APPENDIX H

NOISE AND VIBRATION IMPACT ANALYSIS

This page intentionally left blank

NOISE AND VIBRATION IMPACT ANALYSIS

TOWER DISTRICT SPECIFIC PLAN UPDATE

FRESNO, CALIFORNIA

LSA

July 2025

NOISE AND VIBRATION IMPACT ANALYSIS

TOWER DISTRICT SPECIFIC PLAN UPDATE

FRESNO, CALIFORNIA

Prepared for:

Peter Winch, AICP
Wallace, Roberts, and Todd, LLC (WRT)
120 2nd Street, 3rd Floor
San Francisco, California 94105

Prepared by:

LSA
3210 El Camino Real, Suite 100
Irvine, California 92602
(949) 553-0666

Project No. 20241643

LSA

July 2025

TABLE OF CONTENTS

TABLE OF CONTENTS i
FIGURES AND TABLES ii
LIST OF ABBREVIATIONS AND ACRONYMS iii
INTRODUCTION 1
PROJECT LOCATION 1
PROJECT DESCRIPTION 1
CHARACTERISTICS OF SOUND 4
Measurement of Sound 4
Physiological Effects of Noise 5
FUNDAMENTALS OF VIBRATION 5
REGULATORY SETTING 8
Federal Guidelines 8
Federal Transit Administration 8
State Guidelines 8
California Department of Transportation 8
Local Regulations 9
City of Fresno 9
EXISTING SETTING 13
Overview of the Existing Noise Environment 13
Land Uses in the Project Vicinity 13
Ambient Noise Measurements 13
Existing Aircraft Noise 13
IMPACTS 16
Short-Term Construction Noise Impacts 16
Short-Term Construction Vibration Impacts 19
Long-Term Traffic Noise Impacts 20
Long-Term Stationary Noise Impacts 20
Long-Term Ground-Borne Noise and Vibration from Vehicular Traffic 21
REGULATORY COMPLIANCE MEASURES 21
MITIGATION MEASURES 21
REFERENCES 23

APPENDIX

A: NOISE SURVEY SHEETS

FIGURES AND TABLES

FIGURES

Figure 1: Regional Location and Local Vicinity 2
Figure 2: Project Location 3
Figure 3: Noise Monitoring Locations 15

TABLES

Table A: Definitions of Acoustical Terms 6
Table B: Common Sound Levels and Their Noise Sources 7
Table C: Detailed Assessment Daytime Construction Noise Criteria 8
Table D: Construction Vibration Annoyance Criteria 8
Table E: Construction Vibration Damage Criteria 9
Table F: City of Fresno Transportation (Non-Aircraft) Noise Sources 9
Table G: City of Fresno Stationary Noise Sources 10
Table H: Long-Term Ambient Noise Monitoring Results 14
Table I: Typical Construction Equipment Noise Levels 17
Table J: Summary of Construction Phase, Equipment, and Noise Levels 18
Table K: Vibration Source Amplitudes for Construction Equipment 19

LIST OF ABBREVIATIONS AND ACRONYMS

CalEEMod	California Emissions Estimator Model
Caltrans	California Department of Transportation
Caltrans Manual	Caltrans Transportation and Construction Vibration Guidance Manual
CEQA	California Environmental Quality Act
City	City of Fresno
CNEL	Community Noise Equivalent Level
dB	decibel(s)
dBA	A-weighted decibel(s)
District	Tower District
FHWA	Federal Highway Administration
ft	foot/feet
FTA	Federal Transit Administration
in/sec	inches per second
L_{dn}	day-night average noise level
L_{eq}	equivalent continuous sound level
L_{max}	maximum instantaneous noise level
MM	Mitigation Measure
PPV	peak particle velocity
project	Tower District Specific Plan Update
RCM	Regulatory Compliance Measure
RMS	root-mean-square
Specific Plan Area	Tower District Specific Plan Area
SR	State Route
STC	Sound Transmission Class
UPRR	Union Pacific Railroad
VdB	vibration velocity in decibels

NOISE AND VIBRATION IMPACT ANALYSIS

INTRODUCTION

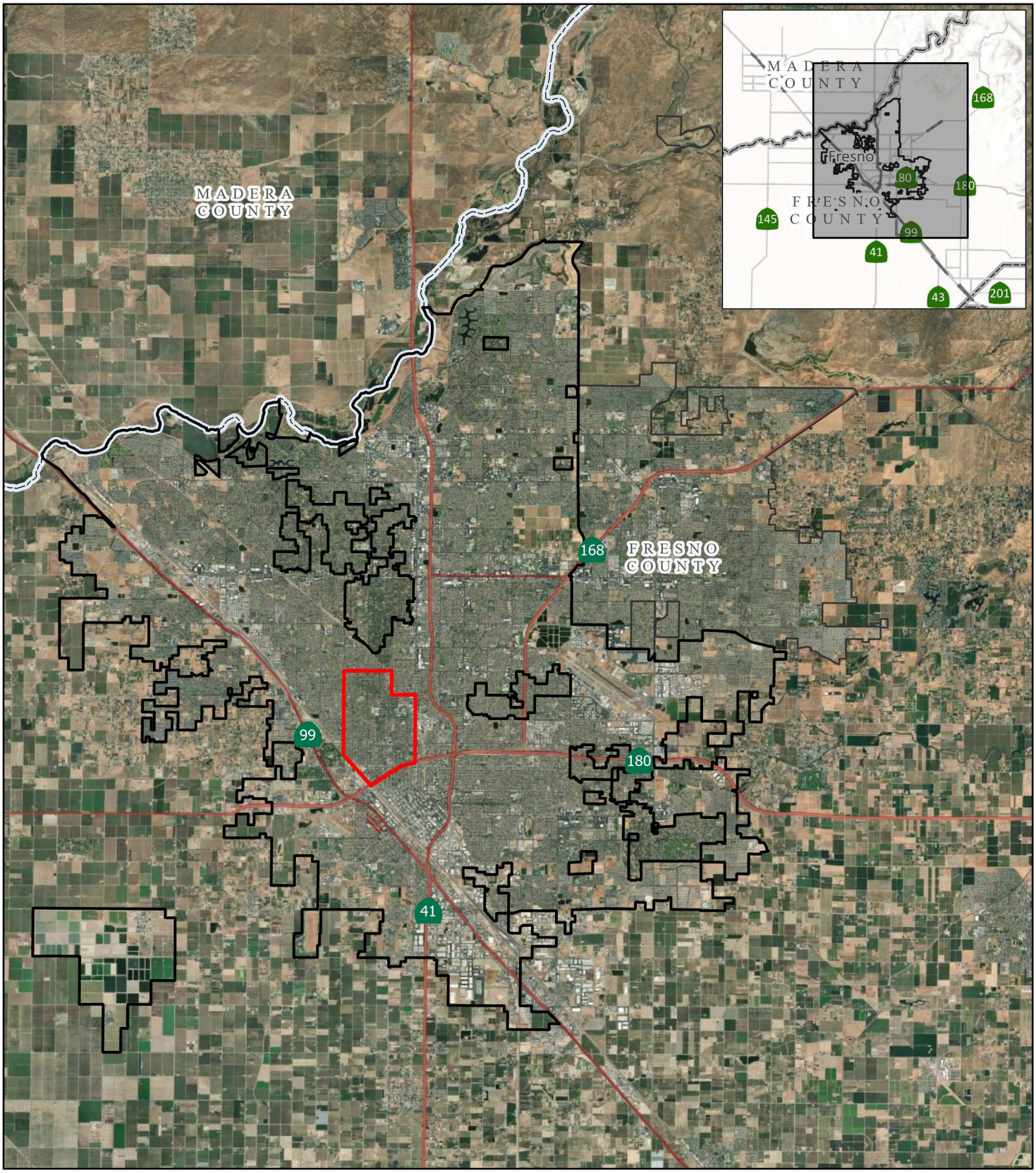
This Noise and Vibration Impact Analysis has been prepared to evaluate the potential noise and vibration impacts and mitigation measures associated with the Tower District Specific Plan Update (project) in Fresno, California. This report is intended to satisfy City of Fresno (City) requirements and the California Environmental Quality Act (CEQA) for a specific plan-level 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 mitigation measures that the project requires.

PROJECT LOCATION

The Tower District (District) is located in Fresno, California, which is in the central San Joaquin Valley of Fresno County, approximately 200 miles north of Los Angeles and 170 miles south of Sacramento. The District is an approximate 1,869-acre area located immediately north of Downtown Fresno and State Route (SR) 180 and 1 mile east of the SR-99 corridor. The District is generally bound by Shields Avenue to the north, Blackstone Avenue to the east, SR-180 to the south, and Fruit Avenue and the Union Pacific Railroad (UPRR) tracks to the west. To the north of Fresno is Madera County, to the northeast and adjacent to Fresno is Clovis, and unincorporated land is located to the east, south, and west of Fresno. Figure 1 shows the regional location and local vicinity map. Figure 2 shows the project location.

PROJECT DESCRIPTION

The proposed project would update the existing Specific Plan, adopted in 1991, to respond to issues in the District that have remained, changed, and emerged, as well as to provide strategic and comprehensive guidance for making decisions regarding the District's built environment and landscape character, land use and activities, public open space, community facilities, transportation, and other forms of infrastructure within the Tower District Specific Plan Area (Specific Plan Area). The Specific Plan Update establishes a shared set of goals, objectives, policies, and implements actions for the future growth and change of the Specific Plan Area. The Specific Plan Update also aids in implementing the broader goals and policies for the City, as outlined in the General Plan, in a manner that can better meet the needs of the District. This update is intended to streamline development within the Specific Plan Area by updating the Specific Plan Update's environmental analysis pursuant to CEQA requirements, and by providing a current regulatory framework and applicable mitigation measures.



LSA

Tower District Boundary
County Boundary
City of Fresno
City of Clovis

N

0 7500 15000
FEET

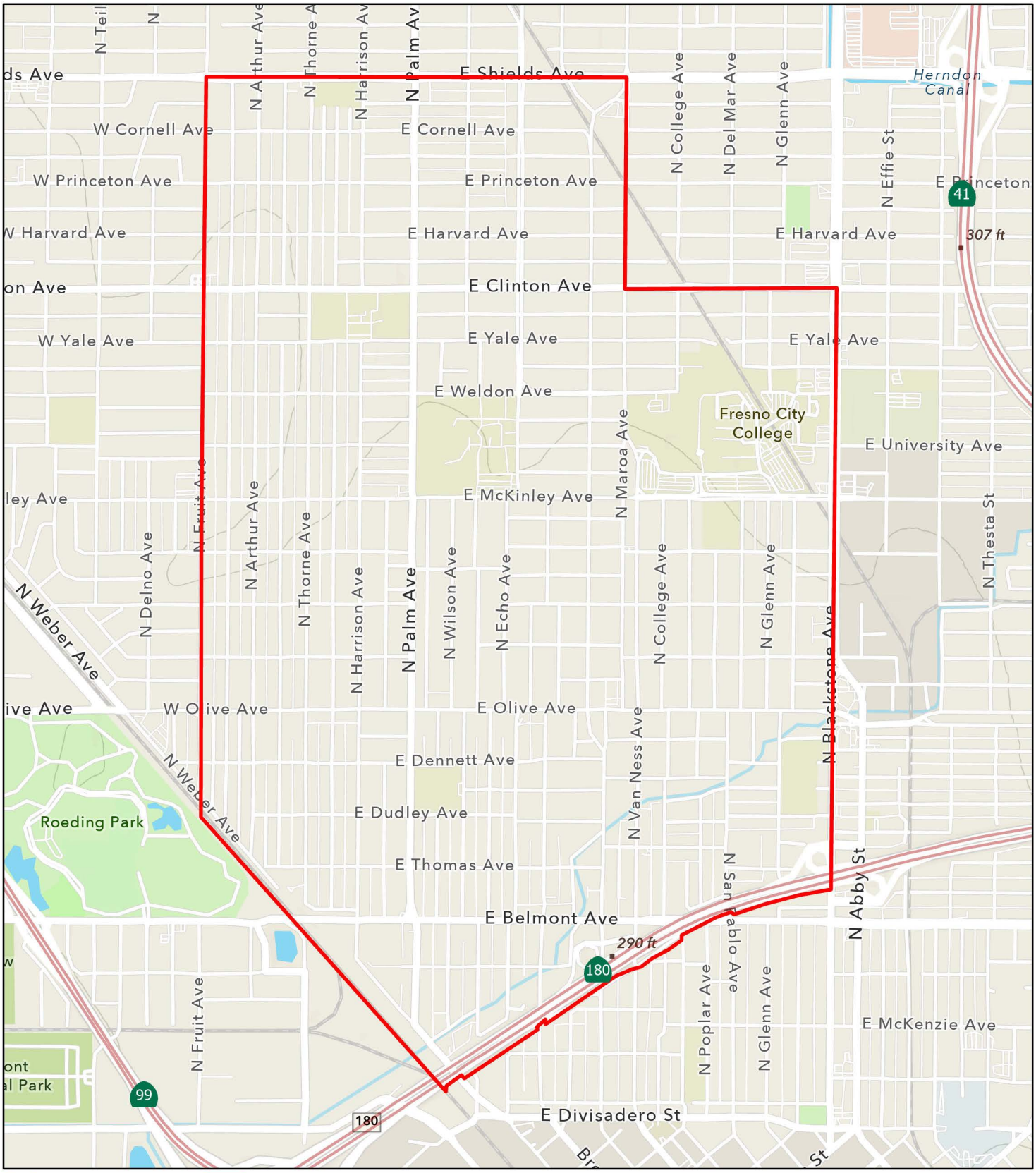
FIGURE 1

Tower District Specific Plan Update

Regional Location and Local Vicinity

SOURCE: Esri World Imagery (2025)

I:\2024\20241643\GIS\Pro\Tower District Specific Plan Update\Tower District Specific Plan Update.aprx (5/1/2025)



LSA

Tower District Boundary

FIGURE 2

0 850 1700
FEET

SOURCE: Esri Outdoor Contour Map (2025)

I:\2024\20241643\GIS\Pro\Tower District Specific Plan Update\Tower District Specific Plan Update.aprx (5/1/2025)

Tower District Specific Plan Update

Project Location

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, 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 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. In the analysis of a project, the noise environment of the project area is defined 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.

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 generate 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 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 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 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 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 the time the noise level exceeds this level and half the time it is less. 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 dB 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 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 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. Sound levels from 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.

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. The motion

may be discernible outdoors, 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 wall hangings, or a low-frequency rumbling noise. The rumbling noise is caused by the vibration of walls, floors, and ceilings radiating sound waves. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by 10 dB or less, which is an order of magnitude below the damage threshold for normal buildings.

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 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 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 (2004).

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 feet (ft) from the vibration source, although there are examples of ground-borne vibration causing interference out to distances greater than 200 ft (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 per second (in/sec) used in the United States.

REGULATORY SETTING

Federal Guidelines

Federal Transit Administration

The construction noise criteria included in the FTA *Transit Noise and Vibration Impact Assessment Manual* (2018) were used to evaluate potential construction noise impacts because the City does not have construction noise level limits. Table C shows the FTA's Detailed Assessment Daytime Construction Noise Criteria based on the composite noise levels for each construction phase.

Table C: Detailed Assessment Daytime Construction Noise Criteria

Land Use	Daytime 8-hour L_{eq} (dBA)
Residential	80
Commercial	85
Industrial	90

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level
FTA = Federal Transit Administration

State Guidelines

California Department of Transportation

Vibration standards included in the 2020 California Department of Transportation (Caltrans) *Transportation and Construction Vibration Guidance Manual* (Caltrans Manual) are used to evaluate ground-borne vibration impacts on human annoyance and building damage even though the City exempts vibration levels generated from construction. The criteria for environmental impact from ground-borne vibration are based on the maximum levels for a single event and the RMS vibration level. Table D provides the criteria for assessing the potential for interference or annoyance. Table E lists the potential vibration building damage criteria associated with construction activities, as suggested in the Caltrans Manual.

Table D: Construction Vibration Annoyance Criteria

Human Response	Vibration Level (RMS in/sec)
Barely perceptible	0.01
Distinctly perceptible	0.04
Strongly perceptible	0.10
Severe	0.40

Source: *Transportation and Construction Vibration Guidance Manual* (Caltrans 2020).
Caltrans = California Department of Transportation
in/sec = inch/inches per second
RMS = root-mean-square

Table E: Construction Vibration Damage Criteria

Structure / Condition	PPV (in/sec)
Extremely fragile historic buildings, ruins, ancient monuments	0.08
Fragile buildings	0.10
Historic and some old buildings	0.25
Older residential structures	0.30
New residential structures	0.50
Modern industrial / commercial buildings	0.50

Source: Table 19, *Transportation and Construction Vibration Guidance Manual* (Caltrans 2020).
Caltrans = California Department of Transportation
in/sec = inch/inches per second
PPV = peak particle velocity

Local Regulations

City of Fresno

General Plan Noise and Safety Element. The City General Plan Noise and Safety Element (2014) and Municipal Code has established interior and exterior noise standards from transportation (non-aircraft) noise sources for various land uses shown in Table F and exterior noise standards from stationary noise sources shown in Table G. In addition, the City General Plan Noise and Safety Element has established policies to meet the City's noise-related objective. The applicable General Plan Noise and Safety Element noise-related objective and policies for the proposed project are listed below.

Table F: City of Fresno Transportation (Non-Aircraft) Noise Sources

Noise-Sensitive Land Use[1]	Outdoor Activity Areas[2]	Interior Spaces	
	dBA L_{dn}/CNEL	dBA L_{dn}/CNEL	dBA L_{eq}
Residential	65	45	--
Transient Lodging	65	45	--
Hospital, Nursing Homes	65	45	--
Theaters, Auditoriums, Music Halls	--	--	35
Church, Meeting Halls	65	--	45
Office Buildings	--	--	45
School, Libraries, Museums	--	--	45

Source: General Plan (City of Fresno 2014).
[1] The Department of Development and Resource Management Director, on a case-by-case basis, may designate land uses other than those shown in this table to be noise sensitive and may require appropriate noise mitigation measures.
[2] Where the location of outdoor activity areas is unknown or not applicable, the noise exposure standard shall be applied at the property line of the receiving land use. When ambient noise levels exceed or equal the levels in this table, mitigation shall only be required to limit noise to the ambient plus 5 dBA.
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
L_{dn} = day-night average noise level
L_{eq} = equivalent continuous sound level

Table G: City of Fresno Stationary Noise Sources

	Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
Hourly Equivalent Sound Level (dBA L_{eq})	50	45
Maximum Sound Level (dBA L_{max})	70	60

Source: City of Fresno Municipal Code (2025).

Note: As determined at outdoor activity areas. Where the location of outdoor activity area is unknown or not applicable, the noise exposure standard shall be applied at the property line of the receiving land use. The Director shall determine uses that qualify as "noise-sensitive". When ambient noise levels exceed or equal the levels in this table, mitigation shall only be required to limit noise to the ambient plus 5 dBA.
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level

General Plan Noise-Related Objective and Policies.

Objective

NS-1 Protect the citizens of the City from the harmful and annoying effects of exposure to excessive noise.

Implementing Policies

NS-1-a **Desirable and Generally Acceptable Exterior Noise Environment.** Establish 65 dBA L_{dn} or CNEL as the standard for the desirable maximum average exterior noise levels for defined usable exterior areas of residential and noise-sensitive uses for noise, but designate 60 dBA L_{dn} or CNEL (measured at the property line) for noise generated by stationary sources impinging upon residential and noise-sensitive uses. Maintain 65 dBA L_{dn} or CNEL as the maximum average exterior noise levels for non-sensitive commercial land uses, and maintain 70 dBA L_{dn} or CNEL as maximum average exterior noise level for industrial land uses, both to be measured at the property line of parcels where noise is generated which may impinge on neighboring properties.

NS-1-b **Conditionally Acceptable Exterior Noise Exposure Range.** Establish the conditionally acceptable noise exposure level range for residential and other noise sensitive uses to be 65 dB L_{dn} or require appropriate noise reducing mitigation measures as determined by a site specific acoustical analysis to comply with the desirable and conditionally acceptable exterior noise level and the required interior noise level standards set in Table 9-2 (Table F).

NS-1-c **Generally Unacceptable Exterior Noise Exposure Range.** Establish the exterior noise exposure of greater than 65 dB L_{dn} or CNEL to be generally unacceptable for residential and other noise sensitive uses for noise generated by sources in Policy NS-1-a, and study

alternative less noise-sensitive uses for these areas if otherwise appropriate. Require appropriate noise reducing mitigation measures as determined by a site specific acoustical analysis to comply with the generally desirable or generally acceptable exterior noise level and the required 45 dB interior noise level standards set in Table 9-2 (Table F) as conditions of permit approval.

NS-1-g Noise mitigation measures which help achieve the noise level targets of this plan include, but are not limited to, the following:

- Façades with substantial weight and insulation;
- Installation of sound-rated windows for primary sleeping and activity areas;
- Installation of sound-rated doors for all exterior entries at primary sleeping and activity areas;
- Greater building setbacks and exterior barriers;
- Acoustic baffling of vents for chimneys, attic and gable ends;
- Installation of mechanical ventilation systems that provide fresh air under closed window conditions.

The aforementioned measures are not exhaustive and alternative designs may be approved by the City, provided that a qualified Acoustical Consultant submits information demonstrating that the alternative design(s) will achieve and maintain the specific targets for outdoor activity areas and interior spaces.

NS-1-h **Interior Noise Level Requirement.** Comply with the State Code requirement that any new multifamily residential, hotel, or dorm buildings must be designed to incorporate noise reduction measures to meet the 45 dB L_{dn} interior noise criterion, and apply this standard as well to all new single-family residential and noise sensitive uses.

NS-1-i **Mitigation by New Development.** Require an acoustical analysis where new development of industrial, commercial or other noise generating land uses (including transportation facilities such as roadways, railroads, and airports) may result in noise levels that exceed the noise level exposure criteria established by Tables 9-2 (Table F) and 9-3 (Table G) to determine impacts, and require developers to mitigate these impacts in conformance with Tables 9-2 (Table F) and 9-3 (Table G) as a condition of permit approval through appropriate means.

Noise mitigation measures may include:

- The screening of noise sources such as parking and loading facilities, outdoor activities, and mechanical equipment;
- Providing increased setbacks for noise sources from adjacent dwellings;
- Installation of walls and landscaping that serve as noise buffers;
- Installation of soundproofing materials and doubleglazed windows; and
- Regulating operations, such as hours of operation, including deliveries and trash pickup.

Alternative acoustical designs that achieve the prescribed noise level reduction may be approved by the City, provided a qualified Acoustical Consultant submits information demonstrating that the alternative designs will achieve and maintain the specific targets for outdoor activity areas and interior spaces. As a last resort, developers may propose to construct noise walls along roadways when compatible with aesthetic concerns and neighborhood character. This would be a developer responsibility, with no City funding.

NS-1-j **Significance Threshold.** Establish, as a threshold of significance for the City's environmental review process, that a significant increase in ambient noise levels is assumed if the project would increase noise levels in the immediate vicinity by 3 dB L_{dn} or CNEL or more above the ambient noise limits established in this General Plan Update.

Municipal Code. Section 10-109(a) of the City Municipal Code (2025) limits construction, repair or remodeling work accomplished pursuant to a building, electrical, plumbing, mechanical, or other construction permit issued by the City or other governmental agency, or to site preparation and grading to between the hours of 7:00 a.m. and 10:00 p.m. on any day except Sunday.

Section 15-2507 of the City Municipal Code (2025) states that no vibration shall be produced that is transmitted through the ground and is discernible without the aid of instruments by a reasonable person at the lot lines of the site. Vibrations from temporary construction, demolition, and vehicles that enter and leave the subject parcel (e.g., construction equipment, trains, trucks, etc…) are exempt from this standard.

EXISTING SETTING

Overview of the Existing Noise Environment

Existing noise levels in the District as well as the surrounding areas of the District are primarily generated by transportation noise sources. Vehicular traffic noise is the dominant source in most areas, and aircraft and rail activity are sources of noise in the local areas surrounding these operations. In addition, industrial and commercial activity are sources of noise in the area of these land uses.

Land Uses in the Project Vicinity

Land uses within the District include single-family residential uses, which comprise over half of the District's land area, medium-density residential uses, high-density residential uses, public uses (e.g., schools, parks, and recreation sites), and light industrial uses, which are generally confined to the southwest edge of the District. Also, the District is generally surrounded by urban, built-up areas consisting of similar land uses to those found within the District, including a mix of residential, commercial, public institutions, and pockets of industrial uses. Additionally, Roeding Regional Park is located west of the District, immediately adjacent to the UPRR line and Golden State Boulevard.

Ambient Noise Measurements

Three long-term (24-hour) noise level measurements were conducted from June 17 to June 18, 2025, using Larson Davis Spark 706RC dosimeters to document the existing noise environment within the project area. Table H summarizes the results of the long-term noise level measurements along with a description of the measurement locations and noise sources that occurred during the measurements. As shown in Table H, the calculated CNEL levels at LT-1 through LT-3 range from 58.2 to 72.1 dBA CNEL. The daytime noise levels ranged from 49.4 to 72.3 dBA L_{eq}, and the nighttime noise levels ranged from 43.3 to 70.1 dBA L_{eq}. Also, the daytime maximum instantaneous noise levels ranged from 67.1 to 98.2 dBA L_{max}, and the nighttime maximum instantaneous noise levels ranged from 56.7 to 94.6 dBA L_{max}. The long-term noise level measurement survey sheets, along with the hourly L_{eq} and L_{max} results, are provided in Appendix A. Figure 3 shows the long-term monitoring locations.

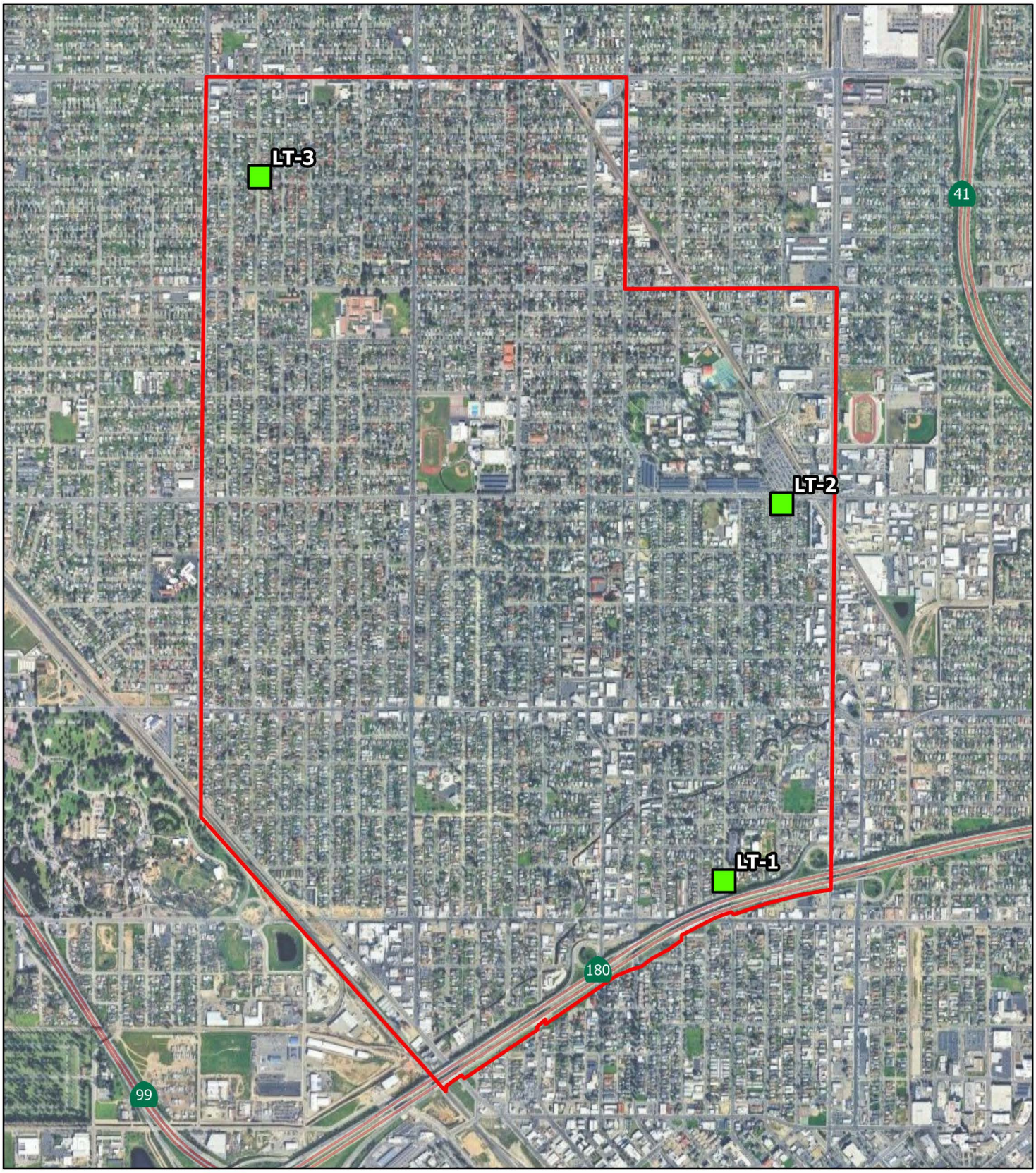
Existing Aircraft Noise

The closest airports to the Specific Plan Area are the Fresno Chandler Executive Airport (1.0 mile southeast of the project site), Fresno Yosemite International Airport (3.3 miles east of the project site), and Sierra Sky Park Airport (4.8 miles northwest of the project site). The Specific Plan Area is outside the 60 dBA CNEL noise contour of airports based on the *Fresno County Airport Land Use Compatibility Plan* (Fresno County Airport Land Use Commission 2023). There are also no private airstrips within 2 miles of the project site. In addition, the aviation-related noise exposure to people residing or working in the Specific Plan Area under the proposed project would remain the same as the Approved Specific Plan. Therefore, the proposed project would not expose people residing or working in the Specific Plan Area to aviation-related excessive noise levels, and this topic is not further discussed.

Table H: Long-Term Ambient Noise Monitoring Results

Monitoring No.	Location	Noise Level					Noise Source
		dBA L_{eq}		dBA L_{max}		CNEL	
		Daytime	Nighttime	Daytime	Nighttime		
LT-1	621 North San Pablo Avenue. On a pole. On the west side of North San Pablo Avenue. Approximately 20 ft from North San Pablo Avenue centerline.	63.5–66.9 (62.5)[1]	56.0–64.2 (61.8)[2]	78.6–93.1	77.1–89.1	69.2	Traffic on Sequoia Kings Canyon Freeway (SR-180) and North San Pablo Avenue.
LT-2	1599 North Calaveras Street. On a pole in the alleyway. Approximately 85 ft from the East McKinley Avenue centerline.	62.2–72.3 (65.6)[1]	58.7–70.1 (64.8)[2]	77.2–98.2	81.6–94.6	72.1	Traffic on East McKinley Avenue and Blackstone Avenue. Occasional train pass-by and crossing noise. Occasional aircraft noise.
LT-3	244 West Princeton Avenue. On a tree. Approximately 20 ft away from North Arthur Avenue centerline. At the northeast corner of North Arthur Avenue and West Princeton Avenue.	49.4–55.5 (51.2)[1]	43.3–56.7 (51.4)[2]	67.1–84.0	56.7–77.4	58.2	Very light traffic on West Princeton Avenue and North Arthur Avenue. Occasional aircraft noise.

Source: Compiled by LSA (2025).
Note: The long-term (24-hour) noise level measurements were conducted from June 17 to June 18, 2025.
[1] Average daytime noise level.
[2] Average nighttime noise level.
CNEL = Community Noise Equivalent Levell
dBA = A-weighted decibels
ft = foot/feet
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
SR-180 = State Route 180



LSA

Tower District Boundary

Long-term Noise Monitoring Locations

FIGURE 3

N

0 850 1700

FEET

SOURCE: Google Imagery (2025)

Tower District Specific Plan Update

Noise Monitoring Locations

I:\2024\20241643\GIS\Pro\Tower District Specific Plan Update\Tower District Specific Plan Update.aprx (7/1/2025)

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 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. 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 longer-term (daily) ambient noise levels would be small because the daily construction-related vehicle trips are small compared to the existing daily traffic volumes on roadways leading to the project site. The results of the California Emissions Estimator Model (CalEEMod) (version 2022.1) contained in Appendix A of the *Tower District Specific Plan Update Air Quality, Energy, and Greenhouse Gas Impact Analysis Report* (LSA 2025a) indicate that the building construction phase would generate the most trips out of all of the construction phases (up to 2,887 vehicle trips) and that they would be distributed throughout the Specific Plan Area over 11 years. Although the proposed project would generate higher vehicle trips than the Approved Specific Plan, construction-related vehicle trips are not expected to double the existing traffic volume on roadways within the project area. A doubling of traffic would result in a noise increase of 3 dBA. A noise level increase of less than 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, short-term, construction-related noise impacts associated with worker commute and equipment transport to the project site would be less than significant. No mitigation measures are required.

The second type of short-term noise impact is related to noise generated from construction activities. Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. The project anticipates site preparation, grading, building construction, paving, and architectural coating phases of construction. 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 I 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.

Table J lists the anticipated construction equipment for each construction phase based on the CalEEMod (Version 2022.1) results contained in Appendix A of the *Tower District Specific Plan Update Air Quality, Energy, and Greenhouse Gas Impact Analysis Report* (LSA 2025a). Table J shows the combined noise level at 50 ft from all of the equipment in each phase and the L_{eq} noise level for each equipment at 50 ft based on the quantity, reference L_{max} noise level at 50 ft, and the acoustical use factor. As shown in Table J, construction noise levels would reach up to 89.2 dBA L_{eq} at a distance of 50 ft.

Table I: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Use Factor[1] (Percent)	Maximum Noise Level (L_{max}) at 50 ft[2]
Backhoe	40	80
Compactor (ground)	20	80
Compressor (air)	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
Generator	50	82
Grader	40	85
Impact Pile Driver	20	95
Jackhammer	20	85
Pavement Scarifier	20	85
Paver	50	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/Torch	40	73

Source: Table 9.1, *FHWA Highway Construction Noise Handbook* (FHWA 2006).
Note: The noise levels reported in this table are rounded to the nearest whole number.
[1] Acoustical Use 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 Spec 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 = Federal Highway Administration
ft = foot/feet
L_{max} = maximum instantaneous noise level

Table J: Summary of Construction Phase, Equipment, and Noise Levels

Construction Phase	Construction Equipment	Quantity	Reference Noise Level at 50 ft (dBA L_{max})	Acoustical Use Factor[1] (%)	Noise Level at 50 ft (dBA L_{eq})	Combined Noise Level at 50 ft (dBA L_{eq})
Site Preparation	Dozers	3	85	40	85.8	87.3
	Front-End Loader	4	80	40	82.0	
Grading	Graders	1	85	40	81.0	89.2
	Excavator	2	85	40	84.0	
	Front-End Loader	2	80	40	79.0	
	Scraper	2	85	40	84.0	
	Dozer	1	85	40	81.0	
Building Construction	Forklift	3	85	20	82.8	86.5
	Generator	1	82	50	79.0	
	Crane	1	85	16	77.0	
	Welder/Torch	1	73	40	69.0	
	Front-End Loader	3	80	40	80.8	
Paving	Paver	2	85	50	85.0	87.6
	Pavement Scarifier	2	85	20	81.0	
	Roller	2	85	20	81.0	
Architectural Coating	Air Compressors	1	80	40	76.0	76.0

Source: Compiled by LSA (2025).

[1] The acoustical use factor is the percentage of time during a construction noise operation that a piece of construction equipment operates at full power.

dBA = A-weighted decibels
ft = foot/feet
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level

Construction noise levels for the proposed project would be relatively similar to the Approved Specific Plan because construction would be localized to the specific project site throughout the Specific Plan Area, and would be constructed over many years. There would, however, be more construction under the proposed Specific Plan Update compared to the Approved Specific Plan. Although noise generated by project construction activities would be higher than the ambient noise levels and may result in a temporary increase in the ambient noise levels, construction noise would stop once project construction is completed. However, construction noise levels have the potential to exceed the FTA daytime construction noise standards of 80 dBA L_{eq} for residences and 85 dBA L_{eq} for commercial properties. Implementation of Regulatory Compliance Measure (RCM) N-1 and Mitigation Measure (MM) N-1 would reduce construction noise levels to the FTA daytime construction noise standards or below. Therefore, noise levels generated from project construction would be less than significant with the implementation of RCM N-1 and MM N-1.

RCM N-1 The construction contractor shall limit construction activities to between the hours of 7:00 a.m. and 10:00 p.m., Monday through Saturday, pursuant to Section 10-109(a) of the City of Fresno Municipal Code. Construction activities are prohibited outside of these hours and any time on Sundays.

MM N-1 If necessary, the construction contractor shall erect a minimum 10-foot-high temporary construction barrier at the project construction boundary to reduce

construction noise levels to the Federal Transit Administration (FTA) daytime noise standards of 80 dBA L_{eq} for residences and 85 dBA L_{eq} for commercial properties. The barriers shall be continuous with no gaps or holes and may be any material that has a minimum Sound Transmission Class (STC) rating of 28.

Short-Term Construction Vibration Impacts

This construction vibration impact analysis discusses the level of human annoyance and assesses the potential for building damage using vibration levels in PPV (in/sec). Table K shows the reference vibration levels at a distance of 25 ft for each type of standard construction equipment from the Caltrans Manual (2020). Outdoor site preparation and grading for the proposed project and Approved Specific Plan is expected to require the use of large bulldozers and loaded trucks, which would generate ground-borne vibrations of up to 0.089 in/sec maximum PPV and 0.062 in/sec RMS PPV for large bulldozers and 0.076 in/sec maximum PPV and 0.053 in/sec RMS PPV for loaded trucks when measured at 25 ft. Pile drivers, vibratory rollers, and other heavy-tracked construction equipment were not used under the Approved Specific Plan and would not be used under the proposed project.

Table K: Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV/L_V at 25 ft	
	Maximum PPV (in/sec)	RMS PPV (in/sec)[1]
Pile Driver (Impact), Typical	0.644	0.451
Pile Driver (Sonic), Typical	0.170	0.119
Vibratory Roller	0.210	0.147
Hoe Ram	0.089	0.062
Large Bulldozer[2]	**0.089**	**0.062**
Caisson Drilling	0.089	0.062
Loaded Trucks[2]	**0.076**	**0.053**
Jackhammer	0.035	0.025
Small Bulldozer	0.003	0.002

Sources: *Transportation and Construction Vibration Guidance Manual* (Caltrans 2020).
[1] RMS vibration velocity is 70 percent of the maximum PPV.
[2] Equipment shown in bold is expected to be used on site.
Caltrans = California Department of Transportation
ft = foot/feet
in/sec = inches per second
L_V = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square

The greatest vibration levels are anticipated during the site preparation and grading phases. 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:

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.1}$$

Construction vibration levels for the proposed project would be relatively similar to the Approved Specific Plan because construction would be localized to the specific project site throughout the Specific Plan Area. There would, however, be more construction under the proposed Specific Plan Update compared to the Approved Specific Plan. The anticipated large bulldozer located within 10 ft of a historic building, 9 ft of an older residential structure, or 6 ft of a new residential or modern industrial/commercial buildings would experience vibration levels exceeding 0.25 in/sec (PPV), 0.3 in/sec (PPV), and 0.5 in/sec (PPV), respectively, which would have the potential to result in building damage. Implementation of MM N-2, which restricts heavy construction (e.g., large bulldozers and loaded trucks) or requires the use of light construction equipment (e.g., small bulldozers and trucks) within 10 ft of a historic building, 9 ft of an older residential structure, or 6 ft of a new residential or modern industrial/commercial building, would reduce vibration levels to below the vibration damage threshold for the respective building types. Therefore, vibration levels generated from project construction would be less than significant with the implementation of MM N-2.

MM N-2 The construction contractor shall restrict heavy construction (e.g., large bulldozers) or require the use of light construction equipment (e.g., small bulldozers and trucks) within 10 feet of a historic building, 9 feet of an older residential structure, or 6 feet of a new residential or modern industrial/commercial building.

Long-Term Traffic Noise Impacts

The proposed project would generate approximately 39,055 daily trips, and the Approved Specific Plan would generate approximately 36,054 daily trips based on the *Tower District Specific Plan Update Trip Generation and Vehicle Miles Traveled Analysis Memorandum* (LSA 2025b). Based on the information above and in the *Trip Generation and Vehicle Miles Traveled Analysis Memorandum*, the proposed project would increase daily trips by 3,001 compared to the Approved Specific Plan. Although the proposed project would increase daily trips by 3,001, the project-related traffic noise increase would either be similar or slightly higher than the Approved Specific Plan because the daily trips are distributed throughout the Specific Plan Area. Given this, daily trips associated with the proposed project are not expected to double the existing traffic volume on roadways within the project area. A doubling of traffic would result in a noise increase of 3 dBA. A noise level increase of less than 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, traffic noise from project-related traffic on off-site sensitive receptors would be less than significant, similar to the Approved Specific Plan. No mitigation measures are required.

Long-Term Stationary Noise Impacts

Similar to the Approved Specific Plan, the proposed project would include new stationary noise sources generated from proposed residential, commercial, and industrial uses, which could include sources such as heating, ventilation, and air conditioning (HVAC) equipment, swimming pool equipment, generators, drive-thru menu board speakerphones, truck loading docks, parking activities, and car wash operations. These long-term stationary noise sources could exceed the City's stationary noise standards shown in Table G if they were to occur in areas adjacent to noise-sensitive land uses. Noise impacts from long-term stationary noise sources would be considered significant. The implementation of MM N-3, which requires preparation of a project specific noise study to identify appropriate measures that would reduce noise levels from long-term operations of the proposed project at nearby noise-sensitive land uses to less than significant. Measures could

include setbacks, soundwalls, or locating loading/parking areas on sides of building structures opposite noise-sensitive receptors (using buildings as shielding). For example, a 6 ft high soundwall can provide noise reduction of 5 dBA and building structures can provide noise reduction of 10 dBA or greater. Therefore, long-term stationary noise impacts would be less than significant with implementation of MM N-3.

MM N-3 A project specific noise study shall be prepared by a qualified acoustical consultant to determine the noise levels generated from long-term operations of the proposed project and measures necessary to reduce noise levels and ensure compliance with the City's stationary noise standards shown in Table G. The project specific noise study will be submitted to the City for review and approval. Noise reduction measures may include, but are not limited to, locating stationary noise sources on the site to be shielded by structures (buildings, enclosures, or soundwalls) or by using equipment that has a quieter rating.

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

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

REGULATORY COMPLIANCE MEASURES

Implementation of the following measure would ensure that construction noise would be generated only during allowable times:

RCM N-1 The construction contractor shall limit construction activities to between the hours of 7:00 a.m. and 10:00 p.m., Monday through Saturday, pursuant to Section 10-109(a) of the City of Fresno Municipal Code. Construction activities are prohibited outside of these hours and any time on Sundays.

MITIGATION MEASURES

Implementation of the following mitigation measures would reduce construction noise and vibration levels:

MM N-1 If necessary, the construction contractor shall erect a minimum 10-foot-high temporary construction barrier at the project construction boundary to reduce construction noise levels to the Federal Transit Administration (FTA) daytime noise standards of 80 dBA L_{eq} for residences and 85 dBA L_{eq} for commercial properties. The barriers shall be continuous with no gaps or holes and may be any material that has a minimum Sound Transmission Class (STC) rating of 28.

MM N-2 The construction contractor shall restrict heavy construction (e.g., large bulldozers) or require the use of light construction equipment (e.g., small bulldozers and trucks)

within 10 feet of a historic building, 9 feet of an older residential structure, or 6 feet of a new residential or modern industrial/commercial building.

MM N-3 A project specific noise study shall be prepared by a qualified acoustical consultant to determine the noise levels generated from long-term operations of the proposed project and measures necessary to reduce noise levels and ensure compliance with the City's stationary noise standards shown in Table G. The project specific noise study will be submitted to the City for review and approval. Noise reduction measures may include, but are not limited to, locating stationary noise sources on the site to be shielded by structures (buildings, enclosures, or soundwalls) or by using equipment that has a quieter rating.

REFERENCES

California Department of Transportation (Caltrans). 2020. *Transportation and Construction Vibration Guidance Manual*. April. Website: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf (accessed July 2025).

City of Fresno. 2014. Fresno General Plan. December 18. Website: https://www.fresno.gov/wp-content/uploads/2023/03/upload_temp_Consolidated-GP-10-13-2022_compressed.pdf (accessed July 2025).

_____. 2025. Municipal Code. May 2.

Federal Highway Administration (FHWA). 1977. Highway Traffic Noise Prediction Model, FHWA RD-77-108.

_____. 2006. *FHWA Highway Construction Noise Handbook*. Roadway Construction Noise Model, FHWA-HEP-06-015. DOT-VNTSC-FHWA-06-02. NTIS No. PB2006-109012. August.

Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment Manual*. FTA Report No. 0123. September. Website: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf (accessed July 2025).

Fresno County Airport Land Use Commission. 2023. *Fresno County Airport Land Use Compatibility Plan*. October. Website: https://www.fresnocog.org/wp-content/uploads/2025/06/2023-ALUCP.pdf (accessed July 2025).

Harris, Cyril M., ed. 1991. *Handbook of Acoustical Measurements and Noise Control*. 3rd Edition. McGraw-Hill, Inc.

LSA Associates, Inc (LSA). 2025a. *Tower District Specific Plan Update Air Quality, Energy, and Greenhouse Gas Impact Analysis Report*. July.

_____. 2025b. *Tower District Specific Plan Update Trip Generation and Vehicle Miles Traveled Analysis Memorandum*. July.

APPENDIX A

NOISE SURVEY SHEETS

Noise Measurement Survey – 24 HR

Project Number: 20241643
Project Name: Tower District Specific Plan

Test Personnel: Moe Abushanab
Equipment: LD 706RC Spark (SN:17119)

Site Number: LT-1 Date: 6/17/2025

Time: From 4:00 p.m. To 4:00 p.m.

Site Location: 621 North San Pablo Avenue. On a pole. On the west side of North San Pablo Avenue. Approximately 20 ft from North San Pablo Avenue centerline.

Primary Noise Sources: Traffic on Sequoia Kings Canyon Freeway (SR-180) and North San Pablo Avenue.

Comments:

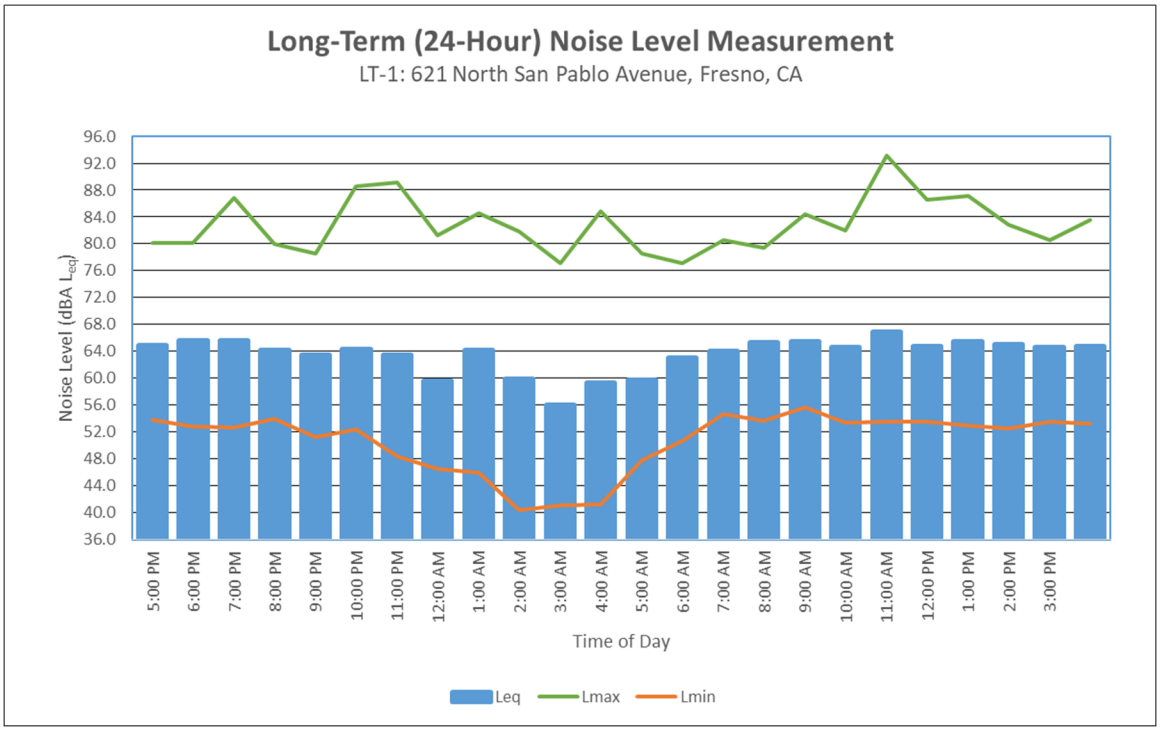
Photo:



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

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
4:00 PM	6/17/2025	64.9	80.2	53.8
5:00 PM	6/17/2025	65.6	80.1	52.8
6:00 PM	6/17/2025	65.6	86.9	52.7
7:00 PM	6/17/2025	64.3	80.0	53.9
8:00 PM	6/17/2025	63.5	78.6	51.2
9:00 PM	6/17/2025	64.4	88.5	52.4
10:00 PM	6/17/2025	63.4	89.1	48.4
11:00 PM	6/17/2025	59.7	81.3	46.5
12:00 AM	6/18/2025	64.2	84.6	45.9
1:00 AM	6/18/2025	59.9	81.8	40.4
2:00 AM	6/18/2025	56.0	77.1	41.1
3:00 AM	6/18/2025	59.3	84.9	41.3
4:00 AM	6/18/2025	59.7	78.6	47.8
5:00 AM	6/18/2025	63.1	77.2	50.7
6:00 AM	6/18/2025	64.1	80.5	54.7
7:00 AM	6/18/2025	65.4	79.4	53.7
8:00 AM	6/18/2025	65.5	84.4	55.7
9:00 AM	6/18/2025	64.7	82.0	53.4
10:00 AM	6/18/2025	66.9	93.1	53.5
11:00 AM	6/18/2025	64.7	86.6	53.5
12:00 PM	6/18/2025	65.4	87.1	52.9
1:00 PM	6/18/2025	65.0	82.8	52.6
2:00 PM	6/18/2025	64.6	80.5	53.5
3:00 PM	6/18/2025	64.8	83.5	53.3

Source: Compiled by LSA Associates, Inc. (2025).
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum measured sound level



Noise Measurement Survey – 24 HR

Project Number: 20241643
Project Name: Tower District Specific Plan

Test Personnel: Moe Abushanab
Equipment: LD 706RC Spark (SN:17815)

Site Number: LT-2 Date: 6/17/2025

Time: From 5:00 p.m. To 5:00 p.m.

Site Location: 1599 North Calaveras Street. On a pole in the alleyway. Approximately 85 ft from from East McKinley Avenue centerline.

Primary Noise Sources: Traffic on E McKinley Avenue and Blackstone Avenue
Occasional train passby and crossing noise. Occasional aircraft noise.

Comments:

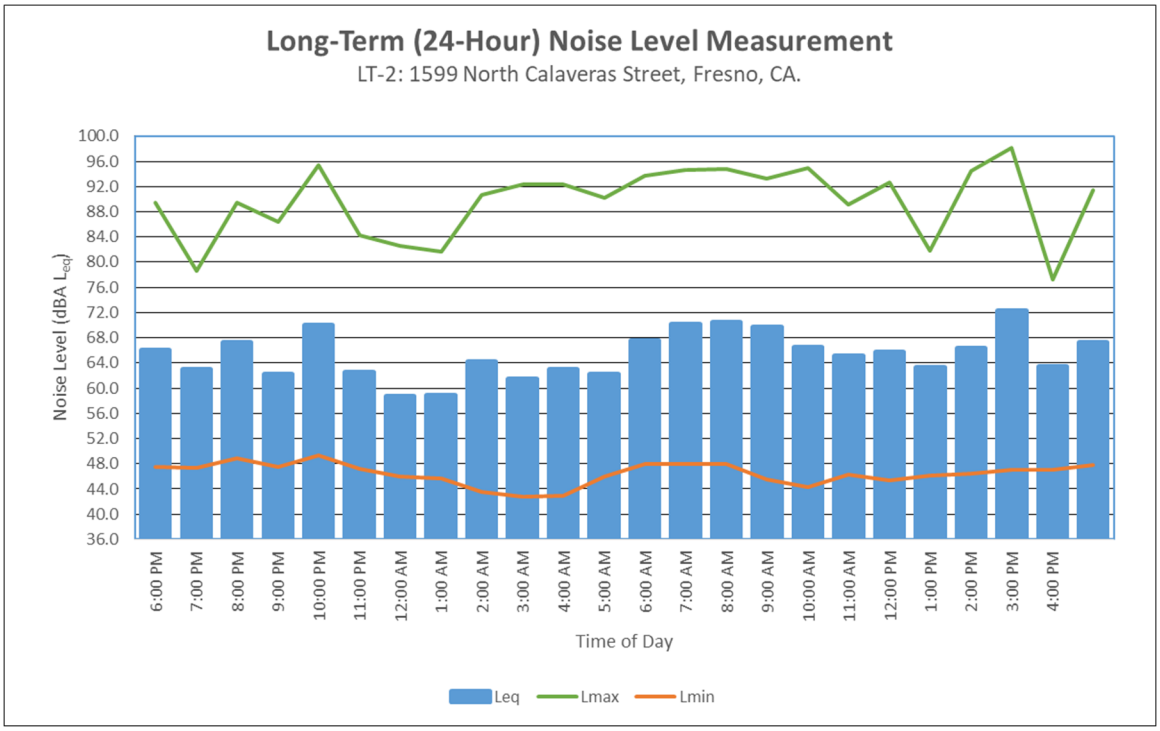
Photo:



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

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
5:00 PM	6/17/2025	66.1	89.4	47.5
6:00 PM	6/17/2025	63.0	78.6	47.3
7:00 PM	6/17/2025	67.2	89.4	48.8
8:00 PM	6/17/2025	62.2	86.4	47.5
9:00 PM	6/17/2025	70.0	95.4	49.4
10:00 PM	6/17/2025	62.5	84.3	47.2
11:00 PM	6/17/2025	58.7	82.6	45.9
12:00 AM	6/18/2025	58.9	81.6	45.7
1:00 AM	6/18/2025	64.2	90.7	43.5
2:00 AM	6/18/2025	61.5	92.4	42.7
3:00 AM	6/18/2025	62.9	92.3	42.9
4:00 AM	6/18/2025	62.2	90.2	46.0
5:00 AM	6/18/2025	67.6	93.7	48.0
6:00 AM	6/18/2025	70.1	94.6	48.0
7:00 AM	6/18/2025	70.4	94.8	47.9
8:00 AM	6/18/2025	69.6	93.3	45.5
9:00 AM	6/18/2025	66.4	94.9	44.3
10:00 AM	6/18/2025	65.1	89.1	46.3
11:00 AM	6/18/2025	65.8	92.6	45.4
12:00 PM	6/18/2025	63.3	81.8	46.2
1:00 PM	6/18/2025	66.4	94.5	46.5
2:00 PM	6/18/2025	72.3	98.2	47.0
3:00 PM	6/18/2025	63.4	77.2	47.1
4:00 PM	6/18/2025	67.3	91.4	47.8

Source: Compiled by LSA Associates, Inc. (2025).
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum measured sound level



Noise Measurement Survey – 24 HR

Project Number: 20241643
Project Name: Tower District Specific Plan

Test Personnel: Moe Abushanab
Equipment: LD 706RC Spark (SN:18906)

Site Number: LT-3 Date: 6/17/2025

Time: From 5:00 p.m. To 5:00 p.m.

Site Location: 244 West Princeton Avenue. On a tree. Approximately 20 ft away from North Arthur Avenue centerline. At the northeast corner of North Arthur Avenue and West Princeton Avenue.

Primary Noise Sources: Very light traffic on West Princeton Avenue and North Arthur Avenue. Occasional aircraft noise.

Comments:

Photo:



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

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
5:00 PM	6/17/2025	53.5	72.6	42.2
6:00 PM	6/17/2025	52.5	71.0	43.0
7:00 PM	6/17/2025	52.5	73.0	42.8
8:00 PM	6/17/2025	50.0	69.9	42.2
9:00 PM	6/17/2025	49.4	67.1	42.6
10:00 PM	6/17/2025	50.2	70.6	41.5
11:00 PM	6/17/2025	51.6	70.6	41.1
12:00 AM	6/18/2025	56.7	76.7	39.8
1:00 AM	6/18/2025	52.4	77.4	38.0
2:00 AM	6/18/2025	43.3	61.6	38.5
3:00 AM	6/18/2025	46.1	57.8	38.6
4:00 AM	6/18/2025	46.2	56.7	41.5
5:00 AM	6/18/2025	50.6	70.5	43.6
6:00 AM	6/18/2025	51.0	71.0	45.2
7:00 AM	6/18/2025	52.6	77.3	41.7
8:00 AM	6/18/2025	55.5	84.0	38.9
9:00 AM	6/18/2025	51.6	74.4	37.9
10:00 AM	6/18/2025	52.7	73.8	40.1
11:00 AM	6/18/2025	53.4	72.0	40.3
12:00 PM	6/18/2025	51.0	75.1	39.5
1:00 PM	6/18/2025	52.3	74.0	40.8
2:00 PM	6/18/2025	52.6	75.5	41.6
3:00 PM	6/18/2025	51.7	71.8	40.9
4:00 PM	6/18/2025	52.4	68.7	42.4

Source: Compiled by LSA Associates, Inc. (2025).
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum measured sound level

