NOISE AND VIBRATION IMPACT ANALYSIS

LANCASTER 3 PROJECT

LANCASTER, CALIFORNIA

LSA

March 2020

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LANCASTER, CALIFORNIA

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LIST OF ABBREVIATIONS AND ACRONYMS

ADT	average daily traffic
City	City of Lancaster
CNEL	Community Noise Equivalent Level
County	County of Los Angeles
dB	decibel
dBA	A-weighted decibel
EPA	United States Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HVAC	heating, ventilation, and air conditioning
in/sec	inches per second
Ldn	day-night average noise level
Leq	equivalent continuous sound level
Lmax	maximum noise level
PPV	peak particle velocity
project	Lancaster 3 Project
RMS	root-mean-square
SENL	single event noise levels
sf	square feet
VdB	vibration velocity in decibels

NOISE AND VIBRATION IMPACT ANALYSIS

INTRODUCTION

This noise and vibration impact analysis has been prepared to evaluate the potential noise and vibration impacts and identify reduction measures associated with the Lancaster 3 Project (project) in Lancaster, Los Angeles County, California. This report is intended to satisfy City of Lancaster (City) requirements for a project-specific noise and vibration impact analysis by examining the short-term and long-term noise and vibration impacts on sensitive uses adjacent to the project site and evaluating reduction measures required by the proposed project.

PROJECT LOCATION AND DESCRIPTION

The project site is at 1752 East Avenue J4 in Lancaster, California, as shown on Figure 1.

USA Properties proposes to construct 264 mixed-income residences on an 11.34-gross-acre site at the northeast corner of 17th Street East and East Avenue J4, as shown on Figure 2. The residential community would include 264 new apartment homes (average of 20.2 dwelling units per gross acre) with a mix of 1-, 2-, 3- and 4-bedroom units ranging between 680 square feet (sf) to 1,287 sf. The community will include 11 three-story wood frame walk-up buildings with a maximum height of 45 feet (ft). Construction of the project is planned to start in August 2020 and finish in early 2023. The project site has a General Plan and Zoning designation of High Density Residential (HDR) which allows for 15.1-30 dwelling units per acre. The project requires no changes to the existing General Plan or Zoning designations.

CHARACTERISTICS OF SOUND

Sound is increasing in the environment and can affect 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 and describes a noisy or quiet environment; it 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 is the average rate of sound energy transmitted through a unit area perpendicular to the direction in which the sound waves are traveling. 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. Decibels (dB), unlike the linear scale (e.g., inches or pounds), is a scale based on powers of 10.

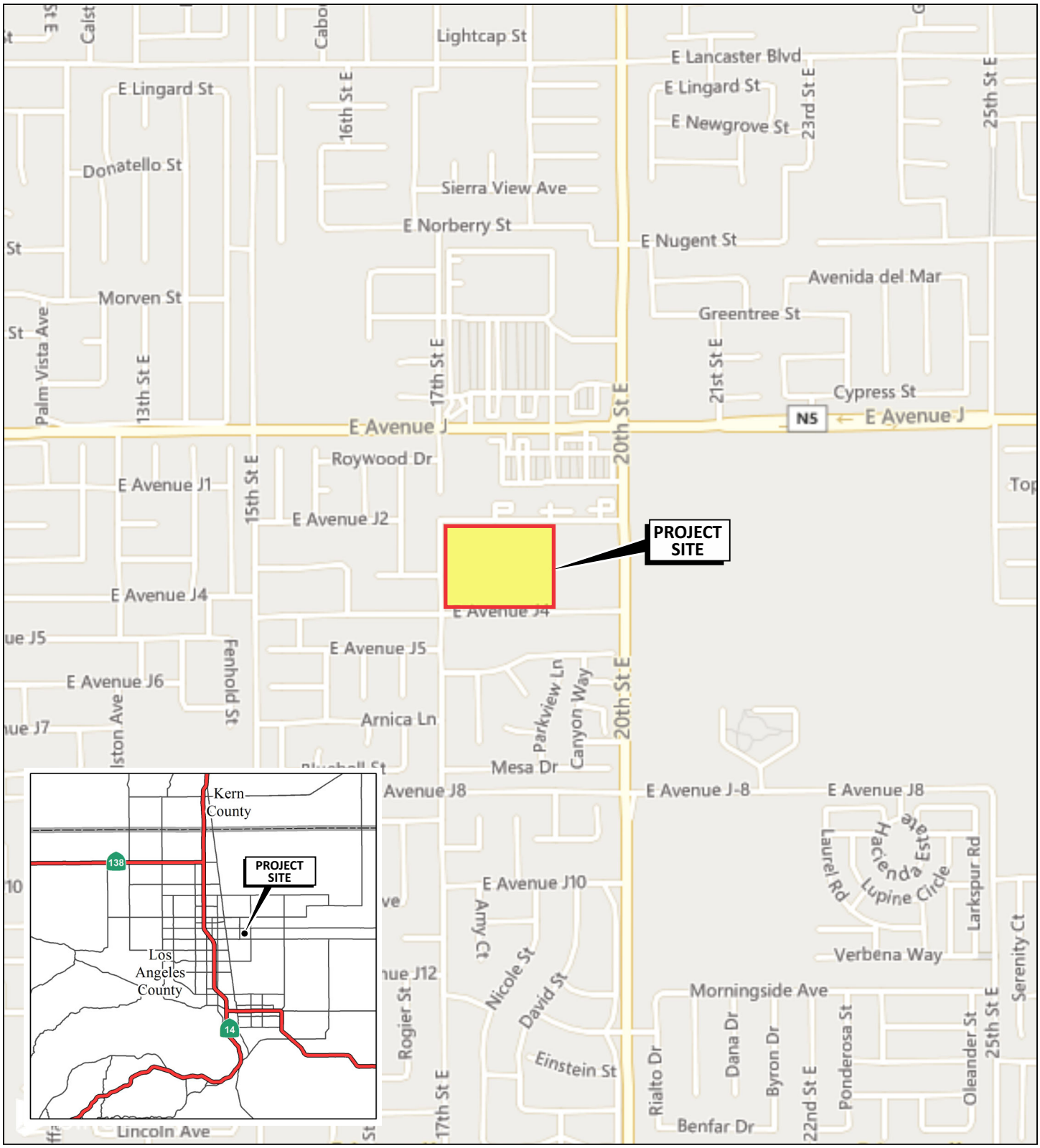

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FIGURE 1

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SOURCE: Bing Maps

Lancaster 3

Project Location

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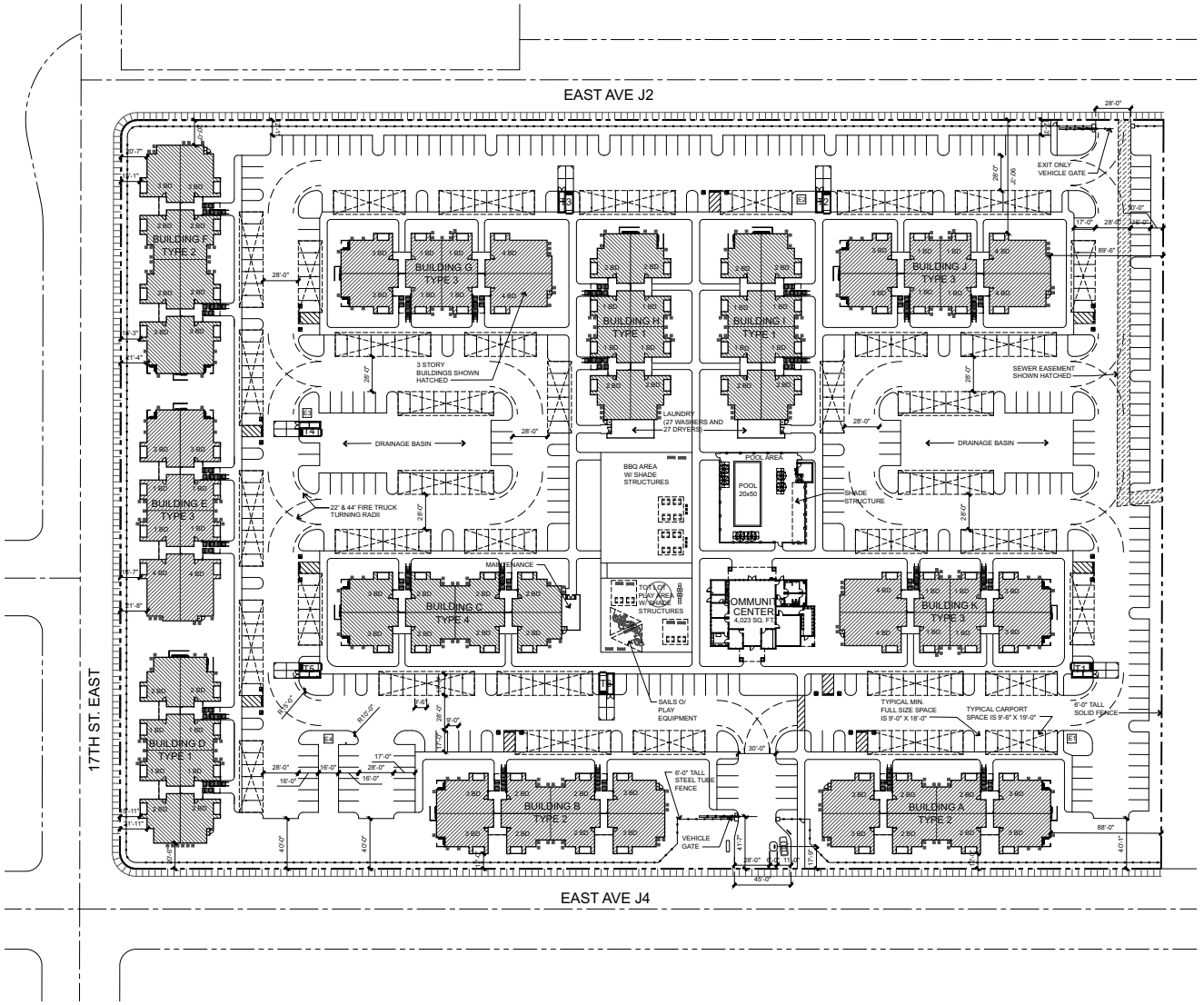

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FIGURE 2

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SOURCE: Kuchman Architects PC

Lancaster 3

Site Plan

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For example, 10 dB is 10 times more intense than 0 dB, 20 dB is 100 times more intense than 0 dB, and 30 dB is 1,000 times more intense than 0 dB. Thirty decibels (30 dB) represents 1,000 times as much acoustic energy as 0 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 A-weighted decibels (dBA) (very quiet) to 100 dBA (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, such as 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-weighted average noise over a sample period. However, the predominant rating scales for human communities in California are L_{eq} and the Community Noise Equivalent Level (CNEL) or the day-night average noise level (L_{dn}) based on 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 noise 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 relaxation hours. CNEL and L_{dn} are within 1 dBA of each other and are normally interchangeable. The noise adjustments are added to the noise events occurring during the more sensitive hours.

Other noise rating scales of importance, when assessing the annoyance factor, include the maximum 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 are specified in terms of L_{max} for short-term noise impacts. L_{max} reflects peak operating conditions and addresses the annoying aspects of intermittent noise. Another noise scale often used together with L_{max} in noise ordinances for enforcement purposes is noise standards in terms of percentile noise levels. 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 of the time the noise level exceeds this level, and half of 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, L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first is audible impacts, which refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dB or greater since 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 and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category is changes in noise level 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 and 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. This is called the threshold of pain. A sound level of 160 to 165 dBA will potentially 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 areas.

Table A lists definitions of acoustical terms, and Table B shows common sound levels and their noise sources.

Table A: Definitions of Acoustical Terms

Term	Definition
Decibel, dB	A unit of noise level 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 de-emphasizes the very-low-frequency 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_2, L_8, L_{50}, L_{90}	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 2 percent, 8 percent, 50 percent, and 90 percent of a stated time period.
Equivalent Continuous Sound 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 dB to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 dB to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Average Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 dB to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
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 from 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 on its amplitude, duration, frequency, time of occurrence, and tonal or informational content, as well as the prevailing ambient noise level.

Source: *Handbook of Acoustical Measurement 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 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	Reference Level
Average Office	60	Quiet	½ as loud
Suburban Street	55	Quiet	—
Light Traffic; Soft Radio Music in Apartment	50	Quiet	¼ as loud
Large Transformer	45	Quiet	—
Average Residence without Stereo Playing	40	Faint	⅛ 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 Associates, Inc. (2004).

FUNDAMENTALS OF VIBRATION

Vibration refers to ground-borne noise and perceptible motion. Ground-borne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors. Outdoors, 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 dB or less. This is an order of magnitude below the damage threshold for normal buildings.

Typical sources of ground-borne 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 ground-borne vibration and noise from these sources are usually localized to areas within approximately 100 ft from the vibration source, although there are examples of ground-borne vibration causing interference out to distances greater than 200 ft (*Transit Noise and Vibration Impact Assessment Manual* [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 ground-borne vibration from street traffic will not

exceed the impact criteria; however, both construction of the project and freight train operations could result in ground-borne vibration that may be perceptible and annoying.

Ground-borne noise is not likely to be a problem because noise arriving via the normal airborne path will usually be greater than ground-borne noise. Ground-borne vibration has the potential to disturb people and damage buildings. Although it is very rare for train-induced ground-borne vibration to cause even cosmetic building damage, it is not uncommon for construction processes (e.g., blasting and pile driving) to cause vibration of sufficient amplitudes to damage nearby buildings (FTA 2018). Ground-borne vibration is usually measured in terms of vibration velocity, either the root-mean-square (RMS) velocity or peak particle velocity (PPV). The RMS velocity 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. The vibration velocity level in decibels is defined as the following:

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

where L_v is the vibration velocity in decibels (VdB), V is the RMS velocity amplitude, and V_{ref} is the reference velocity amplitude, or 1 x 10^{-6} inches/second (in/sec) used in the United States. Table C illustrates human response to various vibration levels, as described in the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).

Table C: Human Response to Different Levels of Ground-Borne Noise and Vibration

Vibration Velocity Level	Noise Level		Human Response
	Low-Frequency[1]	Mid-Frequency[2]	
65 VdB	25 dBA	40 dBA	Approximate threshold of perception for many humans. Low-frequency sound is usually inaudible; mid-frequency sound is excessive for quiet sleeping areas.
75 VdB	35 dBA	50 dBA	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level annoying. Low-frequency noise is acceptable for sleeping areas; mid-frequency noise is annoying in most quiet occupied areas.
85 VdB	45 dBA	60 dBA	Vibration acceptable only if there are an infrequent number of events per day. Low-frequency noise is annoying for sleeping areas; mid-frequency noise is annoying even for infrequent events with institutional land uses such as schools and churches.

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] Approximate noise level when the vibration spectrum peak is near 30 Hz.
[2] Approximate noise level when the vibration spectrum peak is near 60 Hz.
dBA = A-weighted decibel
FTA = United States Federal Transit Administration
Hz = Hertz
VdB = vibration velocity decibels

Factors that influence ground-borne 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 ground-borne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock.

Experience with ground-borne vibration indicates the following: (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 ground-borne 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 ground-borne 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

Federal Regulations

Federal Transit Administration

Vibration standards included in the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) are used in this analysis for ground-borne vibration impacts on human annoyance. Table D provides the criteria for assessing the potential for interference or annoyance from vibration levels in a building.

Table D: Interpretation of Vibration Criteria for Detailed Analysis

Land Use	Max L_v (VdB)[1]	Description of Use
Workshop	90	Distinctly feelable vibration. Appropriate to workshops and nonsensitive areas.
Office	84	Feelable vibration. Appropriate to offices and nonsensitive areas.
Residential Day	78	Feelable vibration. Appropriate for computer equipment and low-power optical microscopes (up to 20X).
Residential Night and Operating Rooms	72	Vibration not feelable, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power microscopes (100X) and other equipment of low sensitivity.

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] As measured in 1/3-octave bands of frequency over the frequency range 8 to 80 Hz.
FTA = United States Federal Transit Administration
Hz = hertz
L_V = velocity in decibels
Max = maximum
VdB = vibration velocity decibels

The criteria for environmental impact from ground-borne vibration and noise are based on the maximum levels for a single event. Table E lists the potential vibration building damage criteria associated with construction activities, as suggested in the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). United States Federal Transit Administration (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 nonengineered-timber and masonry buildings, the construction building vibration damage criterion is 94 VdB (0.2 in/sec in PPV).

Table E: 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
Nonengineered timber and masonry buildings	0.20	94
Buildings extremely susceptible to vibration damage	0.12	90

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] RMS vibration velocity in decibels (VdB) is 1 µin/sec.
µin/sec = micro-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

Local Regulations

City of Lancaster

Public Health and Safety of the General Plan. The City has noise compatible land use objectives for various land uses in the noise section under the Plan for Public Health and Safety in the City's General Plan (2009a). As shown in Table F, residential land uses have a maximum exterior noise level of 65 dBA CNEL and a maximum interior noise level of 45 dBA CNEL. Below are the City's objectives and policies to address noise. As listed and discussed below under Policy 4.3.2, single-event noise levels from construction would be no greater than 15 dBA above the noise objectives included in the Plan for Public Health and Safety (Table F) wherever feasible. Therefore, construction noise levels of 80 dBA and 85 dBA L_{max} are the maximum single event noise levels for residential and commercial uses, respectively.

Table F: City Maximum Exterior and Interior Noise Levels

Land Use	Maximum Noise Level (dBA CNEL)	
	Exterior	Interior
Rural, Single Family, Multiple Family Residential	65	45
School Classrooms	65	45
School Playgrounds	70	--
Libraries	--	50
Hospital/Convalescent Facilities: Living Areas	--	50
Hospital/Convalescent Facilities: Sleeping Areas	--	40
Commercial and Industrial	70	--
Office Areas	--	50

Source: City of Lancaster General Plan, Plan for Public Health and Safety, Table 3-1 (Lancaster 2009a).

- **Objective 4.3** Promote noise compatible land use relationships by implementing the noise standards identified in Table F to be utilized for design purposes in new development, and establishing a program to attenuate existing noise problem.
    - **Policy 4.3.1:** Ensure that noise-sensitive land uses and noise generators are located and designed in such a manner that City noise objectives will be achieved.
    - **Policy 4.3.2:** Wherever feasible, manage the generation of single event noise levels (SENL) from motor vehicles, trains, aircraft, commercial, industrial, construction, and other

activities such that SENL levels are no greater than 15 dBA above the noise objectives included in the Plan for Public Health and Safety.

- **Policy 4.3.3:** Ensure that the provision of noise attenuation does not create significant negative visual impacts.

Municipal Code. Section 8.24.040 of the City's Municipal Code prohibits any construction or repair work of any kind upon any building or structure or any earth excavating, filling or moving where any of the foregoing entails the use of any air compressor, jackhammer, power-driven drill, riveting machine, excavator, diesel-powered truck, tractor or other earth-moving equipment, hard hammers on steel or iron or any other machine tool, device, or equipment that makes loud noises within 500 ft of an occupied dwelling, apartment, hotel, mobile home or other place of residence at any time on Sunday or any day between the hours of 8:00 p.m. and 7:00 a.m. Therefore, construction activity shall be limited to between the hours of 7:00 a.m. and 8:00 p.m. Monday through Saturday.

County of Los Angeles

The County of Los Angeles' regulation on residential air conditioning and operational vibration was used to evaluate potential project impacts because the City does not have specific regulations for these items.

Municipal Code. Section 12.08.530 of the County's Municipal Code limits noise levels generated by residential air conditioning to 55 dBA at any point on the neighboring property line 5 ft above grade level and no closer than 3 ft from any wall, 50 dBA at the center of the neighboring patio 5 ft above grade level and no closer than 3 ft from any wall, or 50 dBA outside the neighboring living area window nearest the equipment location not more than 3 ft from the window opening, but at least 3 ft from any other surface.

Section 12.08.560 of the County's Municipal Code prohibits the operation or permitting the operation of any device that creates vibration that is above the vibration perception threshold of any individual at or beyond the property boundary of the source if on private property, or at 150 ft from the source if on a public space or public right-of-way. The perception threshold shall be a motion velocity of 0.01 in/sec over the range of 1 to 100 Hertz.

EXISTING SETTING

Overview of the Existing Noise Environment

The primary existing noise sources in the project area are transportation facilities. Traffic on 17th Street East, East Avenue J2, and East Avenue J4, and other local streets contributes to the ambient noise levels in the project vicinity. Noise from motor vehicles is generated by engines, the interaction between the tires and the road, and the vehicles' exhaust systems.

Sensitive Land Uses in the Project Vicinity

Land uses in the vicinity of the project area include residences, vacant land, and a commercial use. Single-family residences are west of the project site and multifamily residences are south and immediately east of the project site. The closest residences are immediately east of the project site,

which is approximately 15 ft from the project construction boundary. Vacant land and the commercial use are north of the project site.

Ambient Noise Measurements

Short-Term Noise Measurements

LSA conducted two short-term (20-minute) noise level measurements on February 12, 2020, using a Larson Davis Model 831 Type 1 sound level meter. Table G shows the results of the short-term noise level measurements along with a description of the measurement location and noise sources that occurred during the measurement. As shown in Table G, the measured average noise levels in the project vicinity are 43.8 to 48.5 dBA L_{eq}, and the calculated CNEL noise levels are 49.0 and 54.8 dBA at ST-1 and ST-2, respectively, based on the noise level profile from the long-term noise level measurements. Figure 3 shows the short-term monitoring locations.

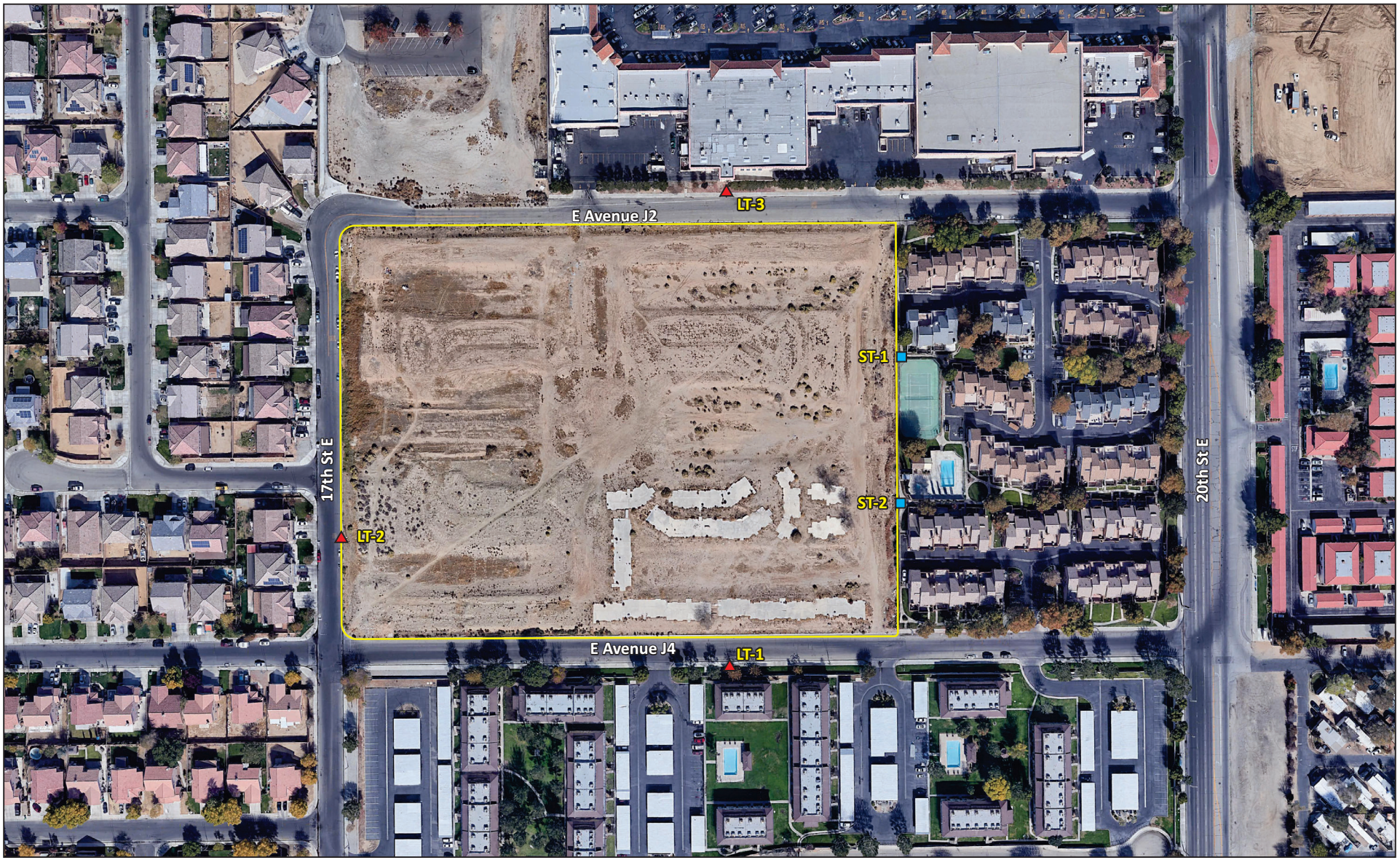
Table G: Short-Term Ambient Noise Level Measurements

Monitor No.	Location	Date	Start Time	Noise Level				Noise Source(s)
				dBA L_{eq}	dBA L_{max}	dBA L_{min}	dBA CNEL[1]	
ST-1	1832 East Avenue J2, between southwest corner of building and tennis court	2/12/20	10:30 a.m.	43.8	58.5	38.9	49.0	Faint traffic to the south and on 20th Street East, faint sirens, and birds chirping
ST-2	1835 East Avenue J2, near the northwest corner of the patio for unit 1	2/12/20	11:00 a.m.	48.5	66.9	44.1	54.8	Pool pump and heater, birds chirping, and faint traffic on 20th Street East

Source: Compiled by LSA Associates, Inc. (2020).
[1] The CNEL noise levels for ST-1 and ST-2 were calculated based on the noise level profile of LT-3 and LT-1, respectively.
CNEL = Community Equivalent Noise Level
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum measured sound level
L_{min} = minimum measured sound level

Long-Term Noise Measurements

The long-term (24-hour) noise level measurements were conducted from February 12 to 13, 2020, using three Spark 706RC Dosimeters. Tables H through J show the hourly L_{eq} results from the long-term noise level measurements, and Table K shows the calculated CNEL from the long-term noise level measurements. As shown in Table K, the measured CNEL is 63.0 dBA at LT-1, 57.1 dBA at LT-2, and 59.6 dBA at LT-3. Figure 3 shows the long-term monitoring locations.



LSA

LEGEND

- Project Site
- LT-1 Long-Term Noise Monitoring Location
- ST-1 Short-Term Noise Monitoring Location

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SOURCE: Google Earth (2020)

FIGURE 3

Lancaster 3

Noise Monitoring Locations

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Table H: Long-Term (24-Hour) Noise Level Measurement Results at LT-1

	Start Time	Date	Noise Level (dBA L_{eq})
1	10:00 AM	2/12/20	57.7
2	11:00 AM	2/12/20	56.5
3	12:00 PM	2/12/20	58.4
4	1:00 PM	2/12/20	58.9
5	2:00 PM	2/12/20	58.6
6	3:00 PM	2/12/20	60.5
7	4:00 PM	2/12/20	60.2
8	5:00 PM	2/12/20	60.7
9	6:00 PM	2/12/20	59.2
10	7:00 PM	2/12/20	57.2
11	8:00 PM	2/12/20	56.7
12	9:00 PM	2/12/20	57.2
13	10:00 PM	2/12/20	58.9
14	11:00 PM	2/12/20	56.9
15	12:00 AM	2/13/20	51.1
16	1:00 AM	2/13/20	50.3
17	2:00 AM	2/13/20	48.7
18	3:00 AM	2/13/20	49.0
19	4:00 AM	2/13/20	54.1
20	5:00 AM	2/13/20	55.2
21	6:00 AM	2/13/20	59.6
22	7:00 AM	2/13/20	62.8
23	8:00 AM	2/13/20	60.4
24	9:00 AM	2/13/20	61.2

Source: Compiled by LSA Associates, Inc. (2020).
dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels

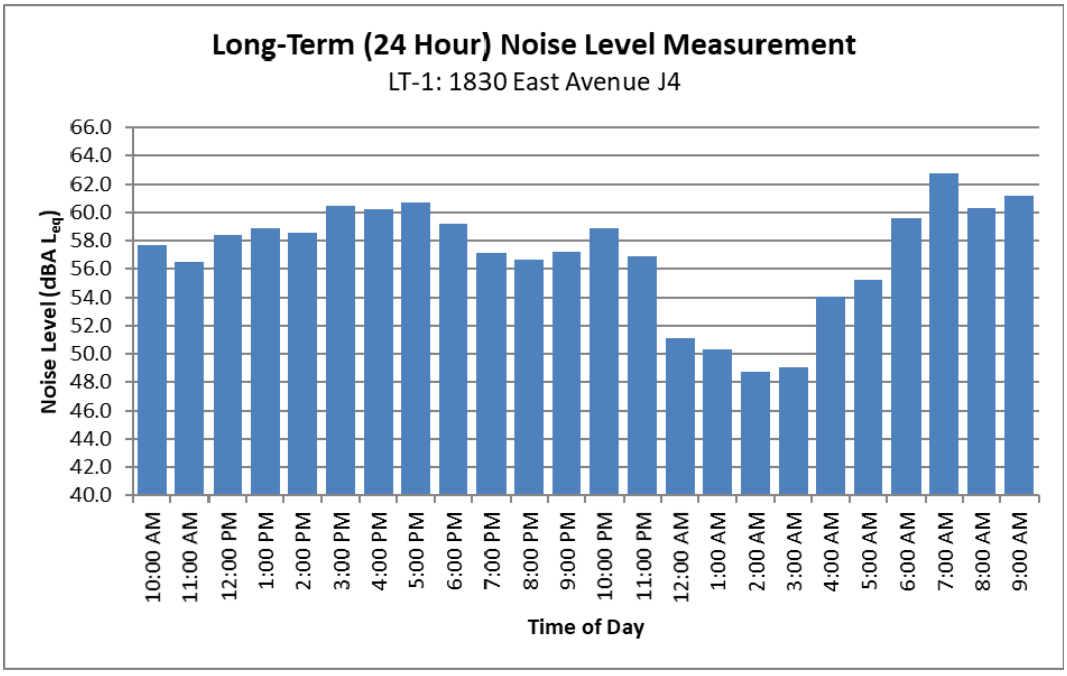

Table I: Long-Term (24-Hour) Noise Level Measurement Results at LT-2

	Start Time	Date	Noise Level (dBA L_{eq})
1	10:00 AM	2/12/20	52.8
2	11:00 AM	2/12/20	53.0
3	12:00 PM	2/12/20	54.8
4	1:00 PM	2/12/20	53.8
5	2:00 PM	2/12/20	53.4
6	3:00 PM	2/12/20	54.6
7	4:00 PM	2/12/20	55.1
8	5:00 PM	2/12/20	55.0
9	6:00 PM	2/12/20	54.1
10	7:00 PM	2/12/20	51.8
11	8:00 PM	2/12/20	52.5
12	9:00 PM	2/12/20	51.6
13	10:00 PM	2/12/20	51.7
14	11:00 PM	2/12/20	49.0
15	12:00 AM	2/13/20	44.8
16	1:00 AM	2/13/20	48.4
17	2:00 AM	2/13/20	46.0
18	3:00 AM	2/13/20	43.3
19	4:00 AM	2/13/20	49.1
20	5:00 AM	2/13/20	48.7
21	6:00 AM	2/13/20	53.7
22	7:00 AM	2/13/20	55.8
23	8:00 AM	2/13/20	53.3
24	9:00 AM	2/13/20	52.7

Source: Compiled by LSA Associates, Inc. (2020).
dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels

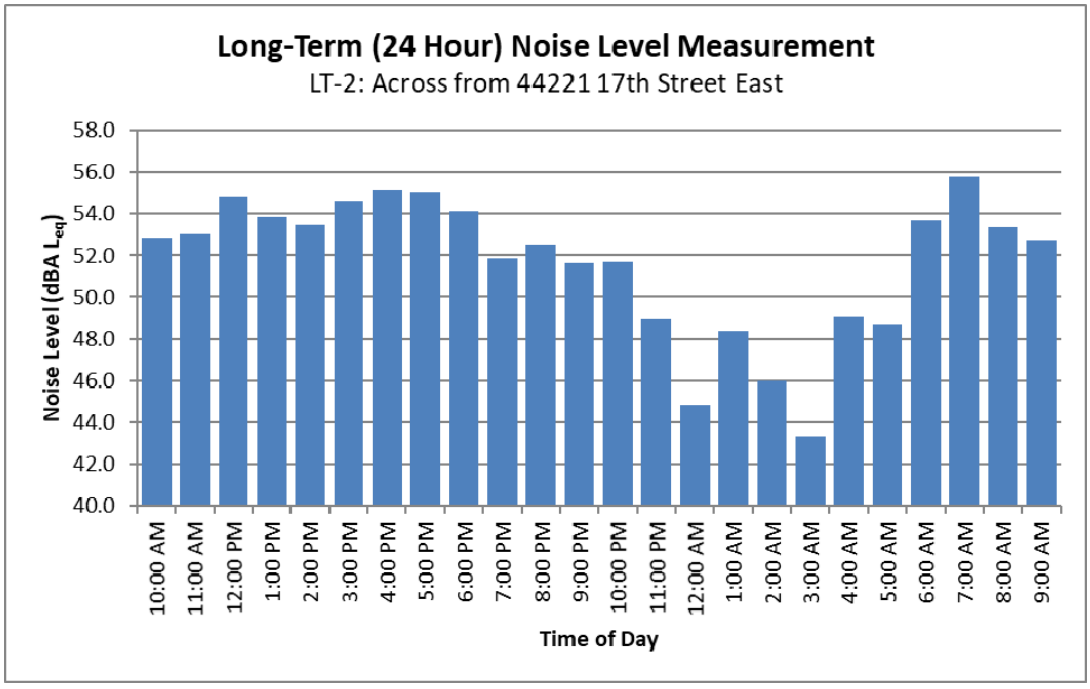

Table J: Long-Term (24-Hour) Noise Level Measurement Results at LT-3

	Start Time	Date	Noise Level (dBA L_{eq})
1	10:00 AM	2/12/20	54.4
2	11:00 AM	2/12/20	54.6
3	12:00 PM	2/12/20	55.9
4	1:00 PM	2/12/20	57.0
5	2:00 PM	2/12/20	57.4
6	3:00 PM	2/12/20	59.3
7	4:00 PM	2/12/20	57.8
8	5:00 PM	2/12/20	56.5
9	6:00 PM	2/12/20	58.2
10	7:00 PM	2/12/20	54.8
11	8:00 PM	2/12/20	54.7
12	9:00 PM	2/12/20	55.0
13	10:00 PM	2/12/20	53.2
14	11:00 PM	2/12/20	50.3
15	12:00 AM	2/13/20	48.3
16	1:00 AM	2/13/20	49.7
17	2:00 AM	2/13/20	50.5
18	3:00 AM	2/13/20	43.6
19	4:00 AM	2/13/20	51.2
20	5:00 AM	2/13/20	51.8
21	6:00 AM	2/13/20	56.3
22	7:00 AM	2/13/20	57.9
23	8:00 AM	2/13/20	56.8
24	9:00 AM	2/13/20	55.9

Source: Compiled by LSA Associates, Inc. (2020).
dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels

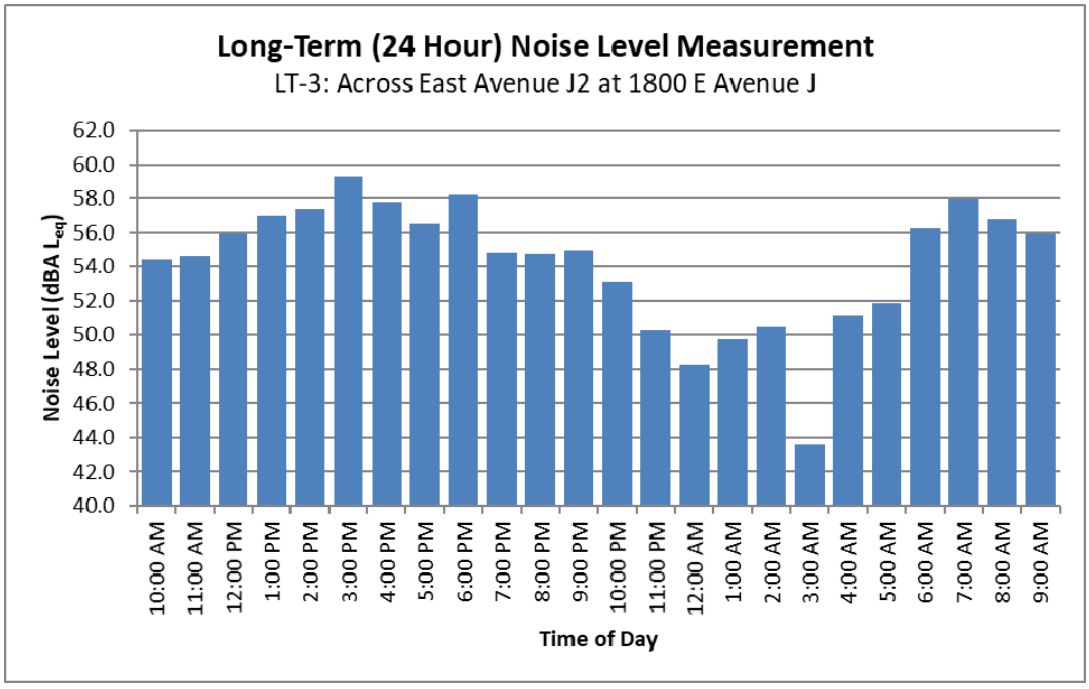

Table K: Long-Term Ambient Noise Monitoring Results

Monitoring No.	Location	Start Date	Start Time	Duration (hours)	Noise Level (dBA CNEL)	Noise Source
LT-1	Park Circle Apartments at 1830 East Avenue J4. On a light pole near apartment building number 1746.	2/12/20	10:00 a.m.	24	63.0	Light traffic on East Avenue J4 and faint traffic from other roadways in the project vicinity
LT-2	Across 17th Street East from single-family residence at 44221 17th Street East. On a light pole at the project boundary.	2/12/20	10:00 a.m.	24	57.1	Light traffic on 17th Street East and faint traffic from other roadways in the project vicinity
LT-3	Across East Avenue J2 at 1800 East Avenue J. On a light pole along East Avenue J2, on the south side of the building near the truck loading dock.	2/12/20	10:00 a.m.	24	59.6	Light traffic on East Avenue J2 and faint traffic from other roadways in the project vicinity

Source: Compiled by LSA Associates, Inc. (2020).
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel

Existing Aircraft Noise

The nearest airports to the project site are the Palmdale Airport/United States Air Force (USAF) Plant 42 and General William J. Fox Airfield, which are 3.8 miles southeast and 7.2 miles northwest of the project site, respectively. Based on the Los Angeles County Airport Land Use Plan (Los Angeles County ALUC 2004a) and the General William J. Fox Airfield Land Use Compatibility Plan (Los Angeles County ALUC 2004b), the project site is outside the 65 and 55 dBA CNEL noise contours of the Palmdale Airport/United States Air Force (USAF) Plant 42 and General William J. Fox Airfield, respectively.

In addition, the Antelope Valley Hospital helipad is 3.4 miles west of the project and is used sparingly for the emergency transport of patients (City of Lancaster 2009b). The Los Angeles County Sheriff's Department helipad is 2.4 miles northwest of the project and is used for law enforcement and any public service helicopters that require emergency assistance (Lancaster 2009b). There are no private airstrips within the vicinity of the project site.

Existing Traffic Noise

The United States Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used to evaluate 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 resulting noise levels are weighted and summed over 24-hour periods to determine the CNEL values. The existing (2020) average daily traffic (ADT) volumes were obtained from the Traffic Impact Analysis (LSA 2020a). The standard vehicle mix for Southern California roadways was used for roadways in the project vicinity. Table L lists the existing traffic noise levels on roadways in the project vicinity. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between traffic and the location where the noise contours are drawn. Table L indicates that the existing traffic noise levels along 17th Street East, East Avenue J2 and East Avenue J4 are low, whereas traffic noise levels along 20th Street are moderate. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix A.

Table L: Existing (2020) Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (ft)	Centerline to 65 CNEL (ft)	Centerline to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane
20th Street North of East Avenue J2	12,250	< 50	104	220	67.4
20th Street Between East Avenue J2 and East Avenue J4	11,925	< 50	102	216	67.3
20th Street South of East Avenue J4	11,240	< 50	99	208	67.0
17th Street East North of East Avenue J4	580	< 50	< 50	< 50	48.4
East Avenue J2 West of Project Driveway 2	330	< 50	< 50	< 50	45.9
East Avenue J2 East Project Driveway 2	330	< 50	< 50	< 50	45.9
East Avenue J2 West of 20th Street	510	< 50	< 50	< 50	47.8
East Avenue J4 West of 17th Street East	620	< 50	< 50	< 50	48.6
East Avenue J4 Between 17th Street East and Project Driveway 1	805	< 50	< 50	< 50	49.8
East Avenue J4 Between Project Driveway 1 and 20th Street	800	< 50	< 50	< 50	49.8

Source: Compiled by LSA Associates, Inc. (2020).
Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
ADT = average daily traffic dBA = A-weighted decibel
CNEL = Community Noise Equivalent Level ft = feet

IMPACTS

Short-Term Construction Noise Impacts

Two types of short-term noise impacts could occur during construction on the project site. First, construction crew commutes and the transport of construction equipment and materials to the site for the proposed project would incrementally increase noise levels on roads leading to the site. The pieces of heavy equipment for construction activities would be moved on site, would remain for the duration of each construction phase, and would not add to the daily traffic volume in the project vicinity. Although there would be a relatively high single-event noise exposure potential causing intermittent noise nuisance (passing trucks at 50 ft would generate up to a maximum of 84 dBA), the effect on the daily ambient noise levels would be small. The building construction phase would generate the most trips out of all of the construction phases, 662 trips per day based on the

California Emission Estimator Model (Version 2016.3.2) output, shown in Appendix A of the Air Quality and Greenhouse Gas Impact Analysis Report for the project (LSA 2020b). It is assumed that approximately half of the construction-related traffic would access the project site from East Avenue J2 and that the other half would access the project from East Avenue J4. Based on Table L, East Avenue J2 and East Avenue J4 have estimated existing daily traffic volume of 330 and 800, respectively, near the project site. Based on the information above, construction-related traffic would increase noise by up to 3.0 dBA on East Avenue J2 and a 1.5 dBA on East Avenue J4. A noise level increase of 3 dBA or more would be perceptible to the human ear in an outdoor environment. Although traffic increases on East Avenue J2 would be perceptible to the human ear in an outdoor environment, traffic noise levels would remain low and traffic noise levels would not exceed 65 dBA CNEL for off-site residences located along East Avenue J2. Therefore, no short-term construction-related noise impacts associated with worker commute and equipment transport to the project site would occur. No noise reduction measures are required.

The second type of short-term noise impact is related to noise generated during site preparation, grading, building construction, paving, and architectural coating 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 change the character of the noise generated on a 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 M lists the maximum noise levels (L_{max}) recommended for noise impact assessments for typical construction equipment included in the *FHWA Highway Construction Noise Handbook* (FHWA 2006), based on a distance of 50 ft between the equipment and a noise receptor.

Typical noise levels range up to 88 dBA L_{max} at 50 ft during the noisiest construction phases. The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backfillers, bulldozers, draglines, and front-end loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders.

Project construction is expected to require the use of graders, bulldozers, and water trucks/pickup trucks. Noise associated with the use of each type of construction equipment for the site preparation phase is estimated to be between 55 dBA L_{max} and 85 dBA L_{max} at a distance of 50 ft from the active construction area. As shown in Table M, the maximum noise level generated by each grader is assumed to be approximately 85 dBA L_{max} at 50 ft. Each bulldozer would generate approximately 85 dBA L_{max} at 50 ft. The maximum noise level generated by water trucks/pickup trucks is approximately 55 dBA L_{max} at 50 ft from these vehicles. Each doubling of the sound sources with equal strength increases the noise level by 3 dBA. Assuming that each piece of construction equipment operates at some distance from the other equipment, the worst-case combined noise level during this phase of construction would be 88 dBA L_{max} at a distance of 50 ft from the active construction area. Based on a usage factor of 40 percent, the worst-case combined noise level during this phase of construction would be 84 dBA L_{eq} at a distance of 50 ft from the active construction area.

Table M: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor[1]	Maximum Noise Level (L_{max}) at 50 ft[2]
Backhoe	40	80
Compactor (ground)	20	80
Compressor	40	80
Crane	16	85
Dozer	40	85
Dump Truck	40	84
Excavator	40	85
Flatbed Truck	40	84
Forklift	20	85
Front-End Loader	40	80
Grader	40	85
Impact Pile Driver	20	95
Jackhammer	20	85
Pickup Truck	40	55
Pneumatic Tools	50	85
Pump	50	77
Rock Drill	20	85
Roller	20	85
Scraper	40	85
Tractor	40	84
Welder	40	73

Source: *FHWA Highway Construction Noise Handbook,* Table 9.1 (FHWA 2006).
Note: The noise levels reported in this table are rounded to the nearest whole number.
[1] Usage factor is the percentage of time during a construction noise operation that a piece of construction equipment is operating at full power.
[2] Maximum noise levels were developed based on Specification 721.560 from the CA/T program to be consistent with the City of Boston, Massachusetts, Noise Code for the "Big Dig" project.
CA/T = Central Artery/Tunnel
FHWA = United States Federal Highway Administration
ft = foot/feet
L_{max} = maximum instantaneous noise level

The closest residential property line is within 50 ft of the project construction boundary and may be subject to short-term construction noise reaching 88 dBA L_{max} (84 dBA L_{eq}) generated by construction activities in the project area. Ambient noise levels at the project site range between 43.8 to 62.8 dBA L_{eq} based on short-term and long noise level measurements at ST-1 and ST-2 shown in Table G and long-term noise level measurements at LT-1, LT-2, and LT-3, shown in Tables H through J. Noise levels generated by project construction would be higher than ambient noise levels and may result in a temporary increase in the ambient noise levels. In addition, single event noise levels generated by project construction would be greater than 15 dBA above the City's noise standard of 65 dBA CNEL for residential uses. However, construction noise would stop once project construction is completed. Implementation of the standard conditions for construction, which include compliance with the construction hours specified in the City's Municipal Code, would minimize construction noise. No noise reduction measures are required.

The following comprise the standard conditions for construction:

- The construction contractor shall limit construction activities to between the hours of 7:00 a.m. and 8:00 p.m. Monday through Saturday. No construction activities shall be permitted outside these hours or any time on Sunday.
- During all project site excavation and grading, the project contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and most noise-sensitive receptors nearest the project site during all project construction.
- The construction contractor shall place all stationary construction equipment so that the emitted noise is directed away from the sensitive receptors nearest the project site.

Short-Term Construction Vibration Impacts

This construction vibration impact analysis discusses the level of human annoyance using vibration levels in VdB and assesses the potential for building damage using vibration levels in PPV (in/sec). Vibration levels calculated in RMS velocity are best for characterizing human response to building vibration, whereas vibration levels in PPV are best for characterizing damage potential. As shown in Table E, the FTA guidelines indicate that a vibration level up to 102 VdB (equivalent to 0.5 PPV [in/sec]) is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster), and would not result in any construction vibration damage (FTA 2018). For a nonengineered-timber and masonry building, the construction vibration damage criterion is 94 VdB (0.2 PPV [in/sec]). For a fragile building, the construction vibration damage criterion is 90 VdB (0.12 PPV [in/sec]).

Table N shows the reference vibration levels at a distance of 25 ft for each type of standard construction equipment from the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). Outdoor demolition, site preparation, and grading for the proposed project is expected to require the use of a large bulldozer and loaded trucks, which would generate ground-borne vibration of up to 87 VdB (0.089 PPV [in/sec]) and 86 VdB (0.076 PPV [in/sec] when measured at 25 ft, respectively.

The greatest vibration levels are anticipated to occur during the demolition, site preparation and grading phase. All other phases are expected to result in lower vibration levels. 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 normally occur within the buildings.

The formula for vibration transmission is provided below:

$$L_v dB\ (D) = L_v dB\ (25\ ft) - 30\ Log\ (D/25)$$
$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

Table N: Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV/L_V at 25 ft	
	PPV (in/sec)	L_V (VdB)[1]
Pile Driver (Impact), Typical	0.644	104
Pile Driver (Sonic), Typical	0.170	93
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large Bulldozer[2]	**0.089**	**87**
Caisson Drilling	0.089	87
Loaded Trucks[2]	**0.076**	**86**
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Sources: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] RMS vibration velocity in decibels (VdB) is 1 µin/sec.
[2] Equipment shown in bold is expected to be used on site.
µin/sec = micro-inches per second
ft = foot/feet
FTA = United States 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

Table O lists the projected vibration levels from various construction equipment expected to be used on the project site to the closest buildings in the project vicinity. As shown in Table O, the closest structure are residential buildings approximately 15 ft immediately east of the project construction boundary that would experience vibration levels of up to 94 VdB (0.191 PPV [in/sec]). This vibration level would result in community annoyance because vibration levels would exceed the FTA community annoyance threshold of 78 VdB for residential uses during daytime hours. However, this vibration level would not have the potential to result in building damage because vibration levels would not exceed the FTA vibration damage threshold of 94 VdB (0.2 PPV [in/sec]) and the residential building was observed to be constructed of nonengineered timber.

Table O: Summary of Construction Vibration Levels

Land Use	Direction	Equipment/Activity	Reference Vibration Level (VdB) at 25 ft	Reference Vibration Level (PPV) at 25 ft	Distance (ft)	Maximum Vibration Level (VdB)	Maximum Vibration Level (PPV)
Commercial	North	Large bulldozers	87	0.089	65	75	0.021
		Loaded trucks	86	0.076	65	74	0.018
Residence	East	Large bulldozers	87	0.089	15	94	0.191
		Loaded trucks	86	0.076	15	93	0.164
Residence	South	Large bulldozers	87	0.089	78	72	0.016
		Loaded trucks	86	0.076	78	71	0.014
Residence	West	Large bulldozers	87	0.089	70	74	0.019
		Loaded trucks	86	0.076	70	73	0.016

Source: Compiled by LSA Associates, Inc. (2020).
Note: The FTA-recommended building damage threshold is 94 VdB (0.2 PPV [in/sec]) for building structures constructed of nonengineered timber.
ft = foot/feet
FTA = United States Federal Transit Administration
in/sec = inches per second
PPV = peak particle velocity
VdB = vibration velocity decibels

Other building structures surrounding the project site would experience vibration levels of up to 75 VdB (0.021 PPV [in/sec]) or lower. This vibration level would not result in community annoyance because vibration levels would not exceed the FTA community annoyance threshold of 78 VdB for residential uses during daytime hours. In addition, this vibration level would not have the potential to result in building damage because vibration levels would not exceed the FTA vibration damage threshold of 94 VdB (0.2 PPV [in/sec]) and these buildings were observed to be constructed of nonengineered timber and masonry. Therefore, no construction vibration impacts would occur. No vibration reduction measures are required.

Long-Term Aircraft Noise Impacts

As discussed above, the project site is outside the 65 and 55 dBA CNEL noise contours of the Palmdale Airport/United States Air Force (USAF) Plant 42 and General William J. Fox Airfield, respectively, based on the Los Angeles County Airport Land Use Plan (Los Angeles County ALUC 2004a) and the General William J. Fox Airfield Land Use Compatibility Plan (Los Angeles County ALUC 2004b). The Antelope Valley Hospital and Los Angeles County Sheriff's Department's helipad are more than 2 miles from the project site and are limited to emergencies. In addition, there are no private airstrips within the vicinity of the project site. Therefore, the proposed project would not expose people residing or working in the project area to excessive noise levels.

Long-Term Traffic Noise Impacts

The FHWA Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used to evaluate traffic-related noise conditions along street 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 resulting noise levels are weighted and summed over 24-hour periods to determine the CNEL values. The Existing (2020) and Opening Year (2025) Cumulative ADT volumes were obtained from the Traffic Impact Analysis (LSA 2020a) for the proposed project. The standard vehicle mix for Southern California roadways was used for roadways in the project vicinity. Tables P and Q list the traffic noise levels for the Existing (2020) and Opening Year (2025) Cumulative Without and With Project scenarios, respectively. 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. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix A.

Tables P and Q show that the proposed project would result in a project-related traffic noise increase of up to 3.1 dBA along East Avenue J4 between Project Driveway 1 and 20th Street. Other roadways in the project vicinity would have a project-related traffic noise increase of up to 1.2 dBA. A noise level increase of 3.1 dBA would be perceptible to the human ear in an outdoor environment. However, traffic noise levels along East Avenue J4 are low and traffic noise levels would not exceed 65 dBA CNEL for off-site residences along East Avenue J4. Therefore, no off-site traffic noise impacts would occur, and no noise reduction measures are required.

Table P: Existing (2020) Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Traffic Conditions					With Project Traffic Conditions					
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA CNEL (ft)	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
20th Street North of East Avenue J2	12,250	< 50	104	220	67.4	12,840	< 50	107	227	67.6	0.2
20th Street Between East Avenue J2 and East Avenue J4	11,925	< 50	102	216	67.3	12,485	< 50	105	222	67.5	0.2
20th Street South of East Avenue J4	11,240	< 50	99	208	67.0	11,580	< 50	101	212	67.2	0.2
17th Street East North of East Avenue J4	580	< 50	< 50	< 50	48.4	600	< 50	< 50	< 50	48.5	0.1
East Avenue J2 West of Project Driveway 2	330	< 50	< 50	< 50	45.9	350	< 50	< 50	< 50	46.2	0.3
East Avenue J2 East of Project Driveway 2	330	< 50	< 50	< 50	45.9	400	< 50	< 50	< 50	46.7	0.8
East Avenue J2 West of 20th Street	510	< 50	< 50	< 50	47.8	580	< 50	< 50	< 50	48.4	0.6
East Avenue J4 West of 17th Street East	620	< 50	< 50	< 50	48.6	800	< 50	< 50	< 50	49.8	1.2
East Avenue J4 Between 17th Street East and Project Driveway 1	805	< 50	< 50	< 50	49.8	1,020	< 50	< 50	< 50	50.8	1.0
East Avenue J4 Between Project Driveway 1 and 20th Street	800	< 50	< 50	< 50	49.8	1,660	< 50	< 50	< 50	52.9	3.1

Source: Compiled by LSA Associates, Inc. (2020).
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel
ft = foot/feet

Table Q: Opening Year (2025) Cumulative Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Traffic Conditions					With Project Traffic Conditions					
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA CNEL (ft)	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
20th Street North of East Avenue J2	16,180	62	124	264	68.6	16,770	63	127	270	68.8	0.2
20th Street Between East Avenue J2 and East Avenue J4	15,825	61	123	260	68.5	16,385	62	125	266	68.7	0.2
20th Street South of East Avenue J4	14,380	58	115	244	68.1	14,720	58	117	248	68.2	0.1
17th Street East North of East Avenue J4	640	< 50	< 50	< 50	48.8	660	< 50	< 50	< 50	48.9	0.1
East Avenue J2 West of Project Driveway 2	360	< 50	< 50	< 50	46.3	380	< 50	< 50	< 50	46.5	0.2
East Avenue J2 East of Project Driveway 2	360	< 50	< 50	< 50	46.3	430	< 50	< 50	< 50	47.1	0.8
East Avenue J2 West of 20th Street	570	< 50	< 50	< 50	48.3	640	< 50	< 50	< 50	48.8	0.5
East Avenue J4 West of 17th Street East	1,070	< 50	< 50	< 50	51.0	1,250	< 50	< 50	< 50	51.7	0.7
East Avenue J4 Between 17th Street East and Project Driveway 1	1,575	< 50	< 50	< 50	52.7	1,780	< 50	< 50	< 50	53.2	0.5
East Avenue J4 Between Project Driveway 1 and 20th Street	1,570	< 50	< 50	< 50	52.7	2,430	< 50	< 50	< 50	54.6	1.9

Source: Compiled by LSA Associates, Inc. (2020).
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel
ft = foot/feet

Land Use Compatibility Assessment

The land use compatibility of the project site was assessed based on the City's exterior and interior noise standards shown in Table F. As Table F shows, the City's exterior and interior noise standards for residences is 65 dBA CNEL and 45 dBA CNEL, respectively. The Opening Year (2025) Cumulative with project traffic noise levels shown in Table R were used to evaluate the proposed on-site uses. The proposed on-site residences were evaluated based on the closest roadway because traffic noise levels on other roadways within the project vicinity are low.

Exterior Noise Assessment

Table R shows the opening year (2025) cumulative with project exterior traffic noise levels at the nearest on-site residence from the adjacent roadway. As shown in Table R, exterior traffic noise levels at the nearest on-site residence range between 49.8 dBA CNEL and 57.5 dBA CNEL. These noise levels would not exceed the City's exterior noise standard of 65 dBA CNEL for residential uses. Therefore, no exterior traffic noise impacts would occur on proposed on-site residential uses. No noise reduction measures are required.

Table R: Opening Year (2025) Cumulative With Project Traffic Noise Levels

Roadway	Reference Noise Level (dBA CNEL)	Reference Distance (ft)	Distance from Roadway Centerline to Residence (ft)	Exterior Noise Level (dBA CNEL)	Interior Noise Level with Windows and Doors Open (dBA CNEL)	Interior Noise Level with Windows and Doors Open (dBA CNEL)
17th Street East	48.9	56	45	50.8	38.8	26.8
East Avenue J2	48.8	56	50	49.8	37.8	25.8
East Avenue J4	54.6	56	40	57.5	45.5	33.5

Source: Compiled by LSA Associates, Inc. (2020).
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel
ft = feet

Interior Noise Assessment

Table R shows the interior noise level without and with windows and doors closed. The interior noise levels were calculated from the exterior noise level and based on standard construction for Southern California (warm climate) residential buildings from the United States Environmental Protection Agency's (EPA) Protective Noise Levels (EPA 1978), which would provide an attenuation of 12 dBA or more with windows and doors open (the national average is 15 dBA) and 24 dBA or more with windows and doors closed (the national average is 25 dBA). With windows and doors open, interior noise levels at the proposed on-site residences along 17th Street East and East Avenue J2 would not exceed the City's interior noise standard of 45 dBA CNEL. However, proposed on-site residences along East Avenue J4 would exceed the City's interior noise standard of 45 dBA CNEL. With windows and doors closed, none of the proposed on-site residences would exceed the City's interior noise standard of 45 dBA CNEL. Mechanical ventilation such as air conditioning would be required for first-row residences along East Avenue J4 so that windows and doors can remain closed for a prolonged period of time. As the project would provide air conditioning as a standard

feature, windows and doors can remain closed for a prolonged period of time. Therefore, no on-site traffic noise impacts would occur and no noise reduction measures are required.

Long-Term Stationary Source Noise Impacts

Heating, Ventilation and Air Conditioning Equipment

The proposed project would include ground floor heating, ventilation, and air conditioning (HVAC) units for each residence that could potentially operate 24 hours per day. Each HVAC unit would generate a noise level of 39.4 dBA L_{eq} at 50 ft based on a sound power level of 71 dBA. There would be as many as six HVAC units in one location, which would generate a noise level of 47.2 dBA L_{eq} at a distance of 50 ft.

Table S shows the noise levels generated by HVAC equipment at the property line of the closest off-site land use along with distance attenuation and shielding. As shown in Table S, noise levels generated from on-site HVAC units would not exceed 55 dBA at any point on the neighboring property line based on requirements specified in the County of Los Angeles Municipal Code Section 12.08.530. In addition, as ambient noise levels range approximately from 50 dBA L_{eq} to 60 dBA L_{eq}, noise generated from HVAC equipment would not increase the ambient noise level. Therefore, no off-site noise impacts from on-site HVAC equipment would occur. No noise reduction measures are required.

Table S: HVAC Noise Levels

Land Use	Direction	Reference Noise Level at 50 ft (dBA L_{eq})	Distance from Source to Off-Site Property Line[1] (ft)	Distance Attenuation (dBA)	Shielding (dBA)	Noise Level (dBA L_{eq})
Commercial	North	47.2	82	4.3	0	42.9
Residential	East	47.2	86	4.7	5	37.5
Residential	South	47.2	80	4.1	0	43.1
Residential	West	47.2	76	3.6	0	43.6

Source: Compiled by LSA Associates, Inc. (2020).
[1] Average distance to the property line of off-site land uses.
dBA = A-weighted decibel
ft = foot/feet
HVAC = heating, ventilation, and air conditioning
L_{eq} = equivalent continuous sound level

Long-Term Ground-Borne Noise and Vibration from Vehicular Traffic

Once operational, the proposed project would not generate vibration. In addition, vibration levels generated from project-related traffic on the adjacent roadways (17th Street East, East Avenue J2, and East Avenue J4) would be unusual for on-road vehicles because the rubber tires and suspension systems of on-road vehicles provide vibration isolation. No vibration impacts would occur from project-related traffic on the adjacent roadways, and no noise and vibration reduction measures are required.

STANDARD CONDITIONS

The following measures would further minimize construction noise:

- The construction contractor shall limit construction activities to between the hours of 7:00 a.m. and 8:00 p.m. Monday through Saturday. Construction is prohibited outside of these hours or at any time on Sundays.
- During all project site excavation and grading, the project contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and most noise-sensitive receptors nearest the project site during all project construction.
- The construction contractor shall place all stationary construction equipment so that the emitted noise is directed away from the sensitive receptors nearest the project site.

REDUCTION MEASURES

Short-Term Construction Noise Impacts

No noise reduction measures are required.

Short-Term Construction Vibration Impacts

No noise reduction measures are required.

Long-Term Aircraft Noise Impacts

No noise reduction measures are required.

Long-Term Traffic Noise Impacts

No noise reduction measures are required.

Long-Term Stationary Noise Impacts

No noise reduction measures are required.

Long-Term Vibration Impacts

No vibration reduction measures are required.

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APPENDIX A

FHWA HIGHWAY TRAFFIC NOISE MODEL PRINTOUTS

TABLE Existing (2019)-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: 20th Street North of East Avenue J2
NOTES: Lancaster 3 - Existing (2019)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12250 SPEED (MPH): 50 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): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.41

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	104.1	219.6	470.8

TABLE Existing (2019)-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: 20th Street Between East Avenue J2 and East Avenue J4
NOTES: Lancaster 3 - Existing (2019)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11925 SPEED (MPH): 50 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): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.30

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	102.4	215.8	462.5

TABLE Existing (2019)-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: 20th Street South of East Avenue J4
NOTES: Lancaster 3 - Existing (2019)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11240 SPEED (MPH): 50 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): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.04

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	98.7	207.5	444.7

TABLE Existing (2019)-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: 17th Street East North of East Avenue J4
NOTES: Lancaster 3 - Existing (2019)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 580 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 48.36

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing (2019)-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J2 West of Project Driveway 2
NOTES: Lancaster 3 - Existing (2019)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 330 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 45.91

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing (2019)-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J2 East Project Driveway 2
NOTES: Lancaster 3 - Existing (2019)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 330 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 45.91

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing (2019)-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J2 West of 20th Street
NOTES: Lancaster 3 - Existing (2019)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 510 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 47.80

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing (2019)-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J4 West of 17th Street East
NOTES: Lancaster 3 - Existing (2019)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 620 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 48.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing (2019)-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J4 Between 17th Street East and Project Driveway 1
NOTES: Lancaster 3 - Existing (2019)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 805 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 49.78

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing (2019)-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J4 Between Project Driveway 1 and 20th Street
NOTES: Lancaster 3 - Existing (2019)

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 800 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 49.76

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing (2019) With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: 20th Street North of East Avenue J2
NOTES: Lancaster 3 - Existing (2019) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12840 SPEED (MPH): 50 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): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	107.3	226.5	485.8

TABLE Existing (2019) With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: 20th Street Between East Avenue J2 and East Avenue J4
NOTES: Lancaster 3 - Existing (2019) With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12485 SPEED (MPH): 50 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): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.49

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	105.4	222.4	476.8

TABLE Existing (2019) With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: 20th Street South of East Avenue J4
NOTES: Lancaster 3 - Existing (2019) With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11580 SPEED (MPH): 50 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): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.17

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	100.5	211.6	453.6

TABLE Existing (2019) With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: 17th Street East North of East Avenue J4
NOTES: Lancaster 3 - Existing (2019) With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 600 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 48.51

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing (2019) With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J2 West of Project Driveway 2
NOTES: Lancaster 3 - Existing (2019) With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 350 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 46.17

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing (2019) With Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J2 East Project Driveway 2
NOTES: Lancaster 3 - Existing (2019) With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 400 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 46.75

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing (2019) With Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J2 West of 20th Street
NOTES: Lancaster 3 - Existing (2019) With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 580 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 48.36

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing (2019) With Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J4 West of 17th Street East
NOTES: Lancaster 3 - Existing (2019) With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 800 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 49.76

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing (2019) With Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J4 Between 17th Street East and Project Driveway 1
NOTES: Lancaster 3 - Existing (2019) With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1020 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 50.81

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing (2019) With Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J4 Between Project Driveway 1 and 20th Street
NOTES: Lancaster 3 - Existing (2019) With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1660 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 52.93

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE 2025 Cumulative-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: 20th Street North of East Avenue J2
NOTES: Lancaster 3 - 2025 Cumulative

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16180 SPEED (MPH): 50 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): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
61.5	124.3	263.8	566.5

TABLE 2025 Cumulative-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: 20th Street Between East Avenue J2 and East Avenue J4
NOTES: Lancaster 3 - 2025 Cumulative

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 15825 SPEED (MPH): 50 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): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.52

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
60.7	122.6	260.0	558.2

TABLE 2025 Cumulative-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: 20th Street South of East Avenue J4
NOTES: Lancaster 3 - 2025 Cumulative

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 14380 SPEED (MPH): 50 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): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.11

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
57.6	115.3	244.1	523.7

TABLE 2025 Cumulative-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: 17th Street East North of East Avenue J4
NOTES: Lancaster 3 - 2025 Cumulative

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 640 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 48.79

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE 2025 Cumulative-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J2 West of Project Driveway 2
NOTES: Lancaster 3 - 2025 Cumulative

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 360 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 46.29

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	0.0	0.0	0.0

TABLE 2025 Cumulative-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J2 East Project Driveway 2
NOTES: Lancaster 3 - 2025 Cumulative

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 360 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 46.29

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	0.0	0.0	0.0

TABLE 2025 Cumulative-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J2 West of 20th Street
NOTES: Lancaster 3 - 2025 Cumulative

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 570 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 48.28

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE 2025 Cumulative-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J4 West of 17th Street East
NOTES: Lancaster 3 - 2025 Cumulative

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1070 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 51.02

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE 2025 Cumulative-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J4 Between 17th Street East and Project Driveway 1
NOTES: Lancaster 3 - 2025 Cumulative

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1575 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 52.70

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE 2025 Cumulative-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J4 Between Project Driveway 1 and 20th Street
NOTES: Lancaster 3 - 2025 Cumulative

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1570 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 52.68

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE 2025 Cumulative With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: 20th Street North of East Avenue J2
NOTES: Lancaster 3 - 2025 Cumulative With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16770 SPEED (MPH): 50 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): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.78

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
62.8	127.2	270.2	580.1

TABLE 2025 Cumulative With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: 20th Street Between East Avenue J2 and East Avenue J4
NOTES: Lancaster 3 - 2025 Cumulative With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16385 SPEED (MPH): 50 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): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.68

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
61.9	125.3	266.0	571.2

TABLE 2025 Cumulative With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: 20th Street South of East Avenue J4
NOTES: Lancaster 3 - 2025 Cumulative With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 14720 SPEED (MPH): 50 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): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.21

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
58.3	117.0	247.9	531.9

TABLE 2025 Cumulative With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: 17th Street East North of East Avenue J4
NOTES: Lancaster 3 - 2025 Cumulative With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 660 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 48.92

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE 2025 Cumulative With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J2 West of Project Driveway 2
NOTES: Lancaster 3 - 2025 Cumulative With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 380 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 46.52

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE 2025 Cumulative With Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J2 East Project Driveway 2
NOTES: Lancaster 3 - 2025 Cumulative With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 430 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 47.06

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE 2025 Cumulative With Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J2 West of 20th Street
NOTES: Lancaster 3 - 2025 Cumulative With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 640 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 48.79

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	0.0	0.0	0.0

TABLE 2025 Cumulative With Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J4 West of 17th Street East
NOTES: Lancaster 3 - 2025 Cumulative With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1250 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 51.69

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE 2025 Cumulative With Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J4 Between 17th Street East and Project Driveway 1
NOTES: Lancaster 3 - 2025 Cumulative With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1780 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 53.23

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE 2025 Cumulative With Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/02/2020
ROADWAY SEGMENT: East Avenue J4 Between Project Driveway 1 and 20th Street
NOTES: Lancaster 3 - 2025 Cumulative With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2430 SPEED (MPH): 25 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): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 54.58

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	52.5
