12828 NEWHOPE RESIDENTIAL PROJECT NOISE IMPACT ANALYSIS

City of Garden Grove

Prepared for

COMPREHENSIVE PLANNING SERVICES

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TABLE OF CONTENTS

Section **Page**

1.0 INTRODUCTION & PROJECT DESCRIPTION 1
1.1 Purpose of Report & Study Objectives 1
1.2 Site Location & Project Description 1
1.3 Sensitive Receptors 1

2.0 FUNDAMENTAL OF NOISE 3
2.1 Noise 3
2.1.1 Noise Description 3
2.1.2 Tone Noise 4
2.1.3 Noise Propagation 4
2.1.4 Ground Absorption 4
2.1.5 Traffic Noise Prediction 5
2.2 Vibration Fundamentals 5
2.2.1 Vibration Description 5
2.2.2 Vibration Perception 6
2.2.3 Vibration Propagation 6
2.2.4 Construction Related Vibration Level Prediction 6

3.0 REGULATORY SETTING 8
3.1 Federal Regulations 8
3.2 State Regulations 9
3.3 Local Regulations 9
3.3.1 City of Garden Grove General Plan Noise Element 10

4.0 EXISTING NOISE CONDITIONS 13
4.1 Measurement Procedure & Criteria 13
4.2 Measurement Equipment 13
4.3 Measurement Locations 13
4.4 Noise Measurement and Results 13

4.0 NOISE AND VIBRATION ANALYSES 15
5.1 Impact Analyses 15
5.1.1 Construction Noise 16
5.1.2 Construction Best Management Practices 17
5.2 Operational Noise 18
5.2.1 Mechanical Equipment Noise 18
5.2.1 Parking Lot Noise 19
5.2.2 Project Generated Traffic Noise Levels 19

5.3 Groundborne Vibration 20
5.3.1 Construction Vibration 20
5.4 Airport Noise Levels 22

APPENDIX A: NOISE MEASUREMENT DATA

LIST OF TABLES

Table		Page
Table 1	Vibration Source Levels for Construction Equipment	7
Table 2	Noise and Land Use Compatibility Matrix	11
Table 3	Garden Grove Noise Standards	11
Table 4	Measured Noise Levels	14
Table 5	Maximum Construction Noise Levels	16
Table 6	Caltrans Guideline Vibration Damage Potential Threshold Criteria	21
Table 7	Project Typical Construction Equipment Vibration Levels	21

LIST OF EXHIBITS

Exhibit		Follows Page
Exhibit A	Proposed Project Site Location	1
Exhibit B	Proposed Site Plan	1
Exhibit C	Noise Measurement Locations	13

GLOSSARY

ADT	Average Daily Traffic
ANSI	American National Standards Institute
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
dBA/DD	A-weighted decibel per each doubling of distance
DOT	Department of Transportation
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FICON	Federal Interagency Committee on Noise
FTA	Federal Transit Administration
Hz	Hertz
Ldn	Day-Night Average Sound Level
Leq	Equivalent Sound Level
LV	Vibration Level
ONAC	Federal Office of Noise Abatement Control
ONC	California Department of Health Services Office of Noise Control
OSHA	Occupational Safety and Health Administration
PPV	peak particle velocity
RMS	root mean square
SEL	Single Event Level
sq ft	square feet
UMTA	Urban Mass Transit Administration
VdB	LV at 1 microinch per second

1.0 INTRODUCTION & PROJECT DESCRIPTION

1.1 Purpose of Report & Study Objectives

This Noise Impact Study has been prepared to determine the offsite and onsite noise impacts associated with the proposed 12828 Newhope Residential Project development (project). The following is provided in this report:

- A description of the study area and the proposed project.
- Information regarding the fundamentals of noise.
- Information regarding the fundamentals of vibration.
- A description of the local noise guidelines and standards.
- An evaluation of the current noise environment.
- An analysis of the potential short-term construction-related noise and vibration impacts from the proposed project.
- An analysis of long-term operations-related noise impacts from the proposed project.

1.2 Site Location & Project Description

The project site located at 12828 Newhope Street in the City of Garden Grove currently contains one single family detached residential unit which will be displaced by the proposed project. The project site is surrounded by existing residential uses to the north, south, east and west.

The proposed project consists of construction and operation of 15 detached single-family residential dwelling units. The project construction activities are expected to begin in June 2024 and the project will be operational in the year 2025. The project site would be balanced and would not involve an import/export of earthwork materials.

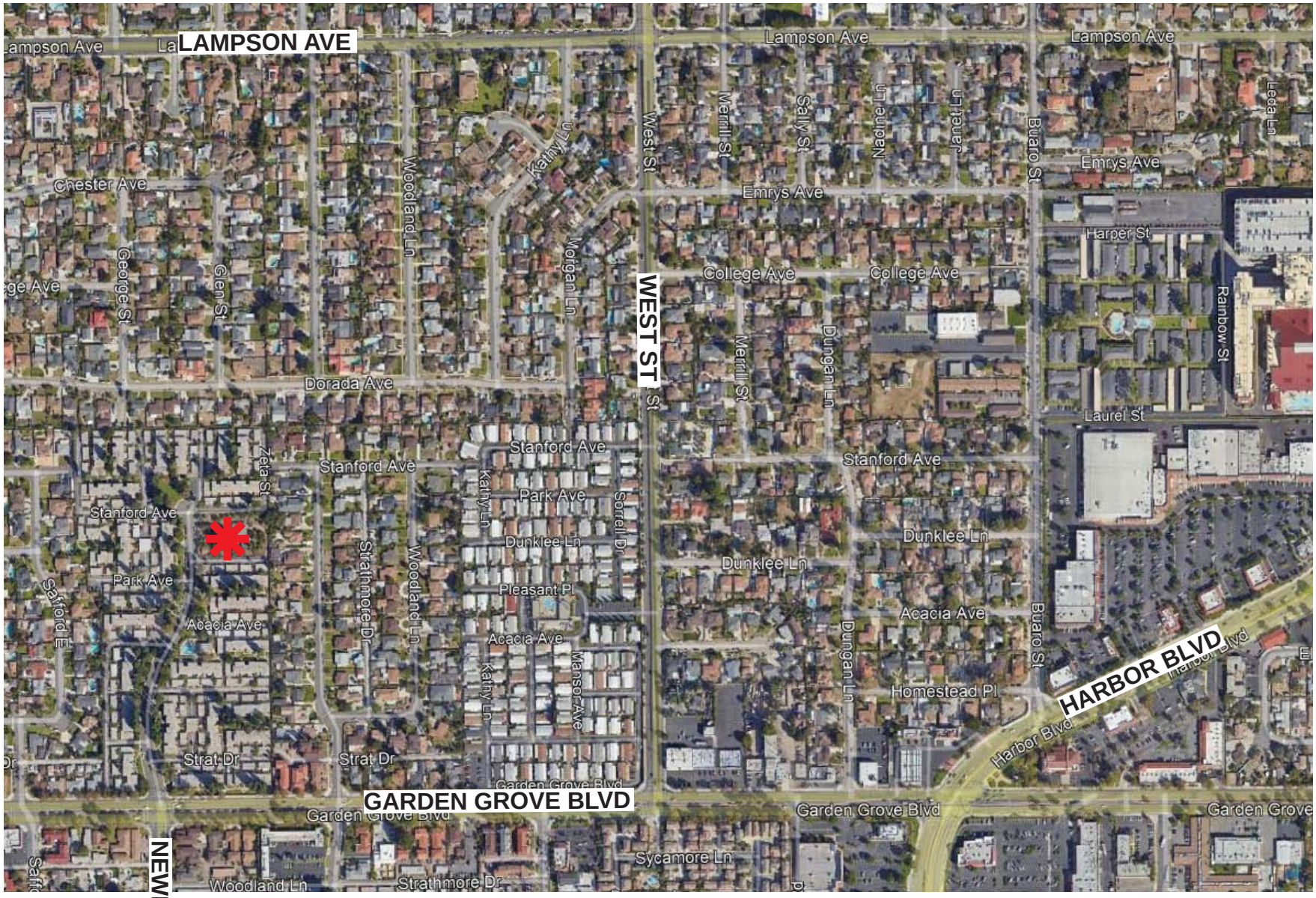
Exhibit A shows the project site location. Exhibit B shows the proposed site plan.

1.3 Sensitive Receptors

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the

potential for increased and prolonged exposure of individuals to both interior and exterior noise levels.

Several sensitive land uses are located surrounding the project site. The closest existing noise sensitive receptors (to the site area) are residential uses located immediately to the east of the project site. The project site is also surrounded by residential uses approximately 30 feet to the north and south and approximately 85 feet to the west of the project site.



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Site Location

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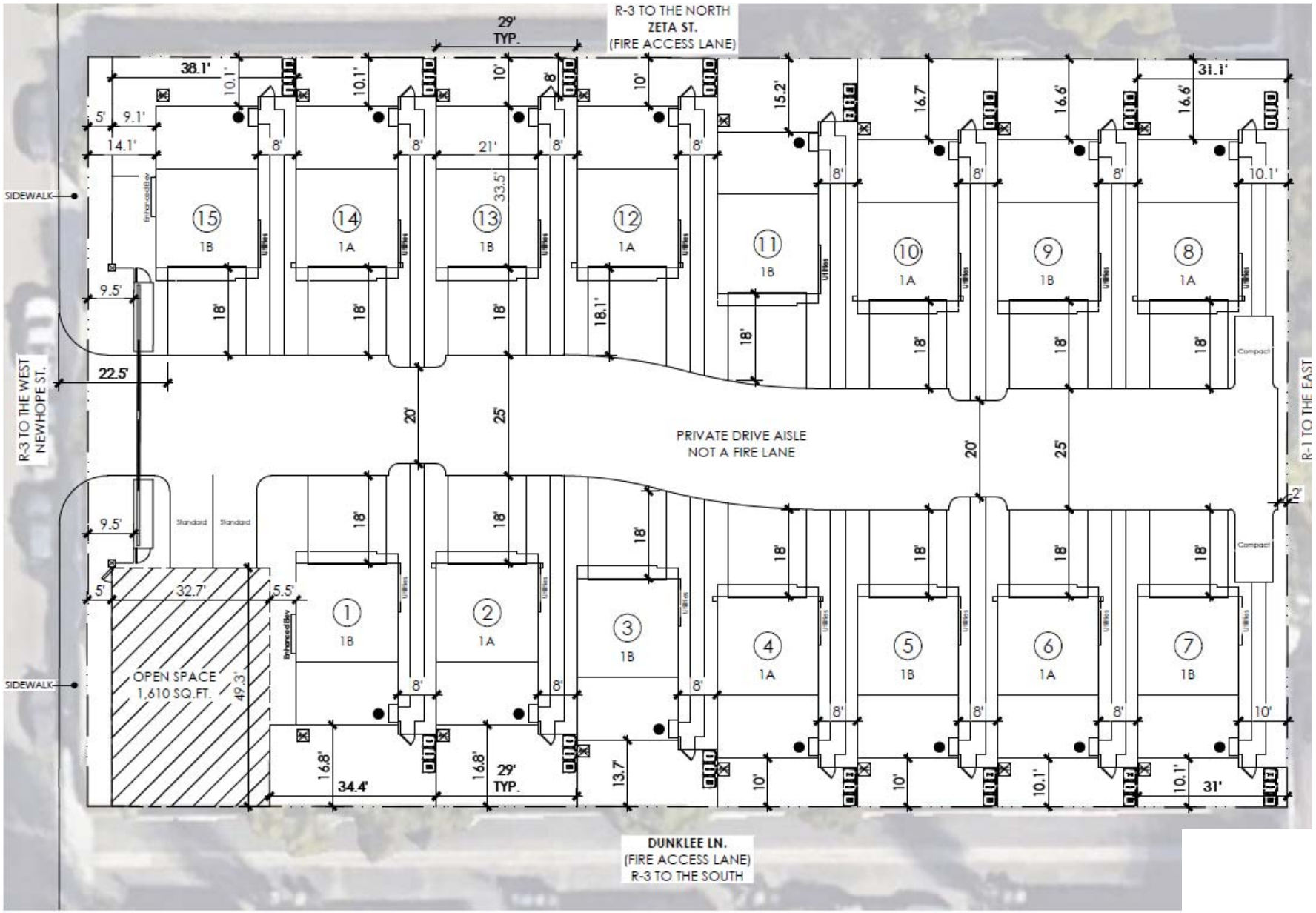
Project Location

Exhibit A



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Site Plan

Exhibit B

2.0 FUNDAMENTAL OF NOISE

2.1 Noise

Noise is defined as unwanted sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit, which expresses the ratio of the sound pressure level being measured to a standard reference level. A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies that are audible to the human ear.

2.1.1 Noise Description

Noise equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in dBA. The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The peak traffic hour Leq is the noise metric used by California Department of Transportation (Caltrans) for all traffic noise impact analyses.

The Day-Night Average Sound Level (Ldn) is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time-of-day corrections require the addition of ten decibels to sound levels at night between 10 p.m. and 7 a.m. While the Community Noise Equivalent Level (CNEL) is like the Ldn, except that it has another addition of 4.77 dB to sound levels during the evening hours between 7 p.m. and 10 p.m. These additions are made to the sound levels at these times because during the evening and nighttime hours, when compared to daytime hours, there is a decrease in the ambient noise levels, which creates an increased sensitivity to sounds. For this reason, the sound is perceived to be louder in the evening and nighttime hours and is weighted accordingly. Many cities rely on the CNEL noise standard to assess transportation- related impacts on noise sensitive land uses.

Another noise descriptor that is used primarily for the assessment of aircraft noise impacts is the Sound Exposure Level, which is also called the Single Event Level (SEL). The SEL descriptor represents the acoustic energy of a single event (i.e., an aircraft overflight) normalized to one-second event duration. This is useful for comparing the acoustical energy of different events involving different durations of the noise sources. The SEL is based on an integration of the noise during the period when the noise first rises within 10 dBA of its maximum value and last falls below 10 dBA of its maximum value. The SEL is often 10 dBA greater, or more, than the LMAX since the SEL logarithmetically adds the Leq for each second of the duration of the noise.

2.1.2 Tone Noise

A pure tone noise is a noise produced at a single frequency and laboratory tests have shown the humans are more perceptible to changes in noise levels of a pure tone (Caltrans 1998). For a noise source to contain a “pure tone,” there must be a significantly higher A-weighted sound energy in a given frequency band than in the neighboring bands, thereby causing the noise source to “stand out” against other noise sources. A pure tone occurs if the sound pressure level in the one-third octave band with the tone exceeds the average of the sound pressure levels of the two contagious one-third octave bands by: 5 dB for center frequencies of 500 Hertz (Hz) and above; by 8 dB for center frequencies between 160 and 400 Hz; and by 15 dB for center frequencies of 125 Hz or less (Department of Health Services 1977).

2.1.3 Noise Propagation

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source as well as ground absorption, atmospheric effects and refraction, and shielding by natural and manmade features.

Sound from point sources, such as air conditioning condensers, radiate uniformly outward as it travels away from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD). Transportation noise sources such as roadways are typically analyzed as line sources, since at any given moment the receiver may be impacted by noise from multiple vehicles at various locations along the roadway. Because of the geometry of a line source, the noise drop-off rate associated with the geometric spreading of a line source is 3 dBA/DD.

2.1.4 Ground Absorption

The sound drop-off rate is highly dependent on the conditions of the land between the noise source and receiver. To account for this ground-effect attenuation (absorption), two types of site conditions are commonly used in traffic noise models: soft-site and hard-site conditions. Soft-site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. For point sources, a drop-off rate of 7.5 dBA/DD is typically observed over soft ground with landscaping, as compared with a 6.0 dBA/DD drop-off rate over hard ground such as asphalt, concrete, stone and very hard packed earth. For line sources a 4.5 dBA/DD is typically observed for soft-site conditions compared to the 3.0 dBA/DD drop-off rate for hard-site conditions. To be conservative, hard-site conditions were used in this analysis.

2.1.5 Traffic Noise Prediction

The level of traffic noise depends on the three primary factors: (1) the volume of the traffic, (2) the speed of the traffic, and (3) the number of trucks in the flow of traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and greater number of trucks.

Vehicle noise is a combination of the noise produced by the engine, exhaust, and tires. Because of the logarithmic nature of traffic noise levels, a doubling of the traffic volume (assuming that the speed and truck mix do not change) results in a noise level increase of 3 dBA. Based on the FHWA community noise assessment criteria, this change is "barely perceptible," for reference a doubling of perceived noise levels would require an increase of approximately 10 dBA. However, the 1992 findings of Federal Interagency Committee on Noise (FICON), which assessed changes in ambient noise levels resulting from aircraft operations, found that noise increases as low as 1.5 dB can cause annoyance, when the existing noise levels are already greater than 65 dB. The truck mix on a given roadway also has an effect on community noise levels. As the number of heavy trucks increases and becomes a larger percentage of the vehicle mix, adjacent noise levels increase.

2.2 Vibration Fundamentals

Groundborne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of groundborne vibrations typically only cause a nuisance to people, but at extreme vibration levels, damage to buildings may occur. Although groundborne 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. Groundborne noise is an effect of groundborne 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.

2.2.1 Vibration Description

Several different methods are used to quantify vibration amplitude such as the maximum instantaneous peak in the vibrations velocity, which is known as the peak particle velocity (PPV) or the root mean square (RMS) amplitude of the vibration velocity. Because of the typically small amplitudes of vibrations, vibration velocity is often expressed in decibels and is denoted as LV and is based on the RMS velocity amplitude. A commonly used abbreviation is VdB, which in this text, is when vibration level (LV) is based on the reference quantity of 1 microinch per second.

2.2.2 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. Offsite 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 groundborne noise or vibration.

2.2.3 Vibration Propagation

The propagation of groundborne vibration is not as simple to model as airborne noise. This is because noise in the air travels through a relatively uniform median, while groundborne vibrations travel through the earth, which may contain significant geological differences. 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 wave front, 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 wave front. 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 wave front. 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.

2.2.4 Construction Related Vibration Level Prediction

Construction activity can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of the construction site respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. Table 1 gives approximate vibration levels for particular construction activities. The data in Table 1 provides a reasonable estimate for a wide range of soil conditions.

Table 1
Vibration Source Levels for Construction Equipment

Equipment	Peak Particle Velocity (inches/second) at 25 feet	Approximate Vibration Level (LV) at 25 feet
Pile driver (impact)	1.518 (upper range) 0.644 (typical)	112 104
Pile driver (sonic)	0.734 upper range 0.170 typical	105 93
Clam shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall)	0.008 in soil 0.017 in rock	66 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

Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, September 2018.

3.0 REGULATORY SETTING

The proposed project is located in the City of Garden Grove and noise regulations are addressed through the efforts of 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 purposes:

- Promulgating noise emission standards for interstate commerce.
- Assisting state and local abatement efforts.
- Promoting noise education and research.

The Federal Office of Noise Abatement and Control (ONAC) was initially tasked with implementing the Noise Control Act. However, the ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees. For example, the Occupational Safety and Health Administration (OSHA) agency limits noise exposure of workers to 90 dB Leq or less for 8 continuous hours or 105 dB Leq or less for 1 continuous hour.

The Department of Transportation (DOT) assumed a significant role in noise control through its various operating agencies. The Federal Aviation Administration (FAA) regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the Federal Transit Administration (FTA). Transit noise is regulated by the federal Urban Mass Transit Administration (UMTA), while freeways that are part of the interstate highway system are regulated by the Federal Highway Administration (FHWA). Finally, the federal government actively advocates 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 sited adjacent to a highway or, alternately that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation sources, 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

Though not adopted by law, the State of California General Plan Guidelines 2017, published by the California Governor's Office of Planning and Research (OPR) (OPR Guidelines), provides guidance for the compatibility of projects within areas of specific noise exposure. The OPR Guidelines identify the suitability of various types of construction relative to a range of outdoor noise levels and provide each local community some flexibility in setting local noise standards that allow for the variability in community preferences. Findings presented in the Levels of Environmental Noise Document (EPA 1974) influenced the recommendations of the OPR Guidelines, most importantly in the choice of noise exposure metrics (i.e., Ldn or CNEL) and in the upper limits for the normally acceptable outdoor exposure of noise-sensitive uses.

The OPR Guidelines include a Noise and Land Use Compatibility Matrix which identifies acceptable and unacceptable community noise exposure limits for various land use categories. Where the "normally acceptable" range is used, it any special acoustical is defined as the highest noise level that should be considered for the construction of the buildings which do not incorporate treatment or noise mitigation. The "conditionally acceptable" or "normally unacceptable" ranges include conditions calling for detailed acoustical study prior to the construction or operation of the proposed project. The City of Indio has adopted their own version of the State Land Use Compatibility Guidelines for land use planning and to assess potential transportation noise impacts to proposed land uses (see Table 2). Title 24, Chapter 1, Article 4 of the California Administrative Code (California Noise Insulation Standards) requires noise insulation in new hotels, motels, apartment houses, and dwellings (other than single-family detached housing) that provides an annual average noise level of no more than 45 dBA CNEL. When such structures are located within a 60-dBA CNEL (or greater) noise contour, an acoustical analysis is required to ensure that interior levels do not exceed the 45-dBA CNEL annual threshold. In addition, Title 21, Chapter 6, Article 1 of the California Administrative Code requires that all habitable rooms, hospitals, convalescent homes, and places of worship shall have an interior CNEL of 45 dB or less due to aircraft noise.

Government Code Section 65302 mandates that the legislative body of each county and city in California 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 Local Regulations

The City of Garden Grove establish the following applicable goals policies related to noise and are shown below.

3.3.1 City of Garden Grove General Plan Noise Element

The Garden Grove General Plan Noise Element (General Plan Noise Element) examines noise sources in the City to identify and appraise the potential for noise conflicts and problem, and to identify ways to reduce existing and potential noise impacts. The Noise Element identifies projected noise levels and contains policies and programs to achieve and maintain noise levels compatible with various types of land uses, as well as prevent high noise levels in sensitive areas.

The City has developed land use compatibility standards, based on recommended parameters from the OPR, that rate compatibility using the terms normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable; refer to Table 2, *Noise and Land Use Compatibility Matrix*. These standards and criteria are incorporated into the land use planning process to reduce future noise and land use incompatibilities. This table is the primary tool that allows the City to ensure integrated planning for compatibility between land uses and outdoor noise.

The following goals and policies from the General Plan Noise Element are applicable to the project.

Goal N-1: Noise considerations must be incorporated into land use planning decisions.

> Policy N-1.3: Require noise reduction techniques in site planning, architectural design, and construction, where noise reduction is necessary consistent with the standards in Tables 7-1 and 7-2 (refer to Table 2 and Table 3, Garden Grove Noise Ordinance Standards, respectively), Title 24 of the California Code of Regulations, and Section 8.47 of the Municipal Code.
>
> Policy N-1.4: Ensure acceptable noise levels are maintained near schools, hospitals, convalescent homes, churches, and other noise sensitive areas.
>
> Policy N-IMP-1A: Maintain a technical resource for builders, developers, and operators of construction equipment that discusses a variety of sound attenuation measures (e.g., temporary noise attenuation fences, preferential location of equipment, use of current technology and types of noise suppression equipment), the amount of noise reduction each produces, and how to combine them to meet City requirements.
>
> Policy N-IMP-1B: Require that new commercial, industrial, any redevelopment projects, or any proposed development near existing residential land use demonstrate compliance with the City's Noise Ordinance prior to approval of the project.
>
> Policy N-IMP-1D: Require construction activity to comply with the limits established in the City's Noise Ordinance.
>
> Policy N-IMP-1E: Require buffers or appropriate mitigation of potential noise sources on noise sensitive areas.
>
> Policy N-IMP-1K: Enforce the Noise Ordinance to ensure that stationary noise and noise emanating from construction activities, private development, and/or special events are minimized.

Table 2
Noise and Land Use Compatibility Matrix

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dBA)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential – Low Density, Single-Family, Duplex, Mobile Homes	50 – 60	55 – 70	70 – 75	75 – 85
Notes: NA = Not Applicable; L_{dn} = Day/Night Average; CNEL = community noise equivalent level; dBA = A-weighted decibels Normally Acceptable - Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements. Conditionally Acceptable - New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice. Normally Unacceptable - New Construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Clearly Unacceptable – New construction or development should generally not be undertaken.				
Source: City of Garden Grove, *Garden Grove General Plan, Noise Element, Table 7-1, Noise and Land Use Compatibility Matrix*, May 2008.				

Table 3
Garden Grove Noise Standards

Land Use Designation		Ambient Base Noise Level	Time Of Day
Sensitive Uses	Residential Use	55 dBA	7:00 a.m. – 10:00 p.m.
		50 dBA	10:00 p.m. – 7:00 a.m.
Conditionally Sensitive Uses	Institutional Use	65 dBA	Any Time
	Office-Professional Use	65 dBA	Any Time
	Hotels and Motels	65 dBA	Any Time
Non-Sensitive Uses	Commercial Uses	70 dBA	Any Time
	Commercial/Industrial Uses Within 150 feet of Residential Uses	65 dBA	7:00 a.m. – 10:00 p.m.
		50 dBA	10:00 p.m.– 7:00 a.m.
	Industrial Uses	70 dBA	Any Time
Source: City of Garde Grove, Municipal Code, Section 8.47.040, Ambient Base Noise Levels 2005.			

City of Garden Grove Municipal Code

The City maintains a comprehensive Noise Ordinance within its Municipal Code that establishes Citywide exterior noise level standards. The City's Noise Ordinance (Municipal Code Section 8.47, *Noise Control*) establishes daytime and nighttime noise standards; refer to Table 3. The Noise Ordinance is designed to control unnecessary, excessive and annoying sounds generated from a stationary source impacting an adjacent property. It differentiates between environmental and nuisance noise. Environmental noise is measured under a time average period while nuisance noise cannot exceed the established Noise Ordinance levels at any time.

At the boundary line between a residential property and a commercial and manufacturing property, the noise level of the quieter zone is required to be used. Any noise level that does not exceed either the ambient base noise level or the actual measured ambient noise level by 5 dB(A), as measured at the property line of the noise generation property, is permitted.

The following sections of the Municipal Code are applicable to the proposed Project.

8.47.050 General Noise Regulation

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

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

D. In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

8.47.060 Special Noise Sources

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

8.47.070 Exemptions

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

4.0 EXISTING NOISE CONDITIONS

To determine the existing noise level environment, short-term noise measurements were taken in the project study area at two locations in the project vicinity and surrounding receptors. The following describes the measurement procedures, measurement locations, and the noise measurement results.

4.1 Measurement Procedure & Criteria

To ascertain the existing noise at the project site, field monitoring was conducted on January 10th, 2024. The field survey noted that noise within the proposed project area is generally characterized by traffic noise propagating from Newport Street.

4.2 Measurement Equipment

Noise monitoring was performed using a Piccolo Type-2 sound level meter. The sound level meter was programmed in “slow” mode to record the sound pressure level at one second intervals for in A-weighted form.

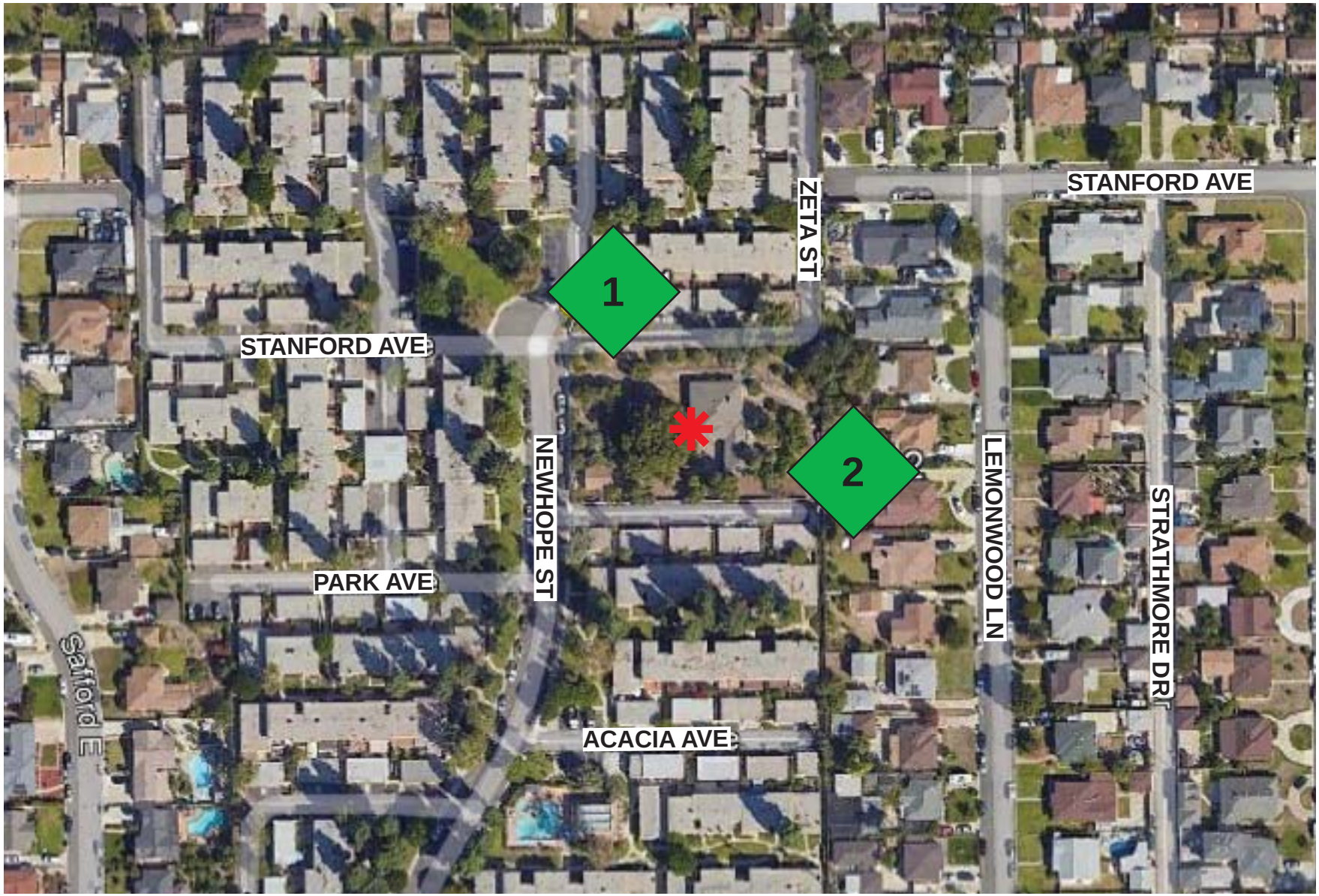
The sound level meters and microphones were mounted approximately five feet above the ground and equipped with a windscreen during all measurements. The sound level meter was calibrated before monitoring. The noise level measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters.

4.3 Measurement Locations

The noise monitoring locations were selected in order to obtain noise measurements of the current noise sources impacting the vicinity of the project site and the surroundings to provide a baseline for the existing noise levels. The noise measurement locations are shown in Exhibit C.

4.4 Noise Measurement and Results

The noise measurements were taken at two locations surrounding the project site near the existing noise sensitive receptors. The results of the noise level measurements are provided below in Table 4.



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Site Location

X Noise Measurement Location

Not to Scale

ENGINEERING, INC.

Noise Measurement Locations

12828 Newhope Street Residential Project, City of Garden Grove, California / 0038-2023-01

JAN/2024

Exhibit C

Table 4
Measured Noise Levels

Site No.	Location	Time	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)
1	At the northwest corner of the project site	11:12 a.m.	53.6	89.3	39.0
2	At the southeast corner of the project site	12:08 p.m.	51.3	75.4	41.6

Meteorological conditions consisted of clear skies, mild temperatures, with light wind speeds (3 miles per hour), and low humidity. Measured daytime noise levels ranged from 51.0 to 65.5 dBA L_{eq}. The results of the field measurements are included in Appendix A. Refer to Exhibit C for the noise measurement locations.

4.0 NOISE AND VIBRATION ANALYSES

Consistent with the California Environmental Quality Act (CEQA) and the CEQA Guidelines, a significant impact related to noise would occur if a proposed project were determined to 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.

b) Generation of excessive groundborne vibration or groundborne noise levels.

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

According to the CEQA checklist, to determine whether impacts to noise resources are significant environmental effects, the following thresholds are analyzed and evaluated:

- Exceedance of noise standards for construction and operational noise
- Groundborne vibration.
- Operational noise.
- Short-term construction noise.

Each of these thresholds is analyzed below.

5.1 Impact Analyses

This impact discussion analyzes the potential for project construction noise to cause an exposure of persons to or generation of noise levels in excess of established City of Garden Grove noise standards or applicable standards of other agencies. Noise levels in the project area would be influenced by construction activities.

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.

5.1.1 Construction Noise

Construction activities generally are temporary and have a short duration, resulting in periodic increases in the ambient noise environment. The project construction activities are expected to begin in June 2024 and the project will be operational in the year 2025 and would include the following phases: demolition, site preparation, grading, building construction, paving, and architectural coating. Ground-borne noise and other types of construction-related noise impacts typically occur during the initial demolition and grading phase. This phase of construction has the potential to create the highest levels of noise. Typical noise levels generated by construction equipment are shown in Table 4, Maximum Construction Noise Levels. It should be noted that the noise levels identified in Table 4 are maximum sound levels (L_{max}), which are the highest individual sound occurring at an individual time period. Operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be due to random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts).

Table 5
Maximum Construction Noise Levels

Type of Equipment	Acoustical Use Factor[1]	L_{max} at 50 Feet (dBA)[2]	L_{max} at 10 Feet (dBA)
Backhoe	40	78	92
Compressor	40	78	92
Concrete Saw	20	90	104
Dozer	40	82	96
Dump Truck	40	76	90
Excavator	40	81	95
Flatbed Truck	40	74	88
Grader	40	85	99
Loader	40	79	93
Paver	50	77	91
Roller	20	80	94
Scraper	40	85	99
Tractor	40	84	98
Water Truck	40	80	89
Welder	40	74	88

Note:
1. Acoustical Use Factor (percent): Estimates the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.
2. These noise levels represent the A-weighted maximum sound level (L_{max}) measured at a distance of 50 feet from the construction equipment.

Source: Federal Highway Administration, Roadway Construction Noise Model (FHWA-HEP-05-054), January 2006.

As shown, the highest noise levels from construction are predicted to range from approximately 88 dBA Lmax to 104 dBA Lmax at the nearest receivers at 10 feet. These maximum noise levels are considered to be a peak exposure, applicable to not more than 10%–15% of the total construction period, only while the construction activity is taking place along the property boundary closest to these nearest off-site receivers. The City does not have established numerical noise standards for construction noise if the construction activities occur within the allowable hours specified by the Municipal Code. Pursuant to Municipal Code Section 8.47.060 (D), *Special Noise Sources – Construction of Buildings and Projects*, it is unlawful for any person within a residential area or within 500 feet of a residential building to operate any construction equipment or perform construction or repair work between the hours of 10:00 p.m. of one day and 7:00 a.m. of the next day. No nighttime construction activities are proposed and thus, the project would comply with the permitted construction hours detailed in Municipal Code Section 8.47.060 (D). Adherence to the permitted hours of construction is required in recognition that construction activities undertaken during daytime hours are a typical part of living in an urban environment and do not cause a significant disruption.

Based on policies listed in the City's General Plan Noise Element, construction activities occurring within 500 feet of sensitive uses are required to implement techniques to minimize noise impacts on residences. Construction activities are expected to occur as close as 10 feet to the nearest single-family residential uses to the east of the project site. Thus, the project would be required to implement techniques to minimize noise impacts (such as utilizing noise muffling devices on construction equipment, installing temporary noise barriers along the construction staging site, and avoiding the simultaneous use of multiple construction equipment). However, there is an existing 5 to 6-foot noise barrier wall surrounding the project to the north, south, east and west of the project site. The project would further implement best management practices (BMP) to minimize noise impacts and construction activities occurring within the allowable hours specified by the Municipal Code. Therefore, with the help of BMPs and noise barrier wall which would break the line of sight between the construction equipment and the sensitive receptors, which would further attenuate construction noise by approximately 10 to 15 dBA.[1]

Thus, with incorporation of the construction BMPs shown below, impacts associated with short-term construction noise would be less than significant and no mitigation measures would be required.

5.1.2 Construction Best Management Practices

In order to further reduce construction noise levels, prior to the issuance of grading permits, the project Applicant or their designee should develop a Construction Noise Reduction Plan to minimize construction noise at nearby noise sensitive receptors. The Construction Noise Reduction Plan shall outline and identify noise complaint measures, best management practices, and equipment noise reduction measures. The Construction Noise Reduction Plan shall include, but is not limited to, the following actions:

[1] Federal Highway Administration, *Roadway Construction Noise Model User's Guide*, January 2006.

1. The construction contractor shall limit construction activities adjacent to existing noise-sensitive uses to daylight hours between 7:00 a.m. and 10:00 p.m. No construction activities are permitted during nighttime hours or holidays.

2. During all project site excavation and grading on-site, construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturer standards.

3. Equipment shall be shut off and not left to idle when not in use.

4. The contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise/vibration sources and nearest sensitive receptor buildings during all project construction activities.

5. The project proponent shall mandate that the construction contractor prohibit the use of music or sound amplification on the project site during construction.

6. Heavy construction truck traffic and hauling trips, and any required lane closures shall occur outside peak travel periods. Peak travel periods are considered to be from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m.

7. Jackhammers, pneumatic equipment and all other portable stationary noise sources shall be shielded, and noise shall be directed away from sensitive receptors.

8. For the duration of construction activities, the construction manager shall serve as the contact person should noise levels become disruptive to local residents. A sign should be posted on the project site with the contact phone number.

With use of BMPs (as applicable) construction-related noise impacts are considered to be less than significant.

5.2 Operational Noise

5.2.1 Mechanical Equipment Noise

Implementation of the project would result in changes to existing noise levels on and around the project site by developing new stationary sources of noise, including introduction of outdoor HVAC equipment. The nearest HVAC would be located approximately 45 feet from the nearest residential use to the east. These sources may affect noise-sensitive vicinity land uses off the project site. On-site operational noise is usually only evaluated for commercial and industrial projects. Quantitative analysis of on-site operational noise is typically not conducted for

residential projects as they usually do not include stationary noise sources that could result in substantial increases in ambient noise levels resulting in violation of established standards.

HVAC equipment typically result in noise levels that averages 66 dBA at 3 feet from the source.[2] Therefore, at 45 feet noise from the HVAC equipment would be approximately 42 dBA. Furthermore, the project is proposing to build a six foot noise barrier wall surrounding the project site which would further reduce the HVAC noise impacts. Therefore, the City's residential exterior daytime (55 dBA), residential exterior nighttime (50 dBA) noise standards per the City's Noise Ordinance would not be exceeded as a result of HVAC stationary noise at the project site. Additionally, HVAC units for the proposed project would be lower than the existing ambient noise levels of 51.3 dBA near the nearest sensitive receptor to the east. Thus, the proposed project would not impact the nearby sensitive receptors from HVAC units and impacts are considered less than significant.

5.2.2 Parking Lot Noise

Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the CNEL scale. However, the instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car pass-bys may be an annoyance to adjacent noise-sensitive receptors. The project proposes 62 parking spaces including 30 private garage spaces and two guest outdoor surface parking spaces. The nearest sensitive receptor would be located immediately adjacent to the proposed parking lot to the east. Parking lot noise levels could range between 53 dBA and 63 dBA at 50 feet. However, the project is proposing to build a six-foot noise barrier wall surrounding the project site which would shield the parking lot noise from the adjacent sensitive land uses. The noise barrier wall would break the line of sight between the parking activity and the sensitive receptors, which would further attenuate operational noise from the parking activity by approximately 8 dBA.[3] Further, parking lot noise would be consistent with the existing noise near the project site and would be partially masked by background noise from traffic along Newhope street. Thus, parking noise levels would not exceed the City's Noise Ordinance daytime (i.e., 55 dBA) and nighttime (i.e., 50 dBA) noise standards for residential uses. As such, the noise impacts from parking lot activities would be less than significant.

5.2.3 Project Generated Traffic Noise Levels

Based on the VMT Screen Memo, the project is expected to generate approximately 141 daily trips. The project is expected to provide full access along Newhope Street. The proposed project would represent a nominal increase in the daily traffic compared to the existing traffic conditions on the surrounding roadways. According to Caltrans, a doubling of Traffic (100

[2] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, Noise Navigator Sound Level Database with Over 1700 Measurement Values, June 26, 2015.
[3] Federal Highway Administration, *Roadway Construction Noise Model User's Guide*, January 2006.

percent increase) on a roadway would result in a perceptible increase in traffic noise levels (3 dBA)[4].

As a result, project-related increase in traffic volume would be nominal compared to the existing traffic volumes along the surrounding roadways and the project would not significantly increase the existing traffic noise levels. Thus, project's operational traffic noise levels are not expected to be significant.

b) Generation of excessive groundborne vibration or groundborne noise levels.

5.3 Groundborne Vibration

This impact discussion analyzes the potential for the proposed project to cause an exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels. Vibration levels in the project area would be influenced by construction activities.

5.3.1 Construction Vibration

Project construction can generate varying degrees of groundborne vibration, depending on the construction procedure and the construction equipment used. Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings in the vicinity of a construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The Caltrans Transportation and Construction Vibration Manual (Caltrans Manual) identifies various vibration damage criteria for different building classes. However, this evaluation conservatively uses the Caltrans architectural damage criterion for continuous vibrations at historic and some old buildings of 0.25 inch per second (inch/second) PPV. Table 6 shows the Caltrans Guideline Vibration Damage Potential Threshold Criteria for different building classes.

[4] California Department of Transportation, technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.

Table 6
Caltrans Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (inch/second)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

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.

Table 7 displays vibration levels for typical construction equipment.

Table 7
Project Typical Construction Equipment Vibration Levels

Equipment	Approximate peak particle velocity at 12 feet (inches/second)[1]
Large Bulldozer	0.1995
Loaded Trucks	0.1704
Small Bulldozers	0.0067

Calculated using the following formula:

PPV equip = PPVref x (25/D)1.1

where: PPV (equip) = the peak particle velocity in in/sec of the equipment adjusted for the distance

PPV (ref) = the reference vibration level in in/sec at 25 feet (inches/second)

D = the distance from the equipment to the receiver

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018.

Based on the site plans, construction activities would likely take place as near as approximately 12 feet from the nearest residential uses to the east. However, it is acknowledged that construction activities would occur throughout the project site and would not be concentrated at the point closest to the nearest structure.

Based on the vibration levels presented in Table 6, ground vibration generated by heavy-duty equipment would range from approximately 0.0067 to 0.1995 in/sec PPV at 12 feet from the source of activity. As such, the nearest residential buildings located 12 feet east of the project site would not be exposed to vibration levels exceeding the Caltrans 0.25 in/sec PPV significance threshold for vibration. Additionally, groundborne vibration during construction would be a temporary impact and would cease completely when construction ends. Once operational, the project would not be a source of groundborne vibration. Impacts would be less than significant.

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.

5.4 Airport Noise Levels

The nearest airport to the project site is the Fullerton Municipal Airport located approximately seven miles to the north. The project site is not located within the Fullerton Municipal Airport noise contours.[5] Additionally, the project site is not located within the vicinity of a private airstrip or related facilities. Therefore, project implementation would not expose people residing or working in the project area to excessive noise levels associated with aircraft. No impacts would occur in this regard.

[5] Orange County Airport Land Use Commission, *Airport Environs Land Use Plan for Fullerton Municipal Airport*, February 21, 2019.

APPENDIX A:
Noise Measurement Data

Site Number: NM-1		
Recorded Date: 01/10/2024		
Start Time: 11:17 a.m.		
Meteorological Data		
Sky:	**Wind Speed: (mph or m/s)**	**Temperature: (degree Fahrenheit)**
Clear	3 mph	68

Measurement Data			
Location	**L_{eq} (dBA)**	**L_{max} (dBA)**	**L_{min} (dBA)**
At the northwest corner of the project site	53.6	89.3	39.0
Ambient Noise Source: Traffic noise from the Newhope Street and airplane noise			

Noise Measurement Location Photo

Site Number: NM-2		
Recorded Date: 01/10/2024		
Start Time: 11:28 a.m.		
Meteorological Data		
Sky:	**Wind Speed: (mph or m/s)**	**Temperature: (degree Fahrenheit)**
Clear	3 mph	68

Measurement Data			
Location	**L_{eq} (dBA)**	**L_{max} (dBA)**	**L_{min} (dBA)**
At the southeast corner of the project site	51.3	75.4	41.6
Ambient Noise Source: Traffic noise from the Newhope Street and airplane noise			

Noise Measurement Location Photo