7	50	0
Tractor	No	40	84		50	0
Tractor	No	40	84		50	0
Tractor	No	40	84		50	0

Results

		Calculated (dBA)	
Equipment		*Lmax	Leq
Excavator		80.7	76.7
Grader		85	81
Dozer		81.7	77.7
Tractor		84	80
Tractor		84	80
Tractor		84	80
	Total	85	87.3

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/28/2021
Case Description: Imperial & Euclid Residential Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Building Construction	Residential	55	50	50

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

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Crane		80.6	72.6
Pickup Truck		75	71
Generator		80.6	77.6
Tractor		84	80
Welder / Torch		74	70
Pickup Truck		75	71
Pickup Truck		75	71
Tractor		84	80
Tractor		84	80
	Total	84	86.3

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/28/2021
Case Description: Imperial & Euclid Residential Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Paving	Residential	55	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	50	0
Paver	No	50		77.2	50	0
Roller	No	20		80	50	0
Roller	No	20		80	50	0
Roller	No	20		80	50	0
Roller	No	20		80	50	0

		Calculated (dBA)	
Equipment		*Lmax	Leq
Paver		77.2	74.2
Paver		77.2	74.2
Roller		80	73
Roller		80	73
Roller		80	73
Roller		80	73
	Total	80	81.2

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/28/2021
Case Description: Imperial & Euclid Residential Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Architectural Coating	Residential	55	50	50

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	50	0

		Calculated (dBA)	
Equipment		*Lmax	Leq
Compressor (air)		77.7	73.7
	Total	77.7	73.7

*Calculated Lmax is the Loudest value.

VIBRATION IMPACTS FROM CONSTRUCTION AND OPERATIONS

PROJECT:	Imperial and Euclid Residential	JOB #:	1445-2020-04
ACTIVITY:	Construction Vibration	DATE:	3-Aug-21
LOCATION:	Receptors at 25 Feet	ENGINEER:	Darshan Shivaiah

VIBRATION INPUT/OUTPUT DATA

OTHER CONSTRUCTION EQUIPMENT

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

PPV =	**0.089 in/sec**

Equipment Type =	2	Large Bulldozer
PPV_{ref} =	0.089	Reference PPV at 25 ft.
D =	25.00	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:	Imperial and Euclid Residential	JOB #:	1445-2020-04
ACTIVITY:	Construction Vibration	DATE:	3-Aug-21
LOCATION:	Receptors at 25 Feet	ENGINEER:	Darshan Shivaiah

VIBRATION INPUT/OUTPUT DATA

OTHER CONSTRUCTION EQUIPMENT

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

PPV =	**0.210 in/sec**

Equipment Type =	1	Vibratory Roller
PPV_{ref} =	0.210	Reference PPV at 25 ft.
D =	25.00	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:	Imperial and Euclid Residential	JOB #:	1445-2020-04
ACTIVITY:	Construction Vibration	DATE:	3-Aug-21
LOCATION:	Receptors at 25 Feet	ENGINEER:	Darshan Shivaiah

VIBRATION INPUT/OUTPUT DATA

OTHER CONSTRUCTION EQUIPMENT

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

PPV =	**0.076 in/sec**

Equipment Type =	4	Loaded Trucks
PPV_{ref} =	0.076	Reference PPV at 25 ft.
D =	25.00	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