NOISE AND VIBRATION IMPACT ANALYSIS

GLENELDER RESIDENTIAL DEVELOPMENT

HACIENDA HEIGHTS, LOS ANGELES COUNTY, CALIFORNIA

LSA

October 2019

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Submitted to:

Lennar Homes
25 Enterprise, Suite 400
Aliso Viejo, California 92656

Prepared by:

LSA
20 Executive Park, Suite 200
Irvine, CA
(949) 553-0666

Project No. LHC1802

LSA

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LIST OF ABBREVIATIONS AND ACRONYMS

CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	decibels
dBA	A-weighted decibels
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HVAC	heating, ventilation, and air conditioning
in/sec	inches per second
L_{dn}	day-night average noise level
L_{eq}	equivalent continuous sound level
L_{max}	maximum instantaneous noise level
LSA	LSA Associates, Inc.
L_V	velocity in decibels
PPV	peak particle velocity
RMS	root-mean-square (velocity)
VdB	vibration velocity decibels

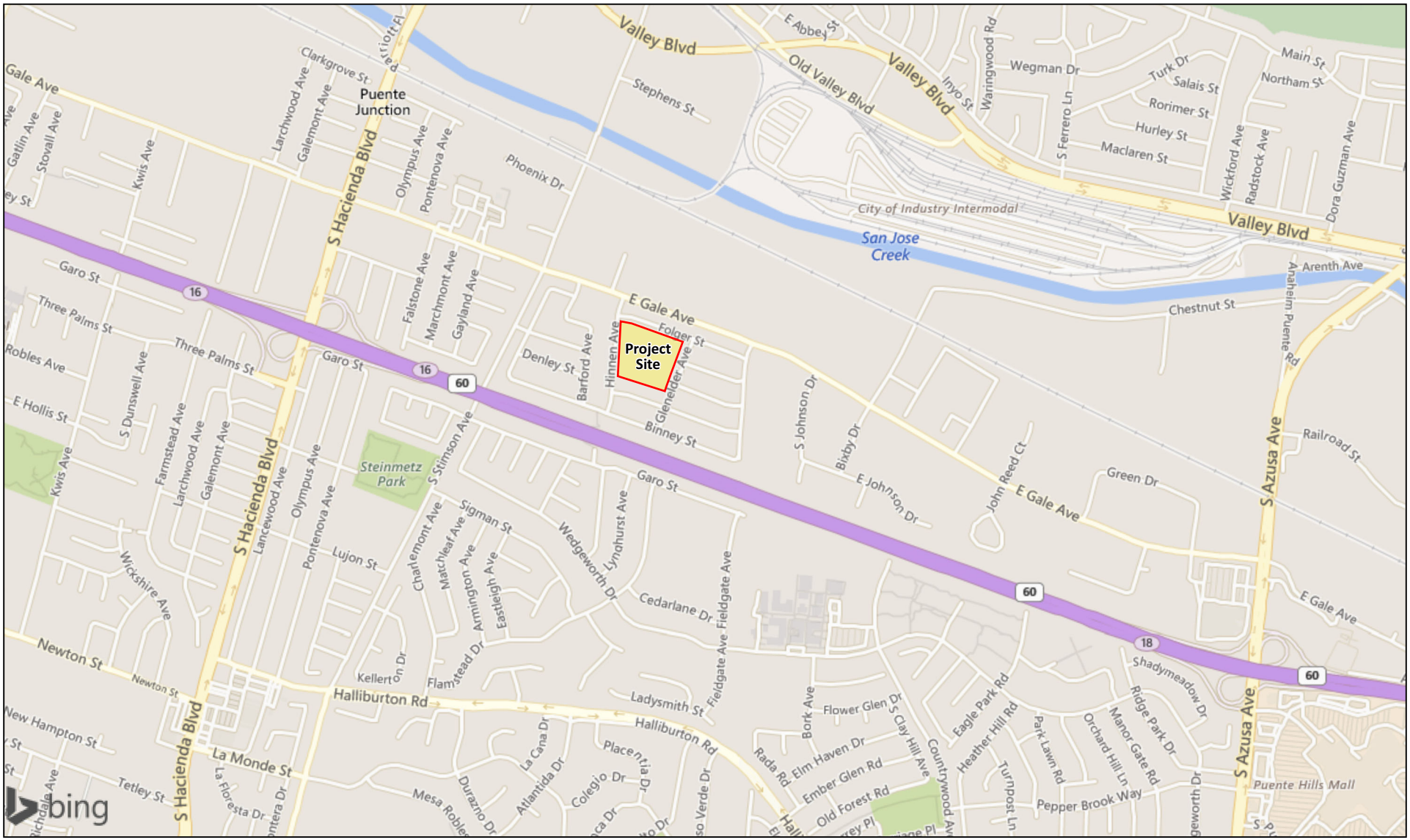
INTRODUCTION

This noise and vibration impact analysis has been prepared to evaluate the potential impacts and mitigation measures associated with the Glenelder Residential Development Project (project) in Hacienda Heights, Los Angeles County (County), California. This analysis is intended to satisfy the Los Angeles County requirements for a project-specific noise and vibration impact analysis by examining the impacts of the proposed project on noise-sensitive uses in the project area and identifying minimization measures that would be necessary to reduce impacts.

The proposed Glenelder Residential Development Project and associated discretionary actions collectively are the "project" assessed in this noise impact analysis. Unless otherwise noted, the terms "Glenelder Residential Development Project" and "project" are used interchangeably.

PROJECT LOCATION AND DESCRIPTION

The proposed project would be developed on a 10.0-acre site (project site) located at 16234 Folger Street between Glenelder Avenue and Hinnen Avenue in Hacienda Heights, as shown on Figure 1. The proposed project would involve the demolition of existing buildings on site, formerly a school, and construct a residential development with 86 single-family homes on the project site. Figure 2 illustrates the site plan of the proposed project.



LSA

LEGEND

- Project Site

N

0 750 1500

FEET

SOURCE: Bing Maps

FIGURE 1

16234 Folger Street

Project Location

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LSA

FIGURE 2

0 80 160

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SOURCE: Lennar

Glenelder Residential Development

Site Plan

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NOISE AND VIBRATIONS FUNDAMENTALS

CHARACTERISTICS OF SOUND

Sound is increasing to such disagreeable levels in the environment that it can threaten quality of life. Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect the ability to hear. Pitch is the number of complete vibrations, or cycles per second, of a wave resulting in the tone's range from high to low. Loudness is the strength of a sound that describes a noisy or quiet environment and is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effect on adjacent sensitive land uses.

Measurement of Sound

Sound intensity is measured through the A-weighted scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies. Unlike linear units (e.g., inches or pounds) decibels are measured on a logarithmic scale representing points on a sharply rising curve.

For example, 10 decibels (dB) is 10 times more intense than 1 dB, 20 dB is 100 times more intense than 1 dB, and 30 dB is 1,000 times more intense than 1 dB. Thirty decibels (30 dB) represents 1,000 times as much acoustic energy as 1 dB. The decibel scale increases as the square of the change, representing the sound pressure energy. A sound as soft as human breathing is about 10 times greater than 0 dB. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10 dB increase in sound level is perceived by the human ear as only a doubling of the loudness of the sound. Ambient sounds generally range from 30 dB (very quiet) to 100 dB (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. For a single point source, sound levels decrease approximately 6 dB for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source (e.g., highway traffic or railroad operations) the sound decreases 3 dB for each doubling of distance in a hard site environment. Line source (noise in a relatively flat environment with absorptive vegetation) decreases 4.5 dB for each doubling of distance.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. The equivalent continuous

sound level (L_{eq}) is the total sound energy of time-varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq} and Community Noise Equivalent Level (CNEL) or the day-night average noise level (L_{dn}) based on A-weighted decibels (dBA). CNEL is the time-varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours), and a 10 dBA weighting factor applied to noises occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale but without the adjustment for events occurring during the evening hours. CNEL and L_{dn} are within 1 dBA of each other and are normally interchangeable. The City uses the CNEL noise scale for long-term noise impact assessment.

Other noise rating scales of importance when assessing the annoyance factor include the maximum instantaneous noise level (L_{max}), which is the highest exponential time-averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis for short-term noise impacts are specified in terms of maximum levels denoted by L_{max}, which reflects peak operating conditions and addresses the annoying aspects of intermittent noise. It is often used together with another noise scale, or noise standards in terms of percentile noise levels, in noise ordinances for enforcement purposes. For example, the L_{10} noise level represents the noise level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half the time the noise level exceeds this level, and half the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the background noise level during a monitoring period. For a relatively constant noise source, the L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first category includes audible impacts that refer to increases in noise leves noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dB or greater because this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1 dB and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category includes changes in noise levels of less than 1 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects the entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear, even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear (the threshold of pain). A sound level of 160–165 dBA will result in dizziness or loss of equilibrium. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying, less developed area. Table A lists definitions of acoustical terms and Table B shows common sound levels and their sources.

Table A: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit of measurement that denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in 1 second (i.e., number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter deemphasizes the very low- and very high-frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. (All sound levels in this report are A-weighted, unless reported otherwise.)
L_{01}, L_{10}, L_{50}, L_{90}	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 1%, 10%, 50%, and 90% of a stated time period.
Equivalent Continuous Noise Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 5 dBA to sound levels occurring in the evening from 7:00 PM to 10:00 PM and after the addition of 10 dBA to sound levels occurring in the night between 10:00 PM and 7:00 AM.
Day/Night Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 dBA to sound levels occurring in the night between 10:00 PM and 7:00 AM.
L_{max}, L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
Ambient Noise Level	The all-encompassing noise associated with a given environment at a specified time; usually a composite of sound from many sources at many directions, near and far; no particular sound is dominant.
Intrusive	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content, as well as the prevailing ambient noise level.

Source: *Handbook of Acoustical Measurements and Noise Control* (Harris 1991).

Table B: Common Sound Levels and Their Noise Sources

Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Evaluations
Near Jet Engine	140	Deafening	128 times as loud
Civil Defense Siren	130	Threshold of Pain	64 times as loud
Hard Rock Band	120	Threshold of Feeling	32 times as loud
Accelerating Motorcycle at a Few Feet Away	110	Very Loud	16 times as loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very Loud	8 times as loud
Ambulance Siren; Food Blender	95	Very Loud	—
Garbage Disposal	90	Very Loud	4 times as loud
Freight Cars; Living Room Music	85	Loud	—
Pneumatic Drill; Vacuum Cleaner	80	Loud	2 times as loud
Busy Restaurant	75	Moderately Loud	—
Near Freeway Auto Traffic	70	Moderately Loud	—
Average Office	60	Quiet	One-half as loud
Suburban Street	55	Quiet	—
Light Traffic; Soft Radio Music in Apartment	50	Quiet	One-quarter as loud
Large Transformer	45	Quiet	—
Average Residence without Stereo Playing	40	Faint	One-eighth as loud
Soft Whisper	30	Faint	—
Rustling Leaves	20	Very Faint	—
Human Breathing	10	Very Faint	Threshold of Hearing
—	0	Very Faint	—

Source: Compiled by LSA (2015).

FUNDAMENTALS OF VIBRATION

Vibration refers to groundborne noise and perceptible motion. Groundborne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernible, but without the effects associated with the shaking of a building there is less adverse reaction. Vibration energy propagates from a source through intervening soil and rock layers to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the structure. Building vibration may be perceived by occupants as the motion of building surfaces, the rattling of items on shelves or hanging on walls, or a low-frequency rumbling noise. The rumbling noise is caused by the vibration of walls, floors, and ceilings that radiate sound waves. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by 10 vibration velocity decibels (VdB) or less. This is an order of magnitude below the damage threshold for normal buildings.

Typical sources of groundborne vibration are construction activities (e.g., blasting, pile driving, and operating heavy-duty earthmoving equipment), steel-wheeled trains, and occasional traffic on rough

roads. Problems with both groundborne vibration and noise from these sources are usually localized to areas within approximately 100 feet from the vibration source, although there are examples of groundborne vibration causing interference out to distances greater than 200 feet (FTA 2018). When roadways are smooth, vibration from traffic, even heavy trucks, is rarely perceptible. It is assumed for most projects that the roadway surface will be smooth enough that groundborne vibration from street traffic will not exceed the impact criteria; however, both construction of a project and freight train operations on railroad tracks could result in groundborne vibration that may be perceptible and annoying.

Groundborne noise is not likely to be a problem because noise arriving via the normal airborne path will usually be greater than groundborne noise. Groundborne vibration has the potential to disturb people and damage buildings. Although it is very rare for train-induced groundborne vibration to cause even cosmetic building damage, it is not uncommon for heavy duty construction processes (e.g., blasting and pile driving) to cause vibration of sufficient amplitudes to damage nearby buildings (FTA 2018). Groundborne vibration is usually measured in terms of vibration velocity, either the root-mean-square (RMS) velocity or peak particle velocity (PPV). The RMS is best for characterizing human response to building vibration, and PPV is used to characterize potential for damage. Decibel notation acts to compress the range of numbers required to describe vibration. Vibration velocity level in decibels is defined as:

$$L_v = 20 \log_{10} [V/V_{ref}]$$

Where L_v is the VdB, "V" is the RMS velocity amplitude, and "V_{ref}" is the reference velocity amplitude, or 1×10^{-6} inches/second (in/sec) used in the United States.

Factors that influence groundborne vibration and noise include the following:

- *Vibration Source.* Vehicle suspension, wheel types and condition, railroad track/roadway surface, railroad track support system, speed, transit structure, and depth of vibration source.
- *Vibration Path.* Soil type, rock layers, soil layering, depth to water table, and frost depth.
- *Vibration Receiver.* Foundation type, building construction, and acoustical absorption.

Among the factors listed above, there are significant differences in the vibration characteristics when the source is underground compared to at the ground surface. In addition, soil conditions are known to have a strong influence on the levels of groundborne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock.

Experience with groundborne vibration indicates: (1) vibration propagation is more efficient in stiff, clay soils than in loose, sandy soils; and (2) shallow rock seems to concentrate the vibration energy close to the surface and can result in groundborne vibration problems at large distances from a railroad track. Factors including layering of the soil and the depth to the water table can have significant effects on the propagation of groundborne vibration. Soft, loose, sandy soils tend to attenuate more vibration energy than hard, rocky materials. Vibration propagation through groundwater is more efficient than through sandy soils.

REGULATORY SETTING

APPLICABLE NOISE STANDARDS

The following are the applicable standards for this project. The project would be entirely within Hacienda Heights, which is an unincorporated suburban community within Los Angeles County.

The Noise Element of the General Plan

The noise standards identified in the Los Angeles County General Plan Noise Element (County 2015) serve as guidelines to evaluate the acceptability of the transportation noise level impacts. These standards are used to assess the long-term traffic noise impacts on land uses.

The following is a summary of General Plan policies that are relevant to the Project.

> **Policy N 1.3:** Minimize impacts to noise-sensitive land uses by ensuring adequate site design, acoustical construction, and use of barriers, berms, or additional engineering controls through Best Available Technologies (BAT).
>
> **Policy N 1.4:** Enhance and promote noise abatement programs in an effort to maintain acceptable levels of noise as defined by the Los Angeles County Exterior Noise Standards and other applicable noise standards.
>
> **Policy N 1.5:** Ensure compliance with the jurisdictions of State Noise Insulation Standards (Title 24, California Code of Regulations and Chapter 35 of the Uniform Building Code), such as noise insulation of new multifamily dwellings constructed within the 60 dB (CNEL or Ldn) noise exposure contours.
>
> **Policy N 1.9:** Require construction of suitable noise attenuation barriers on noise sensitive uses that would be exposed to exterior noise levels of 65 dBA CNEL and above, when unavoidable impacts are identified.
>
> **Policy N 1.12:** Decisions on land adjacent to transportation facilities, such as the airports, freeways and other major highways, must consider both existing and future noise levels of these transportation facilities to assure the compatibility of proposed uses.

Based on these guidelines, an exterior noise level of 65 dBA CNEL is generally considered the maximum exterior noise level for noise-sensitive receptors.

County Noise Ordinance

The noise control ordinance of the County of Los Angeles (County 2016) restricts unnecessary, excessive, and annoying noise. Among others, specific examples of violations cited in the Noise Ordinance that would pertain to the proposed project include the following:

12.08.390 - Exterior noise standards—Citations for violations authorized when:

a. Unless otherwise herein provided, the following exterior noise levels shall apply to all receptor properties within a designated noise zone:

Noise Zone	Designated Noise Zone Land Use (Receptor property)	Time Interval	Exterior Noise Level (dB)
I	Noise Sensitive	Anytime	45
II	Residential	10:00 p.m. to 7:00 a.m.	45
		7:00 a.m. to 10:00 p.m.	50
III	Commercial	10:00 p.m. to 7:00 a.m.	55
		7:00 a.m. to 10:00 p.m.	60
IV	Industrial	Anytime	70

Source: Los Angeles County General Plan Noise Element (Los Angeles County 2015).

b. Unless otherwise herein provided, no person shall operate or cause to be operated, any source of sound at any location within the unincorporated County, or 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 property either incorporated or unincorporated, to exceed any of the following exterior noise standards:

Standard No. 1 shall be the exterior noise level which may not be exceeded for a cumulative period of more than 30 minutes in any hour. Standard No. 1 shall be the applicable noise level from subsection A of this section; or, if the ambient L_{50} exceeds the foregoing level, then the ambient L_{50} becomes the exterior noise level for Standard No. 1.

Standard No. 2 shall be the exterior noise level which may not be exceeded for a cumulative period of more than 15 minutes in any hour. Standard No. 2 shall be the applicable noise level from subsection A of this section plus 5 dB; or, if the ambient L_{25} exceeds the foregoing level, then the ambient L_{25} becomes the exterior noise level for Standard No. 2.

Standard No. 3 shall be the exterior noise level which may not be exceeded for a cumulative period of more than five minutes in any hour. Standard No. 3 shall be the applicable noise level from subsection A of this section plus 10 dB; or, if the ambient $L_{8.3}$ exceeds the foregoing level, then the ambient $L_{8.3}$ becomes exterior noise level for Standard No. 3.

Standard No. 4 shall be the exterior noise level which may not be exceeded for a cumulative period of more than one minute in any hour. Standard No. 4 shall be the

applicable noise level from subsection A of this section plus 15 dB; or, if the ambient $L_{1.7}$ exceeds the foregoing level, then the ambient $L_{1.7}$ becomes the exterior noise level for Standard No. 4.

Standard No. 5 shall be the exterior noise level which may not be exceeded for any period of time. Standard No. 5 shall be the applicable noise level from subsection A of this section plus 20 dB; or, if the ambient L_0 exceeds the foregoing level then the ambient L_0 becomes the exterior noise level for Standard No. 5.

c. If the measurement location is on a boundary property between two different zones, the exterior noise level utilized in subsection B of this section to determine the exterior standard shall be the arithmetic mean of the exterior noise levels in subsection A of the subject zones. Except as provided for above in this subsection C, when an intruding noise source originates on an industrial property and is impacting another noise zone, the applicable exterior noise level as designated in subsection A shall be the daytime exterior noise level for the subject receptor property.

d. The ambient noise histogram shall be measured at the same location along the property line utilized in subsection B of this section, with the alleged intruding noise source inoperative. If for any reason the alleged intruding noise source cannot be turned off, the ambient noise histogram will be estimated by performing a measurement in the same general area of the alleged intruding noise source but at a sufficient distance such that the noise from the alleged intruding noise source is at least 10dB below the ambient noise histogram in order that only the actual ambient noise histogram be measured. If the difference between the ambient noise histogram and the alleged intruding noise source is 5 to 10dB, then the level of the ambient noise histogram itself can be reasonably determined by subtracting a one-decibel correction to account for the contribution of the alleged intruding noise source.

e. In the event the intrusive exceeds the exterior noise standards as set forth in subsections B and C of this section at a specific receptor property and the health officer has reason to believe that this violation at said specific receptor property was unanticipated and due to abnormal atmospheric conditions, the health officer shall issue an abatement notice in lieu of a citation. If the specific violation is abated, no citation shall be issued therefor. If, however, the specific violation is not abated, the health officer may issue a citation.

12.08.400 - Interior noise standards.

a. No person shall operate or cause to be operated within a dwelling unit, any source of sound, or allow the creation of any noise, which causes the noise level when measured inside a neighboring receiving dwelling unit to exceed the following standards:

Standard No. 1 The applicable interior noise level for cumulative period of more than five minutes in any hour; or

Standard No. 2 The applicable interior noise level plus 5 dB for a cumulative period of more than one minute in any hour; or

Standard No. 3 The applicable interior noise level plus 10 dB or the maximum measured ambient noise level for any period of time.

b. The following interior noise levels for multifamily residential dwellings shall apply, unless otherwise specifically indicated, within all such dwellings with windows in their normal seasonal configuration.

Noise Zone	Designated Land Use	Time Interval	Allowable Interior Noise Level (dB)
All	Multifamily	10:00 p.m. — 7:00 a.m.	40
	Residential	7:00 a.m. —10:00 p.m.	45

Source: Los Angeles County General Plan Noise Element (Los Angeles County 2015).

c. If the measured ambient noise level reflected by the L_{50} exceeds that permissible within any of the interior noise standards in subsection A of Section 12.08.390, the allowable interior noise level shall be increased in 5 dB increments in each standard as appropriate to reflect said ambient noise level (L_{50}).

12.08.440 - Construction noise.

a. Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between weekday hours of 7:00 p.m. and 7:00 a.m., or at any time on Sundays or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real-property line, except for emergency work of public service utilities or by variance issued by the health officer is prohibited.

b. Noise Restrictions at Affected Structures. The contractor shall conduct construction activities in such a manner that the maximum noise levels at the affected buildings will not exceed those listed in the following schedule:

1. At Residential Structures.

a. Mobile Equipment. Maximum noise levels for nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment:

	Single-family Residential	Multi-family Residential	Semiresidential/ Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	75dBA	80dBA	85dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	60dBA	64dBA	70dBA

Source: Los Angeles County General Plan Noise Element (Los Angeles County 2015).

b. Stationary Equipment. Maximum noise level for repetitively scheduled and relatively long-term operation (periods of 10 days or more) of stationary equipment:

	Single-family Residential	Multi-family Residential	Semiresidential/ Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	60dBA	65dBA	70dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	50dBA	55dBA	60dBA

Source: Los Angeles County General Plan Noise Element (Los Angeles County 2015).

c. All mobile or stationary internal-combustion-engine powered equipment or machinery shall be equipped with suitable exhaust and air-intake silencers in proper working order.

12.08.530 - Residential air conditioning or refrigeration equipment.

Operating or permitting the operation of any air conditioning or refrigeration equipment in such a manner as to exceed any of the following sound levels is prohibited.

Measurement Location	Units Installed Before 1-1-80 dBA	Units Installed On or After 1-1-80 dBA
Any point on neighboring property line, 5 feet above grade level, no closer than 3 feet from any wall.	60	55
Center of neighboring patio, 5 feet above grade level, no closer than 3 feet from any wall.	55	50
Outside the neighboring living area window nearest the equipment location, not more than 3 feet from the window opening, but at least 3 feet from any other surface.	55	50

APPLICABLE VIBRATION STANDARDS

County Noise Ordinance

Federal Transit Administration

Vibration standards included in the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment* (FTA 2018) are used in this analysis for groundborne vibration impacts related to damage potential. The criteria for environmental impact from groundborne vibration and noise are based on the maximum levels for a single event. Table C lists the potential vibration building damage criteria associated with construction activities, as suggested in the *Transit Noise and Vibration Impact Assessment* (FTA 2018).

FTA guidelines show that a vibration level of up to 102 VdB (equivalent to 0.5 in/sec in PPV) (FTA 2018) is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster), and would not result in any construction vibration damage. For a nonengineered timber and masonry building, the construction building vibration damage criterion is 94 VdB (0.2 in/sec in PPV).

Table C: Construction Vibration Damage Criteria

Building Category	PPV (in/sec)	Approximate L_V (VdB)[1]
Reinforced concrete, steel, or timber (no plaster)	0.50	102
Engineered concrete and masonry (no plaster)	0.30	98
Non-engineered timber and masonry buildings	0.20	94
Buildings extremely susceptible to vibration damage	0.12	90

Source: *Transit Noise and Vibration Impact Assessment* (FTA 2018).

[1] RMS vibration velocity in decibels (VdB) re 1 µin/sec.

µin/sec = inches per second
FTA = Federal Transit Administration
in/sec = inches per second
L_V = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

OVERVIEW OF THE EXISTING ENVIRONMENT

This section describes the existing noise environment in the project site vicinity. The primary existing noise sources include nearby roadways, Hinnen Avenue, Folger Street, Glenelder Avenue, Denley Street, Gale Avenue, and State Route 60 (SR 60), and the Metrolink railway located over 1,200 feet to the north.

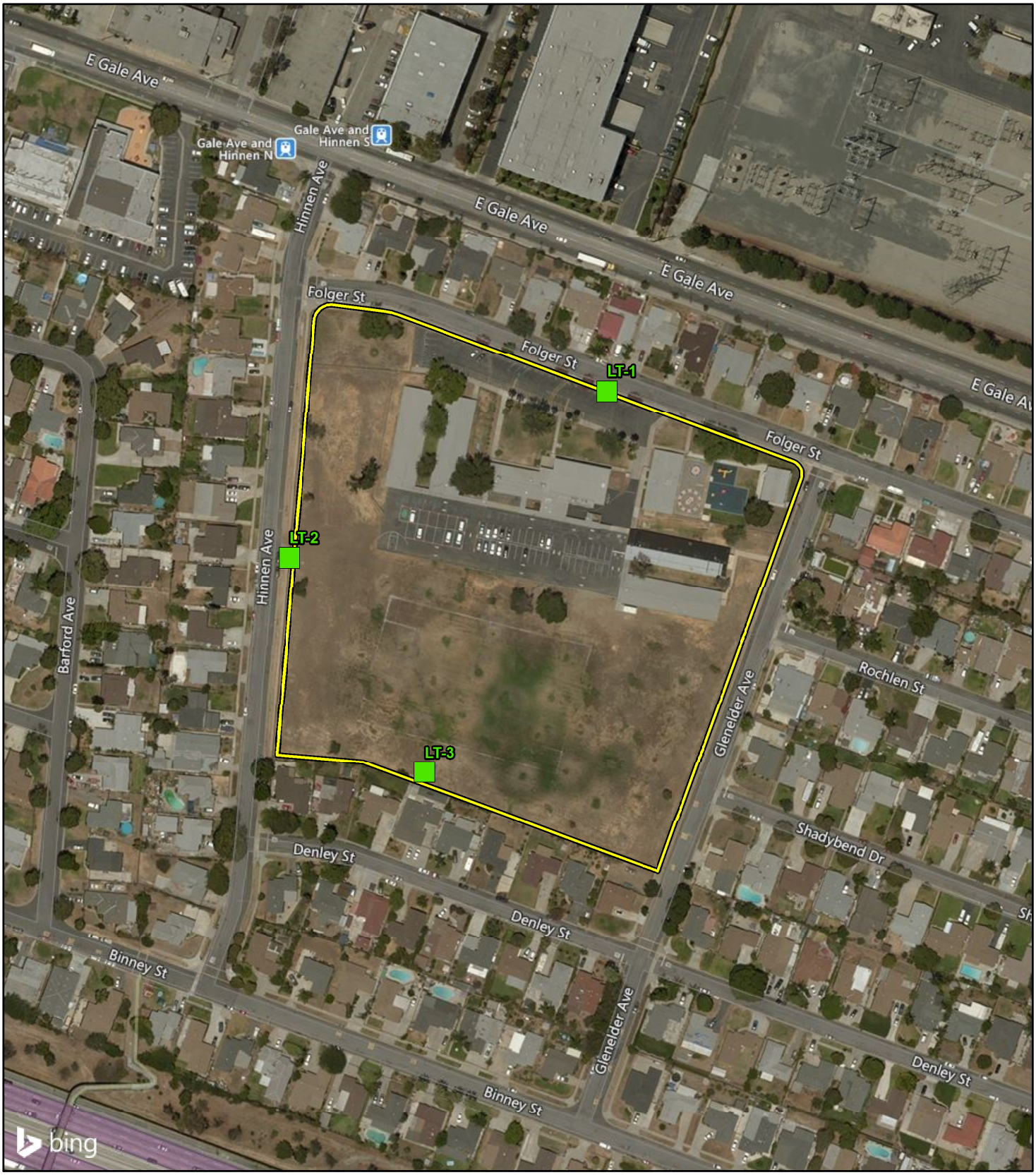
EXISTING NOISE LEVEL MEASUREMENTS

To assess existing noise levels, LSA conducted three long-term noise measurements, as shown on Figure 3, at the project site. The long-term noise measurements were recorded between November 13, 2018 and November 14, 2018. A follow-up measurement was recorded between December 3, 2018 and December 4, 2018. The long-term noise measurements captured hourly L_{eq} data as well as CNEL data, which incorporate the nighttime hours. Noise measurement data collected during the noise monitoring are summarized in Table D and noise measurement sheets are provided in Appendix A.

Table D: Existing Noise Level Measurements

Location	Description	Daytime Noise Levels[1] (dBA L_{eq})	Evening Noise Levels[2] (dBA L_{eq})	Nighttime Noise Levels[3] (dBA L_{eq})	Average Daily Noise Levels (dBA CNEL)
LT-1	16234 Folger Street, on light pole along Folger Street.	54.4–62.8	57.7-60.5	56.2-62.2	66.2
LT-2	16234 Folger Street, on fence along Hinnen Avenue, near the gate.	51.9-59.7	59.0-60.7	57.9-61.3	65.8
LT-3	Near 16221 Denley Street, on tree in school field.	47.6-58.1	57.8-60.5	57.2-60.0	65.1

Source: Compiled by LSA (November and December 2018).
[1] Daytime Noise Levels = noise levels during the hours from 7:00 a.m. to 7:00 p.m.
[2] Evening Noise Levels = noise levels during the hours from 7:00 p.m. to 10:00 p.m.
[3] Nighttime Noise Levels = noise levels during the hours from 10:00 p.m. to 7:00 a.m.
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level
CNEL = Community Noise Equivalent Level



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- Project Location
- Short-Term Monitoring Location
- Long-Term Monitoring Location

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SOURCE: BING Maps (~2016)

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FIGURE 3

Glenelder Residential Development

Noise Monitoring Locations

VEHICULAR TRAFFIC NOISE

Motor vehicles with their distinctive noise characteristics are a major source of noise in Hacienda Heights. The amount of noise varies according to many factors, such as volume of traffic, vehicle mix (percentage of cars and trucks), average traffic speed, and distance from the observer. The major contributing roadway noise sources in the project vicinity are Gale Avenue and SR 60.

Existing roadway traffic noise levels in the project vicinity were assessed using the Federal Highway Administration (FHWA) highway traffic noise prediction model (FHWA RD-77- 108). This model uses a vehicle mix for urban/suburban areas in California and requires parameters, including traffic volumes, vehicle speed, and roadway geometry, to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resultant noise levels are weighted and summed over 24-hour periods to determine the CNEL values. Existing traffic noise contours along modeled roadway segments are shown in Table E. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between the traffic and the location where the noise contours are drawn. Appendix B provides the specific assumptions used in developing these noise levels and model printouts.

Table E: Existing Traffic Noise Levels Without Project

Roadway Segment	ADT	Centerline to 70 dBA CNEL (feet)	Centerline to 65 dBA CNEL (feet)	Centerline to 60 dBA CNEL (feet)	CNEL (dBA) 50 feet from Centerline of Outermost Lane
Hacienda Blvd - North of Gale Ave	28,410	66	127	266	68.0
Hacienda Blvd - Between Gale Ave and SR-60	29,720	< 50	107	221	66.8
Hacienda Blvd - South of SR-60	39,150	78	155	328	69.4
Gale Avenue - Between Hacienda Blvd and Azuza Ave	25,700	68	141	301	69.6
Azusa Ave - North of Gale Ave	39,780	94	189	402	70.7
Azusa Ave - Between Gale Ave and SR-60	42,580	92	169	349	68.8
Azusa Ave - South of SR-60	43,760	102	203	429	70.7

Source: LSA (December 2018).
Note: Traffic noise within 50 feet of the roadway centerline should be evaluated with site-specific information.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels

AIRCRAFT NOISE

Airport related noise levels are primarily associated with aircraft engine noise made while aircraft are taking off, landing, or running their engines while still on the ground. The closest airport is the Fullerton Municipal Airport, approximately 9.25 miles southwest of the project site. Aircraft noise is rarely audible at the project site and no portion of the project site lies within the 65 dBA CNEL noise contours of the airports. The project is located well outside the 65 dBA CNEL noise contours of the Los Angeles International, Ontario International, Long Beach Municipal, and John Wayne airports as well. Therefore, no noise impacts from aircraft noise would occur and no mitigation measures would be required.

EXISTING SENSITIVE LAND USES IN THE PROJECT AREA

The project site is surrounded by single-family residences. The areas adjacent to the project site include the following uses.

- North: Single-family homes across Folger Street.
- South: Single-family homes immediately adjacent and across Denley Street.
- West: Single-family homes across Hinnen Avenue.
- East: Single-family homes across Glenelder Avenue.

IMPACT ASSESSMENT

SHORT-TERM CONSTRUCTION-RELATED IMPACTS

Construction Noise Impacts

Two types of short-term noise impacts would occur during project construction. The first type would be from construction crew commutes and the transport of construction equipment and materials to the project site and would incrementally raise noise levels on access roads leading to the site. Estimates during the phase with most daily haul trips, demolition, state than approximately 8 haul trips per day would occur over the course of 20 days. The pieces of heavy equipment for grading and construction activities will be moved on site, will remain for the duration of each construction phase, and will not add to the daily traffic volume in the project vicinity. Folger Street and Glenelder Avenue would be used to access the project site. Although there would be high single-event noise exposure potential at a maximum level of 84 dBA L_{max} from trucks passing at 50 feet, the effect on longer-term (hourly or daily) ambient noise levels would be small compared to existing hourly and daily traffic volumes. Because construction-related vehicle trips averaging 8 per day would not approach the hourly and daily traffic volumes on the roadways in the vicinity of the project site, hourly and daily traffic noise would not increase by 3 dBA, which is considered imperceptible to the human ear in an outdoor environment. Therefore, short-term, construction-related impacts associated with worker commutes and equipment transport to the project site would be less than significant.

The second type of short-term noise impact is related to noise generated during demolition, site preparation, grading, building construction, architectural coating, and paving on the project site. Construction is undertaken in discrete steps, each of which has its own mix of equipment, and consequently its own noise characteristics. These various sequential phases would change the character of the noise generated on the project site. Therefore, the noise levels vary as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table F lists the maximum noise levels recommended for noise impact assessments for typical construction equipment based on a distance of 50 feet between the equipment and a noise receptor. Typical operating cycles for these types of construction equipment may involve 1 to 2 minutes of full power operation followed by 3 to 4 minutes at lower power settings.

The individual reference noise levels can be adjusted for distance using the following equation:

$$Leq\ (at\ distance\ X) = Leq\ (at\ 50\ feet) - 20 * \log_{10}\left(\frac{X}{50}\right)$$

In general, this equation shows that doubling the distance would decrease noise levels by 6 dBA while halving the distance would increase noise levels by 6 dBA. It is expected that noise levels for the residences to the south, approximately 23 feet away, may approach 91 dBA L_{max} when typical equipment such as excavators are used near the project boundary; however, the average construction noise level that would occur for a much longer duration would be 69 dBA L_{max} when

measured at the center of the project site, a distance of 320 feet from surrounding uses. Specialty equipment such as concrete saws may produce higher noise levels but are not expected to be used in close proximity of the surrounding residents. An average maximum noise level of 69 dBA L_{max} would not exceed the County standard of 75 dBA L_{max}.

Table F: Typical Maximum Construction Equipment Noise Levels (L_{max})

Type of Equipment	Acoustical Usage Factor	Suggested Maximum Sound Levels for Analysis (dBA L_{max} at 50 ft)
Air Compressor	40	80
Backhoe	40	80
Cement Mixer	50	80
Concrete/Industrial Saw	20	90
Crane	16	85
Excavator	40	85
Forklift	40	85
Generator	50	82
Grader	40	85
Loader	40	80
Paver	50	85
Roller	20	85
Rubber Tire Dozer	40	85
Scraper	40	85
Tractor	40	84
Truck	40	84
Welder	40	73

Source: Federal Highway Administration, *Highway Construction Noise Handbook* (2006).
dBA = A-weighted decibel ft = feet L_{max} = maximum noise level

Although project construction noise has the potential to be higher than ambient noise in the project vicinity at times, it would cease to occur once project construction is completed. The following best business practices related to construction noise would further reduce noise levels to the surrounding environment:

Best Business Practices

- Staging and delivery areas shall be located as far as feasible from existing residences.
- Deliveries shall be coordinated by the construction contractor to reduce the potential of trucks waiting to unload for protracted periods of time.

- To the extent feasible, hydraulic equipment instead of pneumatic impact tools and electric powered equipment instead of diesel powered equipment shall be used for exterior construction work.
- Maintaining equipment in an idling mode shall be minimized. All equipment not in use longer than five minutes shall be turned off.
- For smaller equipment (such as, air-compressors and small pumps), line-powered (electric) equipment shall be used to the extent feasible.

Further, the contractor would be required to implement the construction noise mitigation measures (MM) as outlined in MM-1 below, in order to comply with the City's construction noise requirements. Therefore, with implementation of MM-1 construction noise impacts would be less than significant.

Construction Vibration Impacts

Ground-borne noise and vibration from construction activity has the potential to be high when activities occur near project boundaries but would be mostly low to moderate as activities are more central to the project site. While there is currently limited information regarding vibration source levels, the levels shown in Table G are utilized in this analysis and are based on the *Transit Noise and Vibration Impact Assessment* (FTA 2018).

Table G: Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV/L_V at 25 ft	
	PPV (in/sec)	L_V (VdB)[1]
Hoe Ram	0.089	87
Large Bulldozer	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Source: *Transit Noise and Vibration Impact Assessment* (FTA 2018).
[1] RMS VdB re 1 µin/sec.
µin/sec = microinches per second
ft = feet
FTA = Federal Transit Administration
in/sec = inches per second
L_V = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity in decibels

The distance to the nearest buildings for vibration impact analysis is measured between the nearest off-site buildings and the project boundary (assuming the construction equipment would be used at or near the project boundary) because vibration impacts occur normally within the buildings. The formula for vibration transmission is provided below.

$$L_vdB\ (D) = L_vdB\ (25\ ft) - 30\ Log\ (D/25)$$

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

Construction Vibration Damage Potential

As shown in Table C, it would take a minimum of 90 VdB (or 0.12 in/sec PPV) to cause any potential building damage to a susceptible building and a minimum of 94 VdB (or 0.2 in/sec PPV) to cause damage to a non-engineered timber and masonry building.

The project site is bounded by immediately adjacent existing residential uses to the south and existing residential uses across from roadways to the north, west, and east. The closest structures are approximately 15 ft from the project construction area limits. Utilizing the equations above, the operation of typical heavy construction equipment such as large bulldozers and jackhammers would generate ground-borne vibration levels of 93.7 VdB (0.191 in/sec PPV); however, those levels would not exceed the 0.2 in/sec PPV or 94 VdB guideline that is considered safe for non-engineered timber and masonry buildings and therefore would be less than significant.

LONG-TERM NOISE IMPACTS TO OFF-SITE RECEIVERS

Off-Site Traffic Noise

The guidelines included in the FHWA Highway Traffic Noise Prediction Model (FHWA-RD-77-108) were used to evaluate highway traffic-related noise conditions along roadway segments in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry, to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resultant noise levels are weighted and summed over 24-hour periods to determine the CNEL values. Traffic volumes were obtained from the *Traffic Impact Analysis Report* (LSA 2019). The previously referenced Table E provides the traffic noise levels for the Existing without Project scenario. Table H shows the Existing With Project traffic noise levels along with the project-related traffic noise increase and Table I provides the traffic noise levels for the 2022 Opening Year With and Without Project scenarios. These noise levels represent the worst-case scenario, which assumes no shielding is provided between the traffic and the location where the noise contours are drawn. Appendix B provides the specific assumptions used in developing these noise levels and model printouts.

Tables H and I shows that project-related traffic would have very small (0.1 dBA or less) noise level increases along roadway segments in the project vicinity. All roadway segments would have less than perceptible traffic noise level increases under all of the with project scenarios. Since this range of traffic noise level increases in the outdoor environment would not be perceptible to the human ear because it occurs gradually over a period of time, no significant off-site traffic noise impacts from project-related traffic would occur.

Off-Site Air Conditioning Noise

In order to comply with the County's interior noise level standards at the on-site residences, a form of mechanical ventilation, such as air conditioning, is required to maintain a windows-closed condition. Such equipment has the potential to generate noise levels in excess of the County's standard of 55 dBA when measured at the neighboring property. As presented in MM-2, in order to comply with the County's noise standard for residential air conditioning or refrigeration equipment, it should be confirmed by the General Manager of the County Department of Building and Safety, or

Table H: Existing Traffic Noise Levels Without and With Project

Roadway Segment	Existing Traffic Conditions				Existing Plus Project Traffic Conditions				
	ADT	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions
Hacienda Blvd - North of Gale Ave	28,410	127	266	68.0	28,620	128	267	68.1	0.1
Hacienda Blvd - Between Gale Ave and SR-60	29,720	107	221	66.8	30,020	108	222	66.9	0.1
Hacienda Blvd - South of SR-60	39,150	155	328	69.4	39,150	155	328	69.4	0.0
Gale Avenue - Between Hacienda Blvd and Azuza Ave	25,700	141	301	69.6	25,950	142	303	69.7	0.1
Azusa Ave - North of Gale Ave	39,780	189	402	70.7	39,780	189	402	70.7	0.0
Azusa Ave - Between Gale Ave and SR-60	42,580	169	349	68.8	42,750	169	350	68.8	0.0
Azusa Ave - South of SR-60	43,760	203	429	70.7	43,760	203	429	70.7	0.0

Source: LSA Associates Inc., June 2019.
–Traffic data from the *Traffic Operations Analysis Report for Glenelder Residential Development* prepared by LSA (2019),
ADT = average daily traffic CNEL = Community Noise Equivalent Level dBA = A-weighted decibels SR 60 = State Route 60

Table I: Opening Year (2022) Traffic Noise Levels Without and With Project

Roadway Segment	Opening Year Without Traffic Conditions				Opening Year With Project Traffic Conditions				
	ADT	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions
Hacienda Blvd - North of Gale Ave	29,000	129	269	68.1	29,210	129	271	68.2	0.1
Hacienda Blvd - Between Gale Ave and SR-60	30,310	108	224	66.9	30,610	109	225	66.9	0.0
Hacienda Blvd - South of SR-60	39,610	156	331	69.5	39,610	156	331	69.5	0.0
Gale Avenue - Between Hacienda Blvd and Azuza Ave	25,800	141	301	69.6	26,050	142	303	69.7	0.1
Azusa Ave - North of Gale Ave	39,780	189	402	70.7	39,780	189	402	70.7	0.0
Azusa Ave - Between Gale Ave and SR-60	42,640	169	349	68.8	42,810	169	350	68.9	0.1
Azusa Ave - South of SR-60	43,760	203	429	70.7	43,760	203	429	70.7	0.0

Source: LSA Associates Inc., June 2019.
–Traffic data from the *Traffic Operations Analysis Report for Glenelder Residential Development* prepared by LSA (2019),
ADT = average daily traffic CNEL = Community Noise Equivalent Level dBA = A-weighted decibels SR 60 = State Route 60

designee, that the mechanical equipment chosen has a reference level of 55 dBA Leq or lower when measured at a distance of 5 feet, or incorporates noise reducing features such that a noise level of 55 dBA Leq is achieved at neighboring residential properties.

LOCAL GUIDELINES COMPATIBILITY ASSESSMENT

Exterior Noise Assessment

The proposed project is considered an infill project and is located in an area in which all surrounding parcels are currently in use. For this reason, this analysis relies on the existing measured noise levels to provide the most accurate description of the noise environment. On-site proposed residential uses would be exposed to traffic noise levels along Folger Street, Glenelder Avenue, and Hinnen Avenue as well as distant traffic noise from SR-60 to the south and Gale Avenue to the north.

Based on monitoring results shown in Table D, existing noise levels at the project site approach 67 dBA CNEL. County General Plan Noise Element Policy N 1.9 requires that suitable noise barriers be installed when exterior noise levels exceed 65 dBA CNEL. The existing noise environment of 67 dBA CNEL occurs from ambient sources including SR-60, Gale Avenue, and the industrial uses in the area. Given the ambient nature of the noise sources, no suitable barriers can be implemented to completely shield the proposed project's backyards from noise generated by SR-60, Gale Avenue, and the industrial uses in the area. Additionally, the proposed project does not exacerbate the existing noise condition in the project area. Project generated noise in both the Opening Year and Year 2022 With Project conditions results in either no increase or a 0.10 dBA increase over existing conditions (at 3 locations). As described in the Noise Impact Analysis, noise levels below 1 dBA are not perceptible.

Further, it should be noted that the project site is already designated and zoned for residential uses, and was previously used as an elementary school, another noise-sensitive use. Therefore, the proposed project would not introduce any new noise-sensitive uses to the project site that have not already been contemplated by the County.

Given the lack of suitable barriers to attenuate existing ambient noise conditions; the lack of perceptible contribution by the project to surrounding noise levels; and the consistency with existing land use designations, the proposed project is consistent with General Plan Noise Element Policy N 1.9.

Interior Noise Assessment

Based on the EPA Protective Noise Levels (1978), with windows and doors open, interior noise levels at the frontline single family residences would have an interior noise level of 55 dBA CNEL (67 dBA - 12 dBA = 55 dBA) and would exceed the County's interior noise standard of 45 dBA CNEL. With windows and doors closed, interior noise levels at the homes immediately adjacent to surrounding roadways would have an interior noise level of 43 dBA CNEL (67 dBA - 24 dBA = 43 dBA) and would not exceed the County's interior noise standard of 45 dBA CNEL. In addition to standard building construction which assumes windows and glass doors with a minimum Sound Transmission Class (STC) of 25 and an exterior will with a minimum STC of 46, as shown in MM-2 below, a form of mechanical ventilation would be required such that a windows-closed condition could be achieved.

LONG-TERM VIBRATION IMPACTS

The proposed residences would not generate vibration. In addition, vibration levels generated from project-related traffic on the adjacent roadways are unusual for on-road vehicles because the rubber tires and suspension systems of on-road vehicles provide vibration isolation. Vibration generated from project-related traffic on the adjacent roadways would be less than significant and no mitigation measures would be required.

MITIGATION MEASURES

The following mitigation measures apply to the project and will help to reduce potential impacts related to noise and vibration:

MM-1 **Construction Noise.** Prior to issuance of construction permits, the General Manager of the County Department of Building and Safety, or designee, shall verify that all construction plans include the following measures. The measures may include but are not limited to the following:

- Construction shall only occur between 7:00 a.m. and 7:00 p.m. Monday through Saturday. Construction is not allowed on Sundays or federal holidays.
- All construction equipment shall be equipped with the manufacturers' recommended noise muffling devices, such as mufflers and engine covers. These devices shall be kept in good working condition throughout the construction process.
- Any semi-stationary piece of equipment that operates under full power for more than sixty (60) minutes per day shall have a temporary ¾-inch plywood screen if there is a direct line-of-sight to any residential bedroom window from the equipment to homes along the southern site perimeter.

MM-2 **Ventilation Requirements.** Prior to the issuance of building permits, documentation shall be provided to the County Department of Building and Safety, or designee, demonstrating that project buildings meet ventilation standards required by the California Building Code (CBC) with the windows closed. It is likely that a form of mechanical ventilation, such as an air-conditioning system, will be required as part of the project design for all units. Additionally, in order to comply with the County's noise standard for residential air conditioning or refrigeration equipment, it shall be confirmed that the mechanical equipment to be installed has a reference level of 55 dBA L_{eq} or lower when measured at a distance of 5 feet or incorporates noise reducing features such that a noise level of 55 dBA L_{eq} is achieved at neighboring residential properties.

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APPENDIX A

NOISE MEASUREMENT SHEETS

Noise Measurement Survey – 24 HR

Project Number: LHC1802
Project Name: Glenelder

Test Personnel: Corey Knips
Equipment: Quest NoisePro DLX

Site Number: LT-1 Date: 12/3/2018

Time: From 10:00 AM To 10:00 AM

Site Location: 16234 Folger Street, on light pole along Folger Street.

Primary Noise Sources: Traffic on Folger Street, faint traffic on Glenelder Avenue and Hinnen Avenue, and train with horn.

Comments: Serial No.: NXE100155

Location:

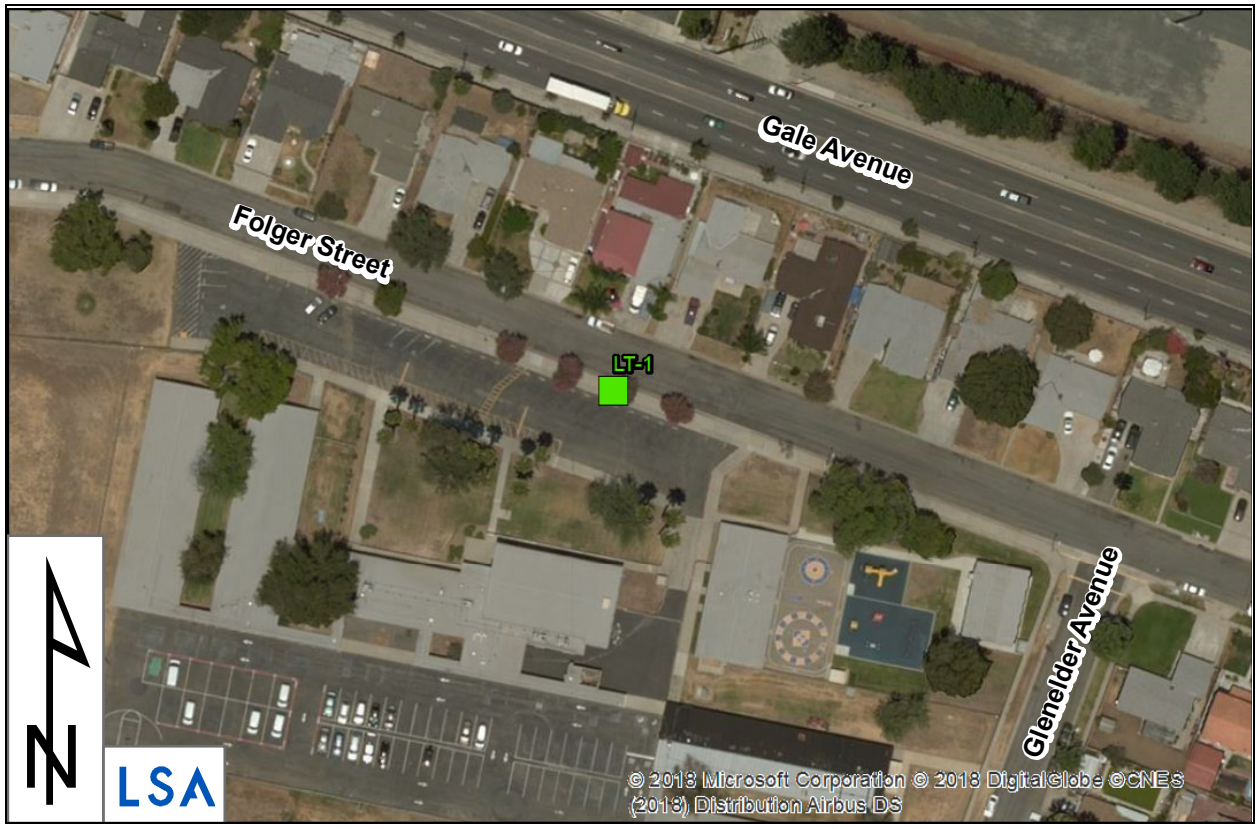

Photo:

Noise Measurement Survey – 24 HR

Project Number: LHC1802
Project Name: Glenelder

Test Personnel: Corey Knips
Equipment: Quest NoisePro DLX

Site Number: LT-2 Date: 11/13/2018

Time: From 11:00 AM To 11:00 AM

Site Location: 16234 Folger Street, on fence along Hinnen Avenue.

Primary Noise Sources: Traffic on Hinnen Avenue and faint traffic on Folger Street.

Comments: Serial No.: NXE100157

Location:

Photo:

Noise Measurement Survey – 24 HR

Project Number: LHC1802
Project Name: Glenelder

Test Personnel: Corey Knips
Equipment: Quest NoisePro DLX

Site Number: LT-3 Date: 11/13/2018

Time: From 11:00 AM To 11:00 AM

Site Location: Near 16221 Denley Street, on tree in school field.

Primary Noise Sources: Traffic on Hinnen Avenue and faint traffic on Glenelder Avenue.

Comments: Serial No.: NXF070063

Location:

Photo:

APPENDIX B

FHWA HIGHWAY TRAFFIC NOISE MODEL PRINTOUTS

TABLE Existing-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Hacienda Blvd north of Gale Ave
NOTES: Hoffer Street and Hathaway Street Residential Project - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 28410 SPEED (MPH): 40 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 34 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.03

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
66.2	126.9	265.6	568.5

TABLE Existing-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Hacienda Blvd btwn Gale Ave and SR-60
NOTES: Hoffer Street and Hathaway Street Residential Project - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 29720 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 34 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.81

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	106.9	221.0	471.6

TABLE Existing-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Hacienda Blvd south of SR-60
NOTES: Hoffer Street and Hathaway Street Residential Project - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 39150 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 34 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.43

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
78.1	155.2	328.0	703.6

TABLE Existing-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Gale Avenue btwn Hacienda Blvd and Azuza Ave
NOTES: Hoffer Street and Hathaway Street Residential Project - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 25700 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 22 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
68.3	140.9	300.6	646.2

TABLE Existing-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Azusa Ave north of Gale Ave
NOTES: Hoffer Street and Hathaway Street Residential Project - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 39780 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
93.6	189.5	402.3	863.9

TABLE Existing-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Azusa Ave btwn Gale Ave and SR-60
NOTES: Hoffer Street and Hathaway Street Residential Project - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 42580 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 54 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.83

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
91.8	168.8	348.7	744.0

TABLE Existing-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Azusa Ave south of SR-60
NOTES: Hoffer Street and Hathaway Street Residential Project - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 43760 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 44 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
102.0	202.9	429.0	920.2

TABLE Existing With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Hacienda Blvd north of Gale Ave
NOTES: Hoffer Street and Hathaway Street Residential Project - Existing With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 28620 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 34 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.07

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
66.4	127.5	266.9	571.3

TABLE Existing With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Hacienda Blvd btwn Gale Ave and SR-60
NOTES: Hoffer Street and Hathaway Street Residential Project - Existing With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 30020 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 34 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.85

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	107.6	222.4	474.7

TABLE Existing With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Hacienda Blvd south of SR-60
NOTES: Hoffer Street and Hathaway Street Residential Project - Existing With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 39150 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 34 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.43

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
78.1	155.2	328.0	703.6

TABLE Existing With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Gale Avenue btwn Hacienda Blvd and Azuza Ave
NOTES: Hoffer Street and Hathaway Street Residential Project - Existing With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 25950 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 22 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	68.7	141.8	302.6	650.4

TABLE Existing With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Azusa Ave north of Gale Ave
NOTES: Hoffer Street and Hathaway Street Residential Project - Existing With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 39780 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
93.6	189.5	402.3	863.9

TABLE Existing With Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Azusa Ave btwn Gale Ave and SR-60
NOTES: Hoffer Street and Hathaway Street Residential Project - Existing With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 42750 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 54 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.85

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
92.0	169.2	349.6	746.0

TABLE Existing With Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Azusa Ave south of SR-60
NOTES: Hoffer Street and Hathaway Street Residential Project - Existing With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 43760 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 44 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
102.0	202.9	429.0	920.2

TABLE Opening Year Without Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Hacienda Blvd north of Gale Ave
NOTES: Hoffer Street and Hathaway Street Residential Project - Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 29000 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 34 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.12

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
66.9	128.6	269.2	576.3

TABLE Opening Year Without Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Hacienda Blvd btwn Gale Ave and SR-60
NOTES: Hoffer Street and Hathaway Street Residential Project - Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 30310 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 34 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.89

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	108.2	223.8	477.8

TABLE Opening Year Without Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Hacienda Blvd south of SR-60
NOTES: Hoffer Street and Hathaway Street Residential Project - Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 39610 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 34 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.48

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
78.6	156.4	330.6	709.0

TABLE Opening Year Without Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Gale Avenue btwn Hacienda Blvd and Azuza Ave
NOTES: Hoffer Street and Hathaway Street Residential Project - Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 25800 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 22 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.63

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
68.4	141.3	301.4	647.9

TABLE Opening Year Without Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Azusa Ave north of Gale Ave
NOTES: Hoffer Street and Hathaway Street Residential Project - Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 39780 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
93.6	189.5	402.3	863.9

TABLE Opening Year Without Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Azusa Ave btwn Gale Ave and SR-60
NOTES: Hoffer Street and Hathaway Street Residential Project - Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 42640 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 54 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.84

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
91.9	168.9	349.0	744.7

TABLE Opening Year Without Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Azusa Ave south of SR-60
NOTES: Hoffer Street and Hathaway Street Residential Project - Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 43760 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 44 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
102.0	202.9	429.0	920.2

TABLE Opening Year With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Hacienda Blvd north of Gale Ave
NOTES: Hoffer Street and Hathaway Street Residential Project - Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 29210 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 34 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.15

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
67.1	129.1	270.5	579.1

TABLE Opening Year With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Hacienda Blvd btwn Gale Ave and SR-60
NOTES: Hoffer Street and Hathaway Street Residential Project - Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 30610 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 34 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.94

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	108.8	225.3	480.9

TABLE Opening Year With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Hacienda Blvd south of SR-60
NOTES: Hoffer Street and Hathaway Street Residential Project - Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 39610 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 34 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.48

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
78.6	156.4	330.6	709.0

TABLE Opening Year With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Gale Avenue btwn Hacienda Blvd and Azuza Ave
NOTES: Hoffer Street and Hathaway Street Residential Project - Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 26050 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 22 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.68

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
68.8	142.2	303.4	652.1

TABLE Opening Year With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Azusa Ave north of Gale Ave
NOTES: Hoffer Street and Hathaway Street Residential Project - Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 39780 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
93.6	189.5	402.3	863.9

TABLE Opening Year With Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Azusa Ave btwn Gale Ave and SR-60
NOTES: Hoffer Street and Hathaway Street Residential Project - Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 42810 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 54 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.85

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
92.0	169.3	349.9	746.7

TABLE Opening Year With Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 05/13/2019
ROADWAY SEGMENT: Azusa Ave south of SR-60
NOTES: Hoffer Street and Hathaway Street Residential Project - Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 43760 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 44 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
102.0	202.9	429.0	920.2
