NOISE IMPACT ANALYSIS

FOR

CITY OF FOWLER GENERAL PLAN UPDATE

NOVEMBER 2022

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LIST OF COMMON TERMS AND ACRONYMS

ADT	Average Daily Traffic
ANSI	Acoustical National Standards Institute, Inc.
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	Decibels
dBA	A-Weighted Decibels
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GPU	General Plan Update
Hz	Hertz
HVAC	Heating Ventilation & Air Conditioning
in/sec	Inches per Second
L_{dn}	Day-Night Level
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Sound Level
ppv	Peak Particle Velocity
UPRR	Union Pacific Railroad
U.S. EPA	United States Environmental Protection Agency
VMT	Vehicle Miles Traveled

INTRODUCTION

This report describes terminology used to discuss noise and discusses and analyzes the ambient noise environment of the proposed City of Fowler General Plan Update Planning Area. Noise impacts associated with implementation of the General Plan Update (GPU) are analyzed. Supporting materials from this report are located in Appendix A.

PROPOSED CITY OF FOWLER GENERAL PLAN UPDATE

The City of Fowler adopted its first General Plan in 1976. The currently adopted General Plan was adopted in June 2004 and runs through 2025. Since its adoption, the General Plan has been revised and amended but has not been comprehensively updated. The proposed GPU will include updates to represent changes in community conditions, new legislation, new regulatory requirements and planning practices, and updates regarding new social and environmental issues. The GPU will be updated to provide a planning horizon of year 2042. The City of Fowler's city limits, sphere of influence, and planning area is depicted in Figure 2.

EXISTING SETTING

Acoustic Fundamentals

Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound is mechanical energy transmitted in the form of a wave because of a disturbance or vibration. Sound levels are described in terms of both amplitude and frequency.

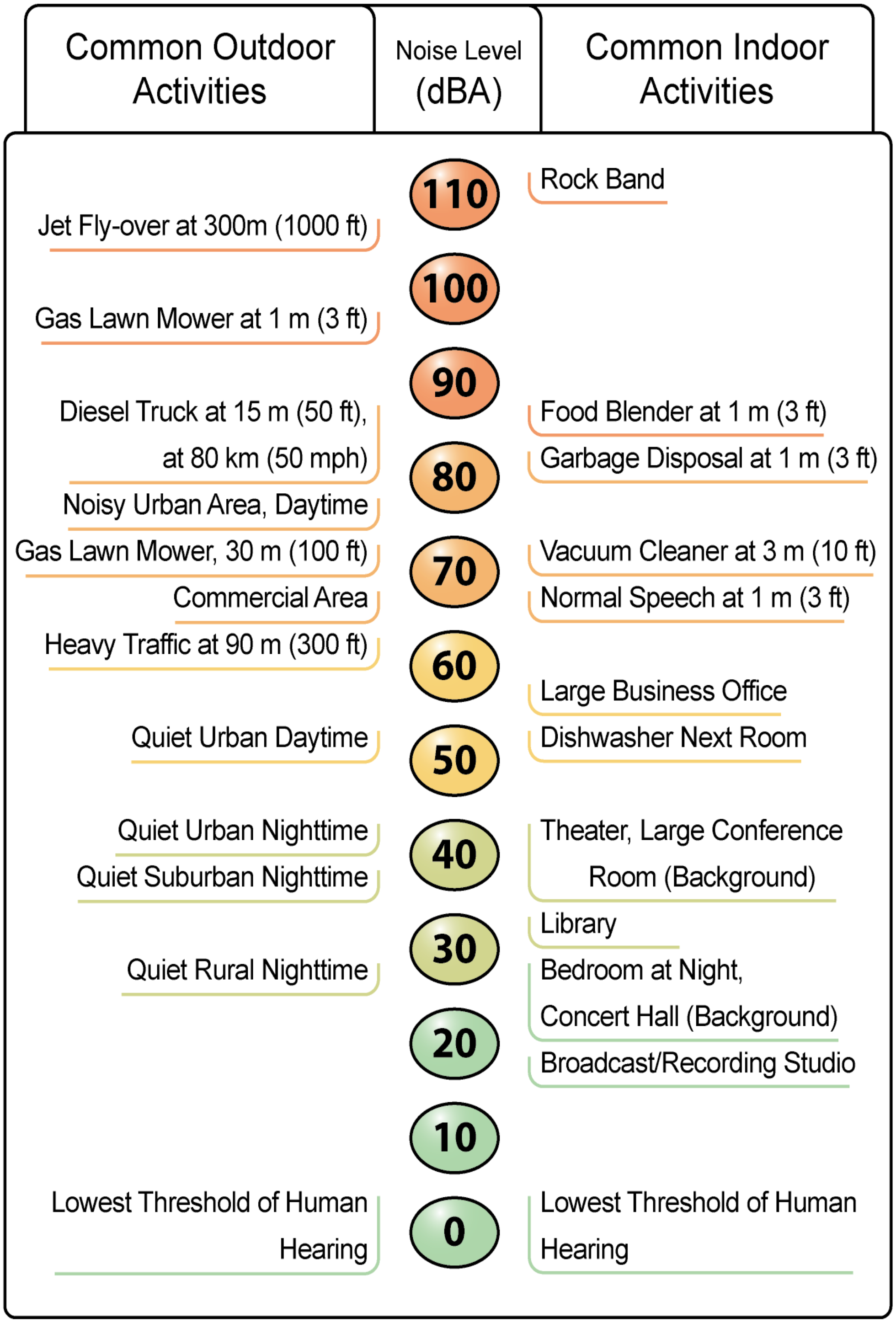
Amplitude

Amplitude is defined as the difference between ambient air pressure and the peak pressure of the sound wave. Amplitude is measured in decibels (dB) on a logarithmic scale. For example, a 65 dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10 dB increase in amplitude with a perceived doubling of loudness and establish a 3 dB change in amplitude as the minimum audible difference perceptible to the average person.

Frequency

The frequency of a sound is defined as the number of fluctuations of the pressure wave per second. The unit of frequency is the Hertz (Hz). One Hz equals one cycle per second. The human ear is not equally sensitive to sound of different frequencies. For instance, the human ear is more sensitive to sound in the higher portion of this range than in the lower and sound waves below 16 Hz or above 20,000 Hz cannot be heard at all. To approximate the sensitivity of the human ear to changes in frequency, environmental sound is usually measured in what is referred to as "A-weighted decibels" (dBA). On this scale, the normal range of human hearing extends from about 10 dBA to about 140 dBA. Common community noise sources and associated noise levels, in dBA, are depicted in Figure 1.

Figure 1. Common Noise Levels



Source: Caltrans 2022

Addition of Decibels

Because decibels are logarithmic units, sound levels cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces a sound level of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together would produce an increase of 5 dB.

Sound Propagation & Attenuation

Geometric Spreading

Noise sources are generally characterized as either a localized source (i.e., point source) or a line source. Examples of point sources include construction equipment, vehicle horns, alarms, and amplified sound systems. Examples of a line sources include trains and on-road vehicular traffic. Sound from a point source propagates uniformly outward in a spherical pattern.

For a point source, sound levels generally decrease (attenuate) at a rate of approximately 6 decibels for each doubling of distance from the source, depending on ground surface characteristics. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver), no excess ground attenuation is assumed. Parking lots and bodies of water are examples of hard surfaces which generally attenuate at this rate. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 decibels per doubling of distance is normally assumed. When soft surfaces are present, the excess ground attenuation for soft surfaces generally results in an overall attenuation rate of approximately 7.5 decibels per doubling of distance from the point source.

On-road vehicle traffic consists of several localized noise sources on a defined path, and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels for line sources attenuate at a rate of approximately 3 decibels for each doubling of distance for hard sites and approximately 4.5 decibels per doubling of distance for soft sites.

Atmospheric Effects

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) from the highway due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in minimum 5 dB of noise reduction. Taller barriers provide increased noise reduction.

Noise reductions afforded by building construction can vary depending on construction materials and techniques. Standard construction practices typically provide approximately 15 dBA exterior-to-interior noise reductions for building facades, with windows open, and approximately 20-25 dBA, with windows closed. With compliance with current building construction and insulation requirements, exterior-to-interior noise reductions typically average approximately 25 dBA. The absorptive characteristics of interior rooms, such as carpeted floors, draperies and furniture, can result in further reductions in interior noise.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases. The acceptability of noise and the threat to public well-being are the basis for land use planning policies preventing exposure to excessive community noise levels.

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted: the so-called "ambient" environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged. Regarding increases in A-weighted noise levels, knowledge of the following relationships will be helpful in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived by humans;
- Outside of the laboratory, a 3 dB change is considered a just-perceivable difference;
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected. An increase of 5 dB is typically considered substantial;
- A 10-dB change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

A limitation of using a single noise-level increase value to evaluate noise impacts, as discussed above, is that it fails to account for pre-development noise conditions. With this in mind, the Federal Interagency Committee on Noise (FICON) developed guidance to be used for the assessment of project-generated increases in noise levels that take into account the ambient noise level. The FICON recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (i.e., CNEL, L_{dn}). FICON-recommended noise evaluation criteria are summarized in Table 1 (FICON 2000).

Table 1. Federal Interagency Committee on Noise Recommended Criteria for Evaluation of Increases in Ambient Noise Levels

Ambient Noise Level Without Project	Increase Required for Significant Impact
< 60 dB	5.0 dB, or greater
60-65 dB	3.0 dB, or greater
> 65 dB	1.5 dB, or greater

Source: FICON 2000

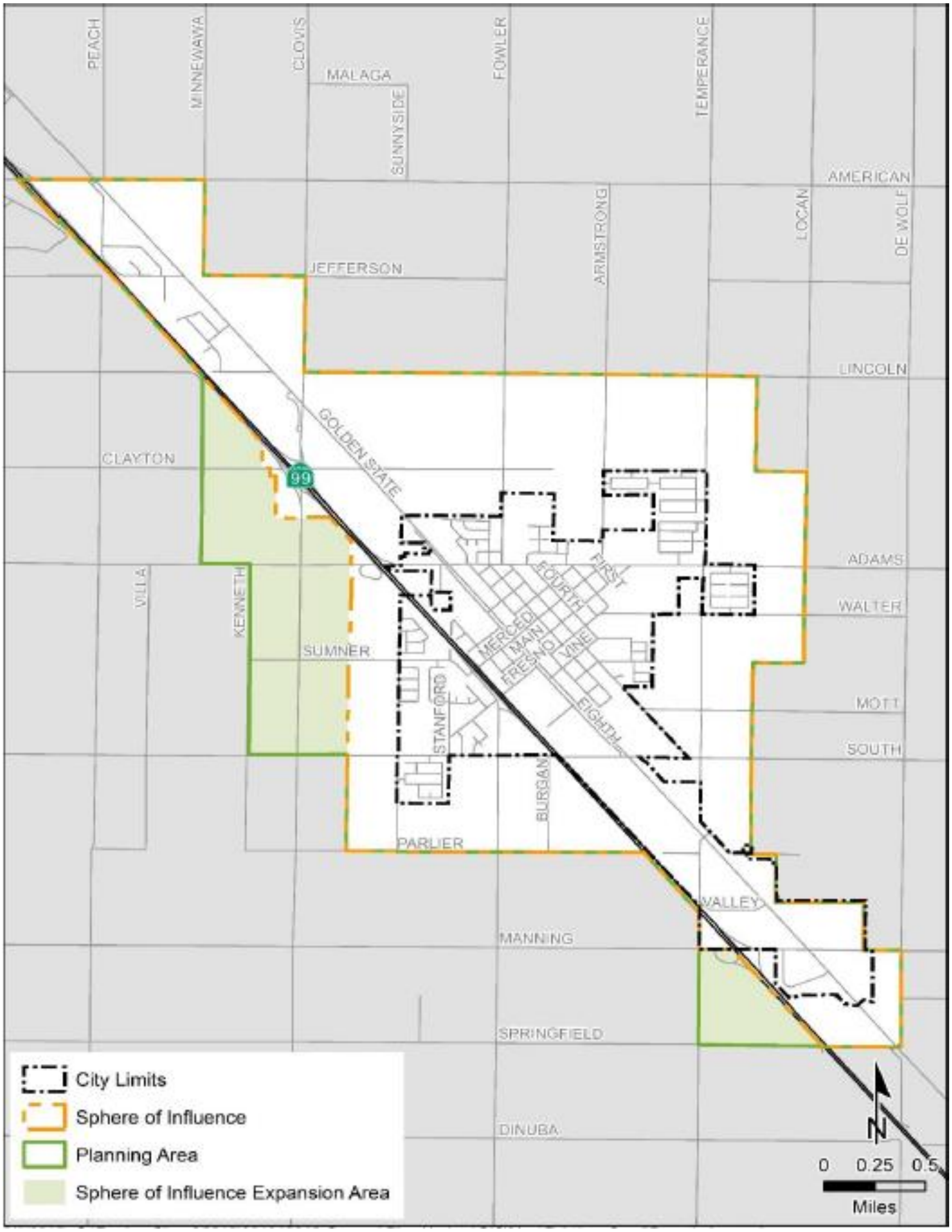
As depicted in Table 1, an increase in the traffic noise level of 5.0, or greater, would typically be considered to result in increased levels of annoyance where existing ambient noise levels are less than 60 dB. Within areas where the ambient noise level ranges from 60 to 65 dB, increased levels of annoyance would be anticipated at increases of 3 dB, or greater. Increases of 1.5 dB, or greater, could result in increased levels of annoyance in areas where the ambient noise level exceeds 65 dB. The rationale for the FICON-recommended criteria is that as ambient noise levels increase, a smaller increase in noise resulting from a project is sufficient to cause significant increases in annoyance (FICON 2000). These criteria are commonly applied for analysis of environmental noise impacts.

Noise-Sensitive Land Uses

Noise-sensitive land uses are generally considered to include those uses that would result in noise exposure that could cause health-related risks to individuals. Places where quiet is essential are also considered noise-sensitive uses. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Other land uses such as libraries, places of worship, and recreation areas are also considered noise-sensitive land uses.

Noise-sensitive land uses within the City of Fowler consist predominantly of residential land uses. Other noise-sensitive land uses located within the City of Fowler include schools, places of worship, and community parks.

Figure 2. Proposed General Plan Update Focus Areas



Source: City of Fowler Community Report 2021

Existing Noise Environment

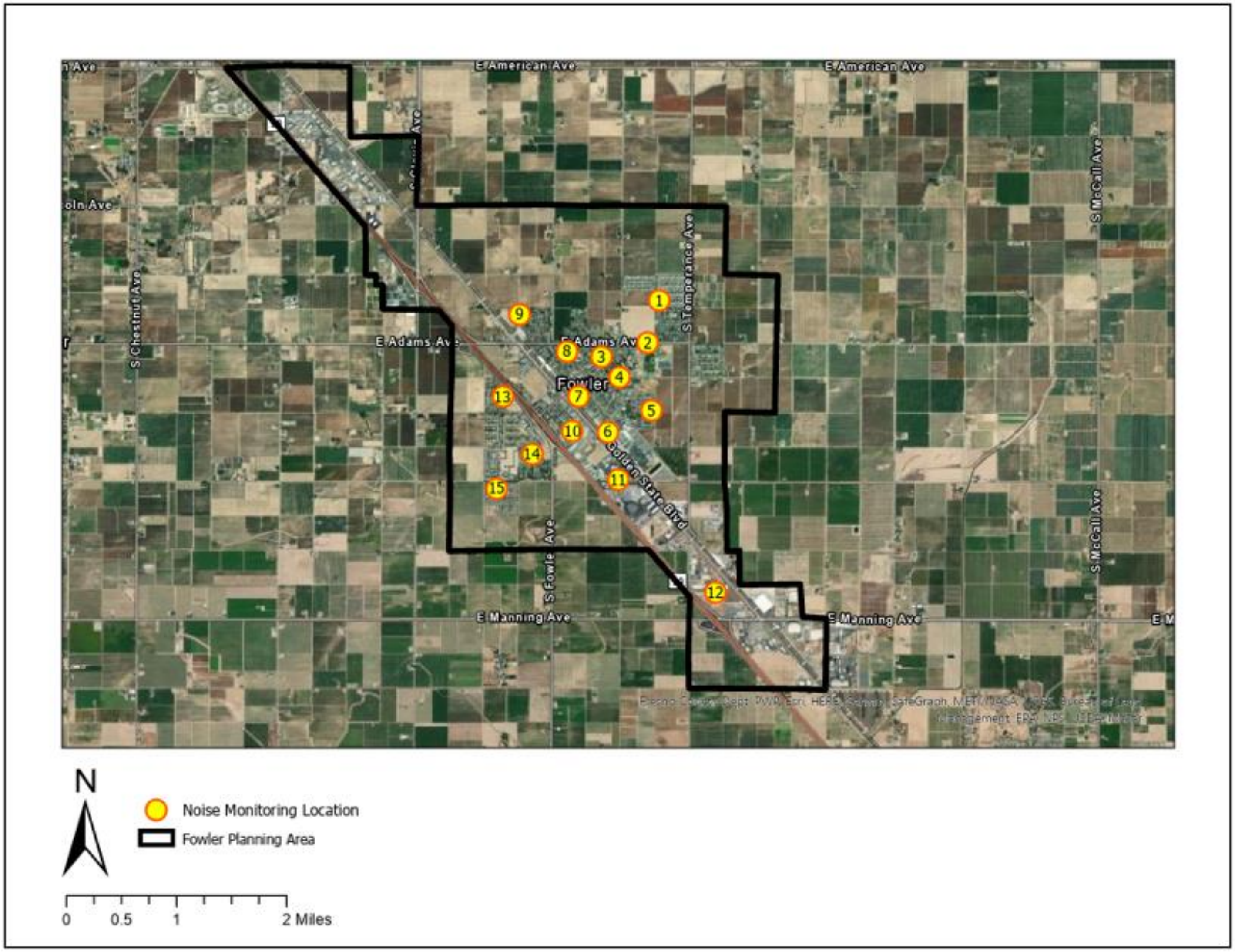
Short-term (10-minute) noise level measurements were conducted on March 24, 2021 for the purpose of documenting and measuring the existing noise environment at various locations throughout the City. Measurement locations were selected near major noise sources located in the vicinity of proposed focus areas and other locations within the community.

Measured daytime noise levels along area roadways ranged from approximately 47.6 to 62.5 dBA equivalent sound level (L_{eq}). In general, nighttime noise levels are typically 5-10 dB lower than daytime noise levels. Ambient noise levels are largely influenced by vehicle traffic on area roadways. To a lesser extent, aircraft overflights and other noise sources within the community (e.g., landscaping, industrial activities, construction activities) also contribute to the ambient noise environment. Ambient noise measurement locations and corresponding measured average-hourly noise levels (in dBA L_{eq}) are summarized in Table 2. Noise measurement locations are depicted in Figure 3.

Table 2. Summary of Measured Ambient Noise Levels

Location		Monitoring Period	Primary Noise Sources	Noise Level (dBA) L_{eq}
1	355 North Jonna Avenue	9:53 - 10:03	Birds, Background Traffic	47.6
2	800 Block East Adams Avenue	10:08 - 10:18	Traffic, Reverse Beeps	62.5
3	Panzak Park	10:27 - 10:37	Traffic, Birds	52.3
4	229 South 3rd Street	10:43 - 10:53	Traffic, Birds, Bus Idle	54.0
5	1540 East Sumner Avenue	11:00 - 11:10	Birds, Dog	48.4
6	519 South 7th Street	11:16 - 11:26	Birds, Industrial Fans	54.3
7	106 East Main Street	11: 34 - 11:44	Traffic	54.7
8	314 North 5th Street	11:50 - 12:00	Birds, Background Traffic	49.9
9	81 Carter Avenue	12:06 - 12:16	Birds, Background Traffic	47.9
10	Valley Children's Park	12:56 - 13:06	Traffic	55.5
11	1362 East South Avenue	13:14 - 13:24	Industrial Fans, Speaker	60.8
12	East Valley Drive	13:45 - 13:55	Traffic, Forklift	54.8
13	1122 West Jameson Avenue	14:06 - 14:16	Traffic, Birds	58.9
14	Donny Wright Park	14:31 - 14:41	Traffic, Birds, Train Horn, People	59.7
15	Sandy Avenue/Clara Court	14:51 - 15:01	Background Traffic	48.0
Noise measurements were conducted on March 24, 2021. Refer to Figure 3 for noise measurement locations.				

Figure 3. Noise Measurement Locations and General Plan Update Focus Areas



Refer to Table 2 for noise measurement data

Noise Sources

Roadway Vehicular Traffic

As noted earlier in this report, noise from vehicular traffic on area roadways is a primarily source of ambient noise in the City. Major sources of noise include the California State Route 99 (SR-99) and Golden State Boulevard.

Traffic noise levels were calculated using the Federal Highway Administration (FHWA) Roadway Noise Prediction Model (FHWA RD-77-108) based on average-daily traffic (ADT) volumes obtained from the traffic analysis prepared for this project (Kittelson & Associates, 2022).Predicted traffic noise levels and distances to projected traffic noise contours for major roadways are summarized in Table 4. Based on the modeling conducted, existing traffic noise levels along area roadways range from approximately 56 to 79 dBA CNEL at 50 feet from the near-travel-lane centerline. The primary generator of traffic noise within the City of Fowler is SR-99. Existing traffic noise levels at 50 feet from the near-travel-lane centerline of SR-99 are approximately 79 dBA CNEL.

Railroad Traffic

The Union Pacific Railroad (UPRR) runs northwest-southeast through the City, adjacent to Golden State Boulevard. Depending on freight demand, approximately 22 to 35 freight trains pass through Fowler on a daily basis.

Existing train noise levels and distance to noise contours are summarized in Table 3. Based on a conservative estimate of 35 trains per day, average-daily noise levels along the railroad corridor could reach levels of approximately 79 dBA CNEL at 100 feet from the rail corridor centerline. Train noise events can also be a source of intermittent noise, including noise generated by locomotive engines, wheel squeal, and warning horns. These instantaneous noise events can contribute to increased levels of annoyance to occupants of nearby noise-sensitive land uses.

Table 3. Existing Railroad Traffic Noise Levels

Train Type	Number of Trains/Day	CNEL at 100 feet from Rail Corridor Centerline	Distance to CNEL Contours (feet) from Rail Corridor Centerline		
			70	65	60
UPRR Freight	35	79	263	468	830
UPRR freight trains distributed equally over a 24-hour period. Does not include shielding provided by intervening terrain or structures. Predicted noise contours do not include shielding by intervening structures.					

Major Surface Transportation Noise Contours

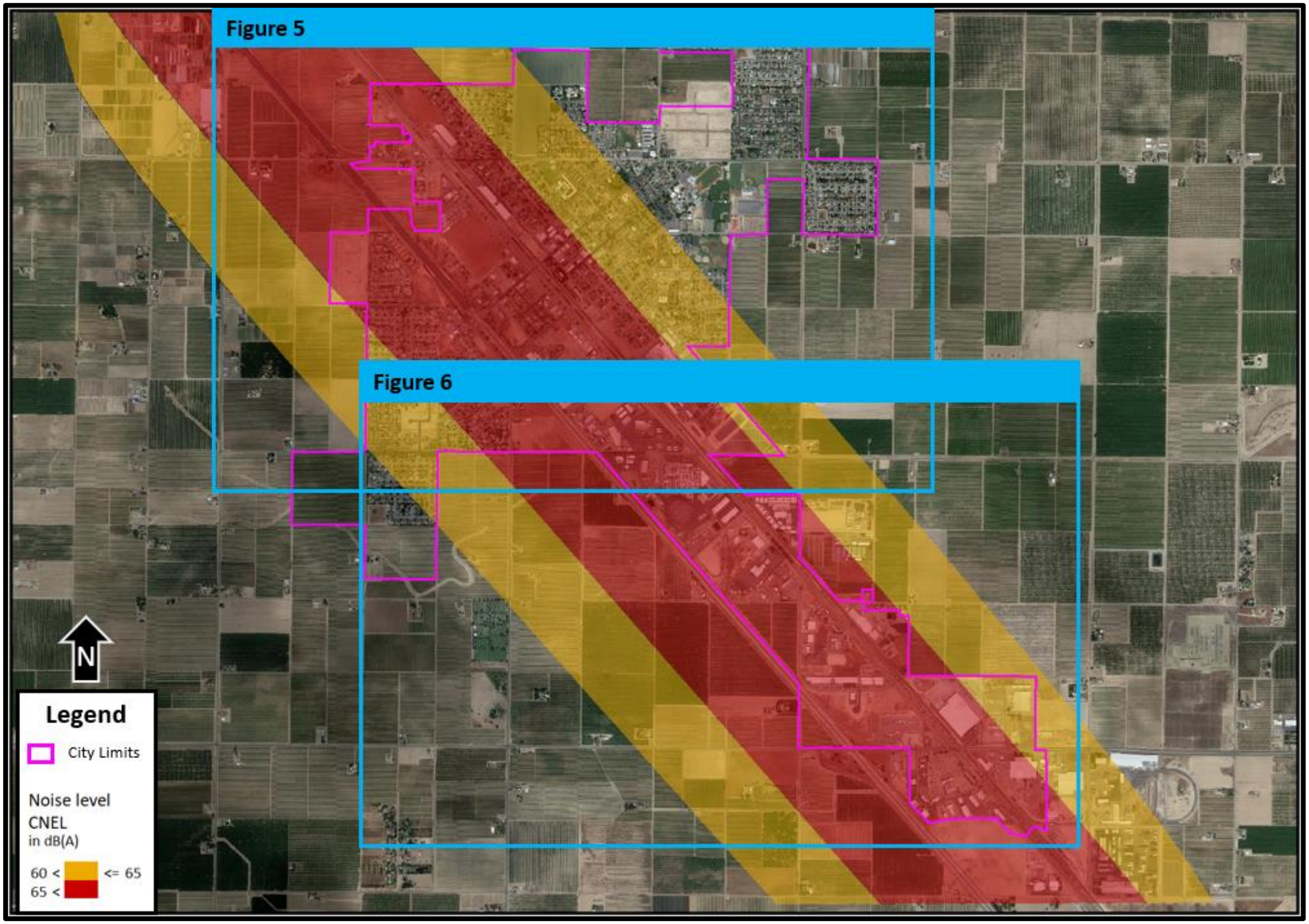
Major surface transportation noise sources in the City of Fowler include SR 99 and the UPRR, which parallels SR 99 to the east in a general northwest to southeast direction. Vehicle traffic along Golden State Boulevard also contribute to projected noise contours along this same general corridor. Combined existing noise contours for these surface transportation noise sources are depicted in Figures 4, 5, and 6.

Table 4. Existing Roadway Traffic Noise Levels & Contour Distances

Roadway Segment	ADT Volumes	CNEL at 50 ft. from Near-travel-lane Centerline	Distance to CNEL Contour (Feet from Road Centerline)		
			70	65	60
American Ave, SR-99 to Golden State Blvd	4,238	64.3	WR	50.4	108
Adams Ave, SR-99 to Golden State Blvd	4,539	63.2	WR	WR	95
Adams Ave, Golden State Blvd to 7th St	4,247	58.6	WR	WR	WR
Adams Ave, East of 5th St	3,412	57.6	WR	WR	WR
Adams Ave, Armstrong Ave to Temperance Ave	3,667	57.4	WR	WR	WR
Adams Ave, Temperance Ave to Locan Ave	2,685	56.5	WR	WR	WR
Sumner Ave, Sunnyside Ave to Merced St	3,108	58.9	WR	WR	WR
Manning Ave, W of 99 SB Ramps	5,802	64.5	WR	52.1	111.5
Manning Ave, E of 99 NB Ramps	21,738	68.4	64.9	127.9	269.6
Manning Ave, E of Golden State	16,414	67.2	WR	107.3	224.2
Clovis Ave, S of Lincoln Ave	15,876	68.6	60.5	122.6	260.5
Clovis Ave, N of SR 99 NB Ramps, S of Golden State Blvd Frontage Connector Road	16,736	68.5	64.5	127.9	270.1
Clovis Ave, SR 99 SB off to Adams Ave	4,513	64.6	WR	52.5	112.6
Clovis Ave, Adams Ave to Summer Ave	3,904	64.0	WR	WR	102.2
Clovis Ave, Summer Ave to South	3,428	63.4	WR	WR	93.8
Clovis Ave, South Ave to Parlier Ave	3,163	63.0	WR	WR	88.9
S Fowler Ave, Merced St. to Fresno St.	7,448	64.3	WR	50.6	108.4
S Fowler Ave, Fresno St. to South Ave.	4,607	63.5	WR	WR	95.7
S Fowler Ave, South Ave to Parlier Ave	3,596	63.6	WR	WR	96.8
Golden State Blvd, American Ave to Lincoln Ave	6,584	65.7	WR	103.1	205.3
Golden State Blvd, Lincoln Ave to Clayton Ave	5,525	65.7	WR	103.1	205.3
Golden State Blvd, Clayton Ave to Adams Ave	5,509	65.7	WR	102.9	205.9
Golden State Blvd, Adams Ave to Merced St.	6,084	65.7	WR	102.9	204.9
Golden State Blvd, Merced St. to South Ave	8,524	65.9	WR	101.7	205.1
Golden State Blvd, South Ave to Temperance Ave	8,846	66.1	WR	103.7	210
Golden State Blvd, Temperance Ave to Valley Dr	10,058	66.7	WR	111.6	228.1
Golden State Blvd, Valley Dr of Manning Ave	9,065	66.2	WR	105.1	213.3
Golden State Blvd, Manning Ave to Springfield Ave	10,722	65.9	WR	100.8	203.4
Merced St, 10th St to 9th St	11,840	64.6	WR	55.8	118.9
Merced St, 9th St to 8th St	10,944	64.2	WR	53.1	112.9
Merced St, 7th St to 6th St	4,172	60.4	WR	WR	59.5
Merced St, 6th St to 5th St	3,665	59.8	WR	WR	54.6
SR-99, South of Merced St	94,000	82.4	509	1,094	2,355
SR-99, Merced St to Adams Ave	97,000	82.6	519	1,117	2,405
SR-99, Adams Ave to Clovis Ave	99,000	82.6	526	1,132	2,438

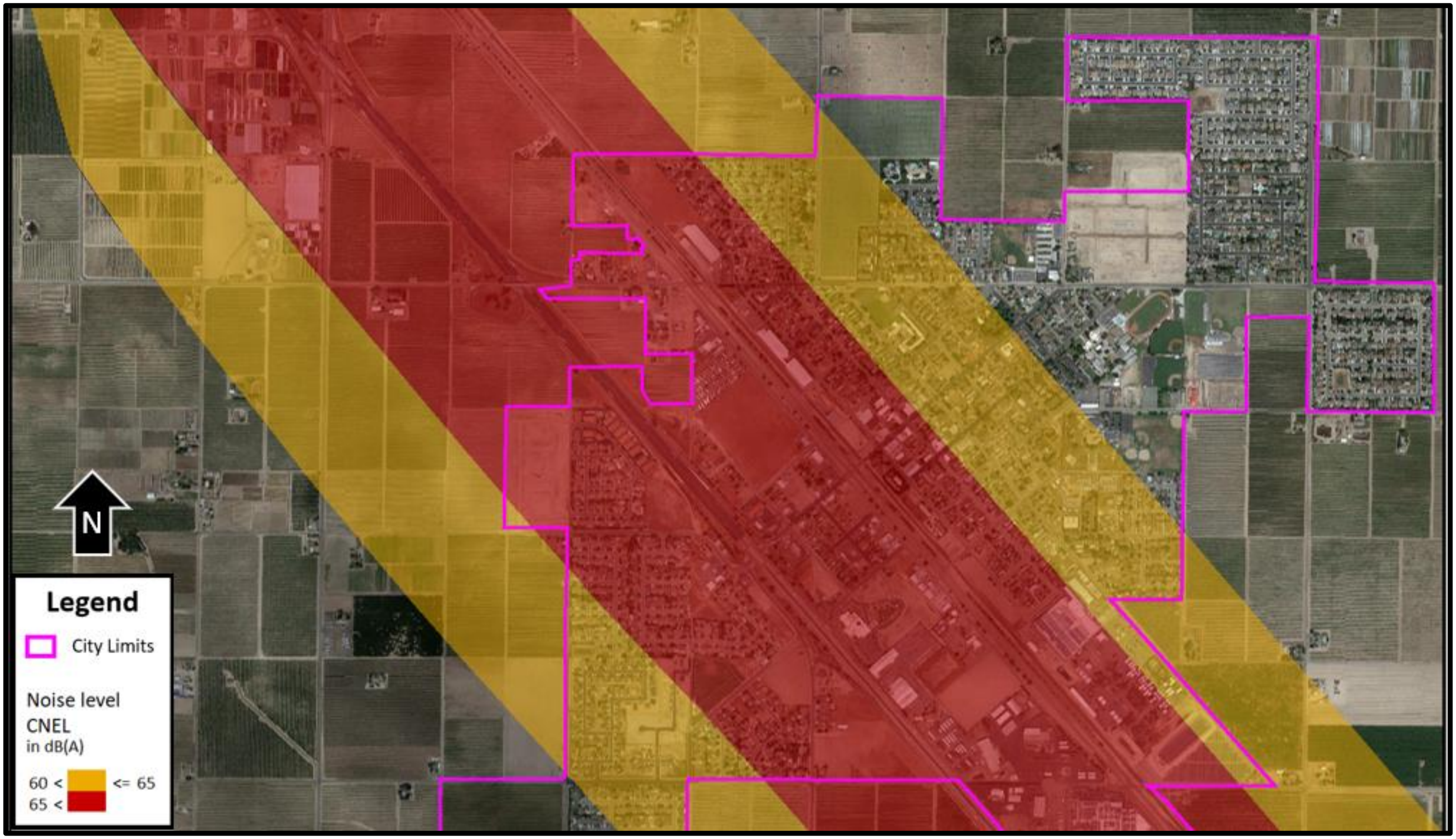
Traffic noise levels for area roadways were calculated based on data obtained from the traffic analysis prepared for this project. Does not include shielding provided by intervening terrain or structures.
Projected roadway traffic noise contours for SR-99 are depicted in Figure 4,5,& 6..
WR = Contour is located within road right-of-way
Source: Kittelson & Associates 2022

Figure 4. Existing Noise Contours – Major Surface Transportation Noise Sources



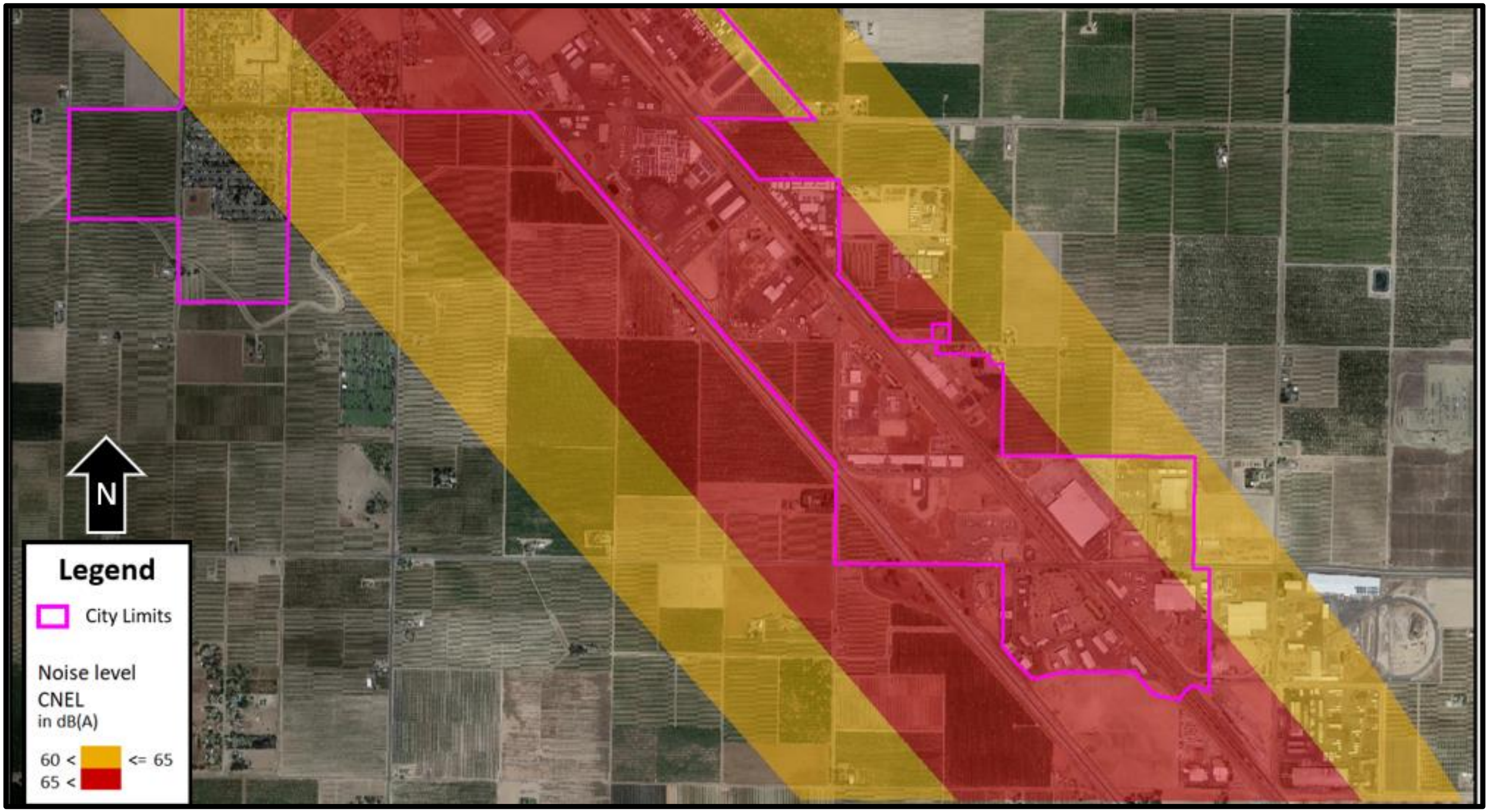
Includes State Route 99, Golden State Boulevard, and Union Pacific Railroad

Figure 5. Existing Noise Contours - Northern Portion of the City of Fowler



Includes State Route 99, Golden State Boulevard, and Union Pacific Railroad

Figure 6. Existing Noise Contours - Southern Portion of the City of Fowler



Includes State Route 99, Golden State Boulevard, and Union Pacific Railroad

Non-Transportation Sources

Within the Fowler, major non-transportation noise sources consist predominantly of industrial and commercial land uses. Many industrial processes produce noise, even when the best available noise control technology is applied. Noise exposures within industrial facilities are controlled by federal and state employee health and safety regulations (i.e., regulations of the Occupational Safety and Health Administration of the U.S. Department of Labor [OSHA] and the California Division of Occupational Safety and Health [Cal-OSHA]). Exterior noise levels that affect neighboring parcels are typically subject to local standards. Commercial, recreational, and public facility activities can also produce noise that may affect adjacent noise-sensitive land uses. These noise sources can be continuous or intermittent and may contain tonal components that are annoying to individuals who live nearby. For instance, emergency-use sirens and backup alarms are often considered nuisance noise sources, but may not occur frequently enough to be considered incompatible with noise-sensitive land uses. In addition, noise generation from fixed noise sources may vary based upon climate conditions, time of day, and existing ambient noise levels.

From a land-use planning perspective, stationary-source noise control issues focus on two goals: (1) preventing the introduction of new noise-producing uses in noise-sensitive areas; and (2) preventing encroachment of noise-sensitive uses upon existing noise-producing facilities. The first goal can be achieved by applying noise performance standards to proposed new noise producing uses. The second goal can be met by requiring that new noise-sensitive uses near noise-producing facilities include mitigation measures to ensure compliance with noise performance standards. Each of these goals stresses the importance of avoiding the location of new uses that may be incompatible with adjoining uses.

The following discussions of existing non-transportation noise sources in the community are intended to be representative of the sources and relative noise levels associated with such uses. The average-hourly noise levels (in dBA L_{eq}) discussed for these sources provide an indication of the noise levels that can generally be expected to occur over an extended period of time. The L_{eq} noise levels do not necessarily reflect possible intermittent high noise levels associated with the various uses but are useful for general planning purposes. Actual noise levels at nearby noise-sensitive receptors will likely vary from one day to the next depending on the operational characteristics of the facility, meteorological conditions, and the physical landscape.

Non-transportation noise sources within the City of Fowler consist predominantly of commercial and industrial uses. To a somewhat lesser extent, other non-transportation noise sources would also include automotive/equipment repair and maintenance facilities, and construction activities. Noise levels associated with some of the more common non-transportation noise sources located throughout the community are discussed in more detail, as follows:

<u>Commercial and Industrial Uses</u>

Within the Fowler planning area, commercial and industrial land uses are located primarily along major roadway and railway corridors. Noise sources commonly associated with these land uses include truck traffic, loading dock activities, heavy-equipment operation, and building mechanical systems. Major industrial and commercial operations within the community include metal and glass recycling centers, trucking distribution centers, and food and agricultural products processing. Various other activities, such as and loading dock activities, can result in temporary or intermittent increases in ambient noise levels. In general, noise levels associated with these uses can range from approximately 55 to 85 dBA L_{eq} at 50 feet.

Noise levels associated with commercial and industrial land uses can vary depending on various factors, including site conditions, equipment operated, and the specific activities being conducted. As a result, actual noise levels at nearby noise-sensitive receptors will likely vary depending on the above mentioned conditions and other influences, such as location, distance from source, shielding provided by intervening terrain and structures, and ground attenuation rates. For this reason, noise generated by commercial and industrial uses and impacts to nearby noise-sensitive land uses should be evaluated on a project-by-project and site-specific basis.

Landscape Maintenance

Landscape maintenance activities often result in sporadic and intermittent increases in ambient noise levels. Equipment used for landscape maintenance often include the use of power mowers and leaf blowers. Leaf blowers and gasoline-powered lawn mowers can result in intermittent noise levels of up to approximately 100 dBA at 3 feet (EPA 1971). Resultant exterior noise levels could reach intermittent levels of approximately 75 dBA L_{max} at 50 feet. The use of leaf blowers, particularly when used during the more noise-sensitive evening and nighttime hours, may result in increased levels of annoyance.

Automotive Maintenance & Repair

Typical automotive maintenance and repair activities often include the use of pneumatic tools, air compressors, and power generators. Other equipment operations such as the use of power hand tools (e.g., sanders, drills, grinders, pneumatic wrenches, etc.), typically generate a lesser degree of noise. The use of air compressors, power generators, and pneumatic tools can generate noise levels of up to approximately 85 dBA at 50 feet. Noise levels generated by the use of hand-held tools, such as sanders, drills, and grinders, typically average between 63 and 87 dBA at 3 feet. The use of multiple hand tools, such as grinders being used on metal, can generate levels of 87 to 97 dBA at 3 feet (EPA 1971). Noise levels associated with these facilities would be dependent on the specific activities performed and source/facility characteristics.

Building Mechanical Systems

The majority of electrical and mechanical equipment in buildings is used for air circulation systems. Mechanical systems may also include pumping systems, elevators and escalators, and various other material conveyance systems. Much of this equipment is located in mechanical equipment rooms or in areas that provide shielding from direct public/personnel exposure (i.e., above ceilings, in walls, or behind enclosures.) Equipment located within exterior areas can result in increases in ambient noise levels, particularly when located in unshielded areas and within line-of-sight of nearby receptors. Such equipment would include air-conditioning units, cooling towers, compressors, fans/turbines, electrical transformers, chillers, and pumps. Noise levels associated with these sources can vary depending on the specific equipment being operated, facility/equipment design, and operational characteristics. Typical noise levels associated with building mechanical equipment can range from less than 50 to 110 dBA at 3 feet, with the highest noise levels reaching approximately 85 dBA at 50 feet from the source.

Construction Activities

Construction noise typically occurs intermittently and varies depending upon the nature or phase (e.g., demolition/land clearing, grading and excavation, erection) of construction. Noise generated by construction equipment, including pile drivers, material handling equipment, pavers, jackhammers, and portable generators, can result in intermittent and prolonged increases in ambient noise levels. Although construction noise impacts are generally short-term, they can result in increased levels of annoyance to occupants of nearby residential dwellings. In general, noise levels generated by construction activities can range from approximately 71 to 83 dBA L_{eq} at 50 feet from the source.

Noise-generating construction activities are currently regulated through implementation of the City's Noise Control ordinance, which generally limits these activities to the less noise-sensitive daytime hours of the day (Fowler, 2020).

REGULATORY SETTING

Federal, state, and local governments have established noise standards and guidelines to protect citizens from potential hearing damage and various other adverse physiological and social effects associated with noise. Those regulations most applicable to the community are summarized, as follows:

Federal

U.S. Environmental Protection Agency

In 1974, the U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control published a report entitled *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. Although this document does not constitute EPA regulations or standards, it is useful in identifying noise levels at which increased levels of annoyance would be anticipated. Based on an annual-average day-night noise level (expressed as L_{dn} or DNL), the document states that "undue interference with activity and annoyance" will not occur if outdoor noise levels in residential areas are below 55 dBA L_{dn} and indoor levels are below 45 dBA L_{dn} (EPA 1974).

Department of Housing and Urban Development

The Federal Department of Housing and Urban Development (HUD) guidelines for the acceptability of residential land uses are set forth in the Code of Federal Regulations, Title 24, Part 51, "Environmental Criteria and Standards." These guidelines identify a noise exposure of 65 dBA L_{dn}, or less, as acceptable. Exterior noise levels of 65 to 75 dBA L_{dn} are considered normally acceptable, provided appropriate sound attenuation is provided to reduce interior noise levels to within acceptable levels. Exterior noise levels above 75 dBA L_{dn} are considered unacceptable. The goal of the interior noise levels for residential, hotel, and hospital/nursing home uses is 45 dBA L_{dn}. These guidelines apply only to new construction supported by HUD grants and are not binding upon local communities.

State

California Building Code

Title 24 of the California Code of Regulations contains standards for allowable interior noise levels associated with exterior noise sources (California Building Code, 1998 edition, Volume 1, Appendix Chapter 12, Section 1208A). The standards apply to new hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family residences. The standards state that the interior noise level attributable to exterior sources shall not exceed 45 dBA CNEL in any habitable room. Proposed multi-family residential structures to be located where the CNEL exceeds 60 dBA shall require an acoustical analysis showing that the proposed building design would achieve the prescribed allowable interior noise standard.

State of California General Plan Guidelines

The *State of California General Plan Guidelines* (State of California 2003), published by the Governor's Office of Planning and Research (OPR), also provides guidance for the acceptability of projects within specific noise environments. Based on these guidelines, residential uses, churches, libraries, and hospitals are "normally unacceptable" in areas where the exterior noise level exceeds 70 dBA CNEL and "conditionally acceptable" within exterior noise environments between 60 and 70 dBA CNEL. Noise levels of up to 60 dBA CNEL are considered "normally acceptable". The goal of these noise standards is, in part, to allow for a "normally acceptable" interior noise level of 45 dBA CNEL. For instance, assuming an average exterior-to-interior noise reduction of 15 dBA (with windows partially open), an exterior noise level of 60 dBA CNEL, or less, would be sufficient to achieve an interior noise level of 45 dBA CNEL. Higher exterior noise levels may be allowed provided that noise-reduction measures are incorporated to achieve acceptable interior noise levels. Within "conditionally acceptable" exterior noise environments, conventional construction with incorporation of fresh air circulation systems sufficient to allow windows to remain closed would normally suffice. Compliance with current building code requirements and with windows closed, exterior-to-interior noise reductions typically average approximately 25 dBA or more. However, the state stresses that these guidelines can be modified to reflect communities' sensitivities to noise. Adjustment factors may also be used in order to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution. The State recommended noise criteria for land use compatibility are summarized in Table 5.

Local

City of Fowler General Plan Noise Element

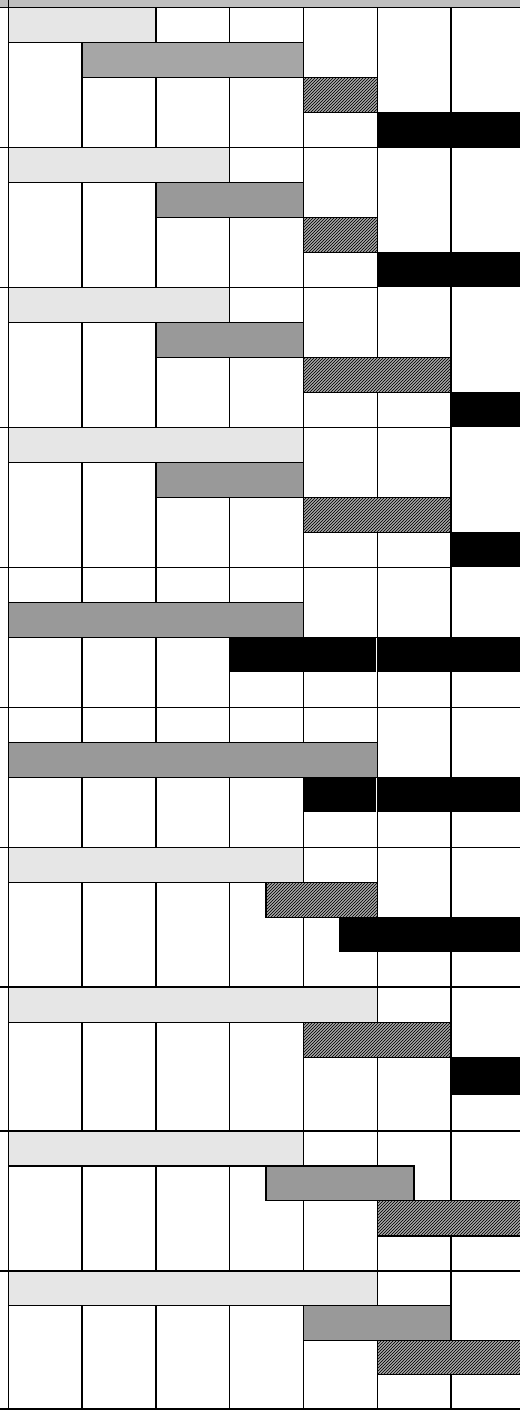
The *Fowler General Plan Element Preparation*, Chapter 7, Section 7.8, identifies exterior average-daily noise standards for the primary purpose of ensuring the compatibility of proposed land uses within exterior noise environments and to ensure that noise levels at adjacent land uses do not exceed acceptable levels. These standards are also designed to protect existing land uses, including transportation and industry, from encroaching urban uses. These noise standards are largely consistent with those identified in the State of California's *General Plan Guidelines*, as discussed above, and summarized in Table 4 (City of Fowler 2014).

The *City of Fowler General Plan Land Use Element* incorporates development and noise-performance standards to ensure that industrial noise levels at adjacent land uses do not exceed acceptable levels. For industrial uses affecting residential uses, the following standards are required (City of Fowler 2004):

- On properties planned for industry, a landscaped setback 20 feet wide containing deciduous and evergreen trees shall be planted and maintained along the property line with abutting property planned for residential uses and along abutting local streets.
- Roof-mounted and detached mechanical equipment shall be acoustically baffled to prevent equipment noise from exceeding 55 dBA measured at the nearest residential property line.
- Exterior area lighting for industrial buildings, parking areas, garages, access drives, and loading areas, shall be low profile, hooded, and directed away from abutting property planned for residential use.

Table 5. State of California Land Use Compatibility Noise Criteria

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dBA) 55 60 65 70 75 80	Interpretation
Residential – Low Density Single Family, Duplex, Mobile Homes		**Normally Acceptable** Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
Residential – Multiple Family		
Transient Lodging – Motels, Hotels		**Conditionally Acceptable** New construction or development should be undertaken only after a detailed analysis of noise reduction requirements and needed noise insulation features included in the design. Conventional construction with closed windows and fresh air supply systems or air conditioning will normally suffice.
Schools, Libraries, Churches, Hospitals, Nursing Homes		
Auditoriums, Concert Halls, Amphitheaters		
Sports Arena, Outdoor Spectator Sports		**Normally Unacceptable** New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Playgrounds, Neighborhood Parks		
Golf Courses, Riding Stables, Water Recreation, Cemeteries		**Clearly Unacceptable** New construction or development should generally not be undertaken
Office Buildings, Business Commercial and Professional		
Industrial, Manufacturing, Utilities, Agriculture		



Source: California GOPR 2017

The *City of Fowler General Plan Circulation Element* includes policies to reduce transportation noise impacts to community residents and sensitive land uses, including the designation of specified truck routes within the community and incorporation of increased setback distances, wall, landscaped berms, and other noise-reduction measures for land uses located along major transportation corridors (City of Fowler 2004).

City of Fowler Municipal Code

The City of Fowler Municipal Code (Title 5, Public Welfare, Chapter 21, Nuisances, Article 6, Unlawful Noise Related Nuisances) includes various provisions intended to protect community residents from prolonged unnecessary, excessive, and annoying sound levels that are detrimental to the public health, welfare, and safety, or are contrary to the public interest. Examples of noise sources subject to the City's municipal Code include, but are not limited to, industrial and commercial machinery and equipment, pumps, fans, compressors, generators, air conditioners and refrigeration equipment (City of Fowler 2021).

Noise sources associated with construction-related activities are typically exempt from the City's nuisance ordinance provided that the activities do not take place between the hours of eight p.m. and seven a.m. or by special permit from the City Manager. Various other activities are also exempt, including, but not limited to, school entertainment and athletic events, mobile sources associated with agricultural activities, and emergency response activities (City of Fowler 2021).

In addition to the City's nuisance ordinance, Article 14, Section 9-5.1417, Performance Standards, of the City's zoning ordinance establishes exterior noise level standards for industrial uses. The City's exterior noise standards are summarized in Table 5. These standards are applied at the property line of the receiving land use and vary by exposure duration and period of the day (City of Fowler 2021).

Table 6. City of Fowler Municipal Code Noise Level Standards - Industrial Uses

Receiving Land Use Category	Time Period	Noise Level (dBA)[1]
Residential	10:00 p.m. to 7:00 a.m.	50
	7:00 a.m. to 10:00 p.m.	60
Public Use[2]	10:00 p.m. to 7:00 a.m.	55
	7:00 a.m. to 10:00 p.m.	60
Commercial	10:00 p.m. to 7:00 a.m.	60
	7:00 a.m. to 10:00 p.m.	65
Industrial	Anytime	70

Applied at the property line of the receiving land use.
The noise standard of a cumulative 30-minute period during any hour
A 10 dB increase of the noise standard for a cumulative of 5, or more, minutes during any hour
A 20 dB increase of the noise standard, or exceed maximum ambient noise level during any time period
Includes schools, libraries, hospitals, churches, and parks.
Noise standards do not apply to railroad operations, motor vehicles, including trucks, or to agricultural equipment used in the cultivation of any agricultural land in the M-I Zone. Noise standards are subject to review/amendment by the City

ENVIRONMENTAL IMPACTS

SIGNIFICANCE THRESHOLD CRITERIA

According to Appendix G of the CEQA Guidelines, a project would normally have a significant effect on the environment if the project would:

NOI-1: Result in exposure of persons or generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

NOI-2: Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

NOI-3: Expose people residing or working in the project area to excessive noise levels for a project located within an airport land use plan area or, where such a plan has not been adopted, or within two miles of a public airport or a public use airport.

The City is not located within an airport land use plan area or within two miles of a public or private use airport. Implementation of the proposed GPU would not expose people residing or working in the project area to excessive noise levels. As a result, no impact is anticipated to occur with regard to the exposure of sensitive receptors to aircraft noise levels. Therefore, impacts related to thresholds NOI-5 and NOI-6 are not discussed further in this report.

Methodology

A combination of use of existing literature and general application of accepted noise thresholds was used to determine the impact of ambient noise levels resulting from and on development within the GPU Planning Area. Short- and long-term impacts associated with transportation and non-transportation noise sources were qualitatively assessed based on potential increases in ambient noise levels anticipated to occur at noise-sensitive land uses. Traffic noise levels along major area roadways were estimated using the FHWA Highway Traffic Noise Prediction model (FHWA-RD-77-108.) The FHWA modeling was based upon the Calveno noise-emission factors for automobiles and medium- and heavy-duty trucks. Input data used in the model included average-daily traffic volumes, day/night percentages of automobiles and medium and heavy trucks, vehicle speeds, ground attenuation factors, roadway widths, and ground elevation data. Traffic volumes for major roadway segments within the City were derived from the traffic analysis prepared for this project. Projected year 2042 traffic noise levels were also quantified for nearby segments of SR-99 based on projected increases in traffic obtained from Kittelson & Associates.

Predicted train noise levels and corresponding distances to noise contours for the UPRR railroad corridor were calculated in accordance with the Federal Transit Administration's (FTA's) *Transit Noise and Vibration Impact Assessment* guidance (FTA 2018). Train noise levels were quantified for freight trains along the UPRR freight line. Predicted train volumes and operational data were obtained from the Fowler General Plan Element Preparation (City of Fowler 2014). Projected future 2042 train volumes for this corridor were unable to be obtained.

Relevant Proposed GPU Goals and Policies

The 2042 GPU includes a number of goals and policies that would reduce noise impacts on sensitive receptors. Some of the most relevant of these goals and policies include the following:

Policies

CH-25 New development of the land uses shall be located, designed, and operated in such a way that external noise levels from stationary noise sources do not exceed the maximum identified. Noise levels shall be measured immediately within the property line of the affected land use. Where two land uses meet, the more restrictive standard shall be used.

CH-26 New development shall be designed and operated in such a way that interior noise levels from both stationary and mobile noise sources do not exceed 45 dBA L_{dn} for adjacent residential uses or other uses where people normally sleep and 45 dBA L_{eq} at peak hour for adjacent office, school, church, or similar use.

CH-27 New uses increasing stationary and/or mobile noise levels shall be subject to the following thresholds for CEQA significance:

- Where existing ambient noise levels are less than 60 dB, an increase of 5 dB or more, measured at the outdoor activity area of a noise-sensitive use, shall be considered significant;
- Where existing ambient noise levels are between 60 and 65 dB, an increase of 3 dB or more, measured at the outdoor activity area of a noise-sensitive use, shall be considered significant;
- Where existing ambient noise levels are greater than 65 dB, an increase of 1.5 dB or more, measured at the outdoor activity area of a noise-sensitive use, shall be considered significant. (New)

CH-28 Require noise generators to provide increased setbacks, walls, landscaped berms, other sound-absorbing barriers, or a combination thereof to prevent excessive noise exposure and reduce noise levels to acceptable levels, as needed.

CH-29 Require noise reduction methods along major roadways in order to protect adjacent, noise-sensitive land uses against excessive noise. Noise reduction methods shall include design strategies, including setbacks, landscaped berms, and other sound-absorbing barriers, when possible, in lieu of sound walls, to mitigate noise impacts and enhance aesthetics. Sound walls may also be appropriate noise-reduction strategies.

CH-30 When sound walls are proposed, encourage a combination of berms and/or landscaping and walls to produce a more visually pleasing streetscape.

CH-31 Require roof-mounted and detached mechanical equipment to be acoustically buffered when adjacent to residential uses to prevent equipment noise in excess of 55dBA as measured at the nearest residential property line.

CH-32 Purchase City vehicles and equipment with low noise generation. Maintain City vehicles to minimize noise.

CH-33 Transportation and City infrastructure construction shall not be subject to typical noise standards so long as construction occurs between the hours of 7 AM and 7 PM, Monday through Friday, or between 8 AM and 5 PM on weekends and federal holidays. Construction may occur outside of these times if completing the work within these time frames is deemed infeasible.

CH-34 The City shall require an assessment of construction noise impacts on nearby noise-sensitive land uses and associated activities to minimize those impacts as part of the discretionary review process.

CH-35 Require construction projects anticipated to generate a significant amount of vibration to ensure acceptable interior vibration levels at nearby residential and commercial uses based on current City or FTA criteria.

CH-36 The City may require a project-specific vibration impact assessment and associated impact reduction measures for projects involving the use of major vibration-generating equipment which could result in vibration levels in excess of 0.2 in/sec peak particle velocity (PPV).

Impacts and Mitigation Measures

Impact N-1:	Would the General Plan result in exposure of persons or generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

The City of Fowler GPU consists of developing parcels that are currently vacant, or under-developed and have the potential for enhanced or further development. The building of the proposed scenario was calculated by Kittelson & Associates (Kittelson & Associates 2022). The buildout forecast represents the most likely amount of development under the proposed zoning rather than the maximum possible amount of development. Future development within the Fowler sphere of Influence would result in the construction of an estimated 16,414,061 square feet (sqft) of industrial land uses, 1,631,444 sqft of commercial land uses, 197,838 sqft of public facilities, and 12,494 additional dwelling units. This would result in a total of approximately 1,240,395 vehicle miles traveled (VMT) per day. Future development would result in a net increase of approximately 992,501,214 VMT. Short-term construction and long-term operational noise impacts associated with future development are discussed as follows:

Short-term Exposure to Construction Noise

Construction noise typically occurs intermittently and varies depending upon the nature or phase (e.g., demolition/land clearing, grading and excavation, erection) of construction. Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. Temporary increases in ambient noise levels, particularly during the nighttime hours, could result in increased levels of annoyance and potential sleep disruption. Although noise ranges were found to be similar for all construction phases, the grading phase tends to involve the most equipment and resulted in slightly higher average-hourly noise levels. Typical noise levels for individual pieces of construction equipment and distances to predicted noise contours are summarized in Table 7. As depicted, individual equipment noise levels typically range from approximately 74 to 88 dBA L_{eq} at 50 feet. Typical operating cycles may involve 2 minutes of full power, followed by 3 or 4 minutes at lower settings. Intermittent noise levels can range from approximately 77 to 95 dBA L_{max}, the loudest of which include the use of pile drivers and impact devices (e.g., hoe rams, impact hammers).

Assuming a construction noise level of 88 dBA L_{eq} and an average attenuation rate of 6 dBA per doubling of distance from the source, construction activities located within approximately 1,330 feet of noise-sensitive receptors could reach levels of approximately 60 dBA L_{eq}. Depending on distances from nearby noise-sensitive land uses and the specific construction activities conducted, construction activities may result in temporary and periodic increases in ambient noise levels at nearby receptors. Of particular concern, are activities that occur during the evening and nighttime hours. Construction activities that occur during these more noise-sensitive hours may result in increased levels of annoyance and potential sleep disruption to occupants of nearby noise-sensitive land uses (e.g., residential dwellings, schools). As a result, because such increases could result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project and could result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies or neighboring jurisdictions, this impact is considered **potentially significant**.

Table 7. Typical Individual Construction Equipment Noise Levels

Equipment	Typical Noise Level (dBA) 50 feet from Source		Distance to Noise Contours (feet, dBA L_{eq})		
	L_{max}	L_{eq}	70 dBA	65 dBA	60 dBA
Air Compressor	80	76	105	187	334
Auger/Rock Drill	85	78	133	236	420
Backhoe/Front End Loader	80	76	105	187	334
Blasting	94	74	83	149	265
Boring Hydraulic Jack/Power Unit	80	77	118	210	374
Compactor (Ground)	80	73	74	133	236
Concrete Batch Plant	83	75	94	167	297
Concrete Mixer Truck	85	81	187	334	594
Concrete Mixer (Vibratory)	80	73	74	133	236
Concrete Pump Truck	82	75	94	167	297
Concrete Saw	90	83	236	420	748
Crane	85	77	118	210	374
Dozer/Grader/Excavator/Scraper	85	81	187	334	594
Drill Rig Truck	84	77	118	210	374
Generator	82	79	149	265	472
Gradall	85	81	187	334	594
Hydraulic Break Ram	90	80	167	297	529
Jack Hammer	85	78	133	236	420
Impact Hammer/Hoe Ram (Mounted)	90	83	236	420	748
Pavement Scarifier/Roller	85	78	133	236	420
Paver	85	82	210	374	667
Pile Driver (Impact/Vibratory)	95	88	420	748	1,330
Pneumatic Tools	85	82	210	374	667
Pumps	77	74	83	149	265
Truck (Dump/Flat Bed)	84	80	167	297	529
Sources: FTA 2018, FHWA 2008					

Proposed General Plan Policies that Provide Mitigation

The proposed GPU includes numerous goals and policies that would help to further reduce criteria noise impacts on receptors. Relevant policies include policies: CH-33, CH-34, CH-35, CH-36.

Due to the short-term and intermittent frequency of construction noise, and the required compliance with the City's municipal code and GPU Policy CH-33, CH-34, CH-35, and CH-36 which would require compliance with applicable standards and procedures for the control of noise impacts, construction noise level increases would not result in a substantial temporary or periodic increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance. As a result, this impact would be considered **less than significant**.

Mitigation Measures

None required.

Long-term Exposure to Non-Transportation Noise

The proposed 2042 GPU would primarily facilitate new residential, commercial, industrial, and public land uses within the city limits. Potential noise/land use conflicts would occur at the interface between planned residential and commercial land uses due to noise sources typically associated with commercial activities, such as rooftop-mounted HVAC equipment, delivery trucks, car washes, and amplified sound. Other noise sources associated with commercial activities include delivery trucks, parking lot sweepers, leaf blowers, and mowers. The city has adopted specific standards for noise level standards (see Table 5). Noise level could potentially exceed the specific standards and would, therefore, be considered to have a **potentially significant** impact.

Proposed General Plan Policies that Provide Mitigation

The proposed GPU includes numerous goals and policies that would help to further reduce criteria noise impacts on receptors. Relevant policies include policies: CH-25, CH-26, CH-27, CH-28, CH-30, CH-31, and CH-32

Compliance with proposed policy CH-25, CH-26, CH-27, CH-28, CH-30, CH-31, and CH-32 would ensure specific projects adhere to the Municipal Code and would mitigate any significant nuisance noise from commercial activities, rooftop-mounted HVAC equipment, delivery trucks, car washes, and amplified sound. Therefore, implementation of the 2042 GPU would not result in ambient noise level environments at noise-sensitive uses that exceed the City's maximum allowable noise exposure standards set forth in Table 5. Consequently, future noise/land use conflicts between planned residential and commercial land would be **less than significant**.

Long-term Exposure to Transportation Noise

Major noise sources in the planning area consist predominantly of vehicle traffic on area roadways. Major roadway segments in the City include, but are not limited to, SR-99, Golden State Boulevard, Clovis Avenue, Manning Avenue, and Merced Street. In addition, as noted earlier in this report, rail traffic along the UPRR also contributes to transportation noise levels in the community. Roadway traffic noise and UPRR noise impacts are discussed in greater detail, as follows:

<u>Roadway Traffic Noise</u>

Traffic noise levels were estimated using the FHWA Highway Traffic Noise Prediction model (FHWA-RD-77-108) for existing and future cumulative (year 2042) conditions. Predicted future cumulative traffic noise levels and distances to projected noise contours are summarized in Tables 10. It is important to note that predicted noise contours are approximate and do not take into account shielding or reflection of noise due to intervening terrain or structures. As a result, predicted noise contours should be considered to represent bands of similar noise exposure along roadway segments, rather than absolute lines of demarcation. Although these predicted noise contours are not considered site-specific, they are useful for determining potential land use conflicts. Predicted increases in future cumulative traffic noise levels, in comparison to existing traffic noise levels, are summarized in Table 11.

Under future cumulative conditions with buildout of the GPU and in comparison, to existing conditions (Table 11), the GPU would contribute to significant increases in traffic noise levels along segments of American Avenue, Adams Avenue, Sumner Avenue, Manning Avenue, Clovis Avenue, South Fowler Avenue, Golden State Boulevard, Merced Street, and SR-99 (Refer to Table 11). In addition, development of future land uses within the proposed focus areas would likely occur along major roadways. Depending on the type of land uses proposed, distances from area roadways, and site conditions, future development could be exposed to traffic noise levels in excess of the City's current noise standards for land use compatibility (refer to Table 5). As a result, exposure to vehicular traffic noise on area roadways would be considered a **potentially significant** impact.

Table 8. 2042 GPU Buildout Roadway Traffic Noise Levels & Contour Distances

Roadway Segment	ADT Volumes	CNEL at 50 ft. from Near-travel-lane Centerline	Distance to CNEL Contour (Feet from Road Centerline)		
			70	65	60
American Ave, SR-99 to Golden State Blvd	15,022	69.8	54.3	116.5	250.6
Adams Ave, SR-99 to Golden State Blvd	17,352	67.7	WR	88.7	190.4
Adams Ave, Golden State Blvd to 7th St	11,407	62.9	WR	WR	90.8
Adams Ave, East of 5th St	7,694	61.1	WR	WR	70
Adams Ave, Armstrong Ave to Temperance Ave	6,277	59.8	WR	WR	62.3
Adams Ave, Temperance Ave to Locan Ave	5,079	59.3	WR	WR	53.5
Sumner Ave, Sunnyside Ave to Merced St	11,485	64.6	WR	54.5	116.4
Manning Ave, W of 99 SB Ramps	29,134	71.5	70.6	151.7	326.6
Manning Ave, E of 99 NB Ramps	39,103	71.0	90.4	186.4	397.5
Manning Ave, E of Golden State	32,092	70.1	80.5	164	348.7
Clovis Ave, S of Lincoln Ave	36,041	72.2	99.3	209.3	448.8
Clovis Ave, N of SR 99 NB Ramps, S of Golden State Blvd Frontage Connector Road	39,075	72.2	105.8	221.3	473.6
Clovis Ave, SR 99 SB off to Adams Ave	16,123	70.1	56.9	122.1	262.7
Clovis Ave, Adams Ave to Summer Ave	17,174	70.4	59.3	127.3	274
Clovis Ave, Summer Ave to South	9,493	67.8	WR	85.9	184.6
Clovis Ave, South Ave to Parlier Ave	6,719	66.3	WR	68.3	146.7
S Fowler Ave, Merced St. to Fresno St.	19,438	68.5	WR	95.4	205.3
S Fowler Ave, Fresno St. to South Ave.	15,352	68.8	WR	99.1	213.2
S Fowler Ave, South Ave to Parlier Ave	16,055	70.1	56.8	121.7	261.9
Golden State Blvd, American Ave to Lincoln Ave	31,974	73.4	146.1	303.2	647.5
Golden State Blvd, Lincoln Ave to Clayton Ave	26,225	72.5	129.8	266.5	567.8
Golden State Blvd, Clayton Ave to Adams Ave	22,354	71.8	118.3	240.4	510.8
Golden State Blvd, Adams Ave to Merced St.	28,845	70.0	94.2	184.4	388.2
Golden State Blvd, Merced St. to South Ave	25,114	70.4	99.4	196.8	415.5
Golden State Blvd, South Ave to Temperance Ave	23,504	70.2	96	188.8	397.8
Golden State Blvd, Temperance Ave to Valley Dr	33,283	71.7	116.2	235.6	500.4
Golden State Blvd, Valley Dr of Manning Ave	35,200	71.9	120	244.3	519.3
Golden State Blvd, Manning Ave to Springfield Ave	27,929	69.9	92.6	180.7	380
Merced St, 10th St to 9th St	23,946	67.6	WR	88.5	189.8
Merced St, 9th St to 8th St	21,045	67.1	WR	81.3	174.1
Merced St, 7th St to 6th St	12,100	65.0	WR	56.2	120.4
Merced St, 6th St to 5th St	11,593	64.8	WR	54.6	117.1
SR-99, South of Merced St	139,306	84.1	660.5	1,421.4	3,061.2
SR-99, Merced St to Adams Ave	146,209	84.3	682.1	1,468	3,161.5
SR-99, Adams Ave to Clovis Ave	152,422	84.5	701.3	1,509.3	3,250.4

Traffic noise levels for area roadways were calculated based on data obtained from the traffic analysis prepared for this project. Does not include shielding provided by intervening terrain or structures.
Projected roadway traffic noise contours for SR-99 are depicted in Figure 7,8,& 9.
WR = Contour is located within road right-of-way
Source: Kittelson & Associates 2022

Table 9. Traffic Noise Levels
Existing Compared to Year 2042 with General Plan Update Buildout

Roadway Segment	CNEL at 50 ft. from Near-travel-lane Centerline			Potentially Significant?[1]
	Existing Conditions	GPU Buildout	Increase	
American Ave, SR-99 to Golden State Blvd	64.31	69.8	5.5	**Yes**
Adams Ave, SR-99 to Golden State Blvd	63.15	67.7	4.6	**Yes**
Adams Ave, Golden State Blvd to 7th St	58.56	62.85	4.3	No
Adams Ave, East of 5th St	57.61	61.14	3.5	No
Adams Ave, Armstrong Ave to Temperance Ave	57.43	59.77	2.3	No
Adams Ave, Temperance Ave to Locan Ave	56.52	59.29	2.8	No
Sumner Ave, Sunnyside Ave to Merced St	58.91	64.59	5.7	**Yes**
Manning Ave, W of 99 SB Ramps	64.52	71.53	7.0	**Yes**
Manning Ave, E of 99 NB Ramps	68.4	70.95	2.6	**Yes**
Manning Ave, E of Golden State	67.18	70.09	2.9	**Yes**
Clovis Ave, S of Lincoln Ave	68.61	72.17	3.6	**Yes**
Clovis Ave, N of SR 99 NB Ramps, S of Golden State Blvd Frontage Connector Road	68.48	72.16	3.7	**Yes**
Clovis Ave, SR 99 SB off to Adams Ave	64.58	70.11	5.5	**Yes**
Clovis Ave, Adams Ave to Summer Ave	63.95	70.38	6.4	**Yes**
Clovis Ave, Summer Ave to South	63.39	67.81	4.4	**Yes**
Clovis Ave, South Ave to Parlier Ave	63.04	66.31	3.3	**Yes**
S Fowler Ave, Merced St. to Fresno St.	64.33	68.5	4.2	**Yes**
S Fowler Ave, Fresno St. to South Ave.	63.52	68.75	5.2	**Yes**
S Fowler Ave, South Ave to Parlier Ave	63.59	70.09	6.5	**Yes**
Golden State Blvd, American Ave to Lincoln Ave	66.49	73.35	6.9	**Yes**
Golden State Blvd, Lincoln Ave to Clayton Ave	65.73	72.49	6.8	**Yes**
Golden State Blvd, Clayton Ave to Adams Ave	65.72	71.8	6.1	**Yes**
Golden State Blvd, Adams Ave to Merced St.	63.73	69.99	6.3	**Yes**
Golden State Blvd, Merced St. to South Ave	65.94	70.44	4.5	**Yes**
Golden State Blvd, South Ave to Temperance Ave	66.13	70.16	4.0	**Yes**
Golden State Blvd, Temperance Ave to Valley Dr	66.69	71.67	5.0	**Yes**
Golden State Blvd, Valley Dr of Manning Ave	66.24	71.91	5.7	**Yes**
Golden State Blvd, Manning Ave to Springfield Ave	65.91	69.85	3.9	**Yes**
Merced St, 10th St to 9th St	64.58	67.63	3.1	**Yes**
Merced St, 9th St to 8th St	64.23	67.07	2.8	No
Merced St, 7th St to 6th St	60.4	65.02	4.6	**Yes**
Merced St, 6th St to 5th St	59.83	64.84	5.0	**Yes**
SR-99, South of Merced St	82.41	84.12	1.7	**Yes**
SR-99, Merced St to Adams Ave	82.55	84.33	1.8	**Yes**
SR-99, Adams Ave to Clovis Ave	82.64	84.51	1.9	**Yes**

Traffic noise levels were calculated based on traffic volumes derived from the traffic analysis prepared for this project.

1. Significant increases are based on the following thresholds (Refer to Table 1):

- *5.0, or greater, where the existing noise level is less than 60 dBA*
- *3.0, or greater, where the existing noise level is 60-65 dBA*
- *1.5, or greater, where the existing noise level is greater than 65 dBA*

Source: Kittelson & Associates 2022

Railroad Traffic Noise

The UPRR line runs northwest southeast through the City, adjacent to Golden State Boulevard. Roughly 35 freight trains currently travel along this rail corridor on a daily basis. By year 2042, freight trains traveling along this corridor are likely to increase but no reliable projections could be found in order to analysis future conditions.

Existing train noise levels and distance to noise contours are summarized in Table 3. Based on a conservative estimate of 35 trains per day, average-daily noise levels along the railroad corridor could reach levels of approximately 79 dBA CNEL at 100 feet from the rail corridor centerline. Although the proposed GPU would not result in an increase in train traffic, the development of future land uses near the train tracks, and could be exposed to train noise levels in excess of the City's current noise standards for land use compatibility (refer to Table 5). Train noise events can also be a source of intermittent noise, including noise generated by locomotive engines, wheel squeal, and warning horns. These instantaneous noise events can contribute to increased levels of annoyance to occupants of nearby noise-sensitive land uses. As a result, exposure to railroad traffic noise levels would be considered a **potentially significant** impact.

Table 10. Future Railroad Traffic Noise Levels

Train Type	Number of Trains/Day	CNEL at 100 feet from Rail Corridor Centerline	Distance to CNEL Contours (feet) from Rail Corridor Centerline		
			70	65	60
UPRR Freight	35	79	263	468	830
UPRR freight trains distributed equally over a 24-hour period. Does not include shielding provided by intervening terrain or structures. Predicted noise contours do not include shielding by intervening structures.					

Major Surface Transportation Noise Contours

As previously noted, major surface transportation noise sources in the City of Fowler include SR 99 and the UPRR, which parallels SR 99 to the east in a general northwest to southeast direction. Vehicle traffic along Golden State Boulevard also contribute to projected noise contours along this same general corridor. Combined projected future noise contours for these surface transportation noise sources are depicted in Figures 7, 8 and 9.

Proposed General Plan Policies that Provide Mitigation

The proposed GPU includes numerous goals and policies that would help to reduce potential surface transportation noise impacts to noise-sensitive land uses. Relevant policies include policies: CH-25, CH-26, CH-27, CH-28, CH-29, CH-30, and CH-32.

Implementation of the proposed GPU policies would reduce potential transportation noise impacts. Future development projects would be required to analyze project-related noise impacts and incorporate necessary noise-reduction measures. Noise-reduction measures typically implemented to reduce traffic noise include increased insulation, setbacks, and construction of sound barriers. Additional policies have been proposed to promote alternative means of transportation and to limit heavy truck traffic to designated truck routes, which would help to reduce transportation-related noise levels along area roadways. Implementation of these policies and actions will help to reduce impacts associated with future development. The proposed GPU Noise Element does not identify noise standards applicable to transportation noise sources that are typically used for determination of land use compatibility. To further ensure the compatibility of future land uses within noise environments influenced by transportation noise sources, the following additional mitigation measure is recommended:

Proposed Mitigation Measures

MM N-1: Ensure that future development exposed to transportation noise sources complies with the City's noise standards for determination of land use compatibility. The exterior and interior noise standards identified in Table 11 are recommended.

Table 11. Maximum Allowable Noise Exposure for Transportation Noise Sources

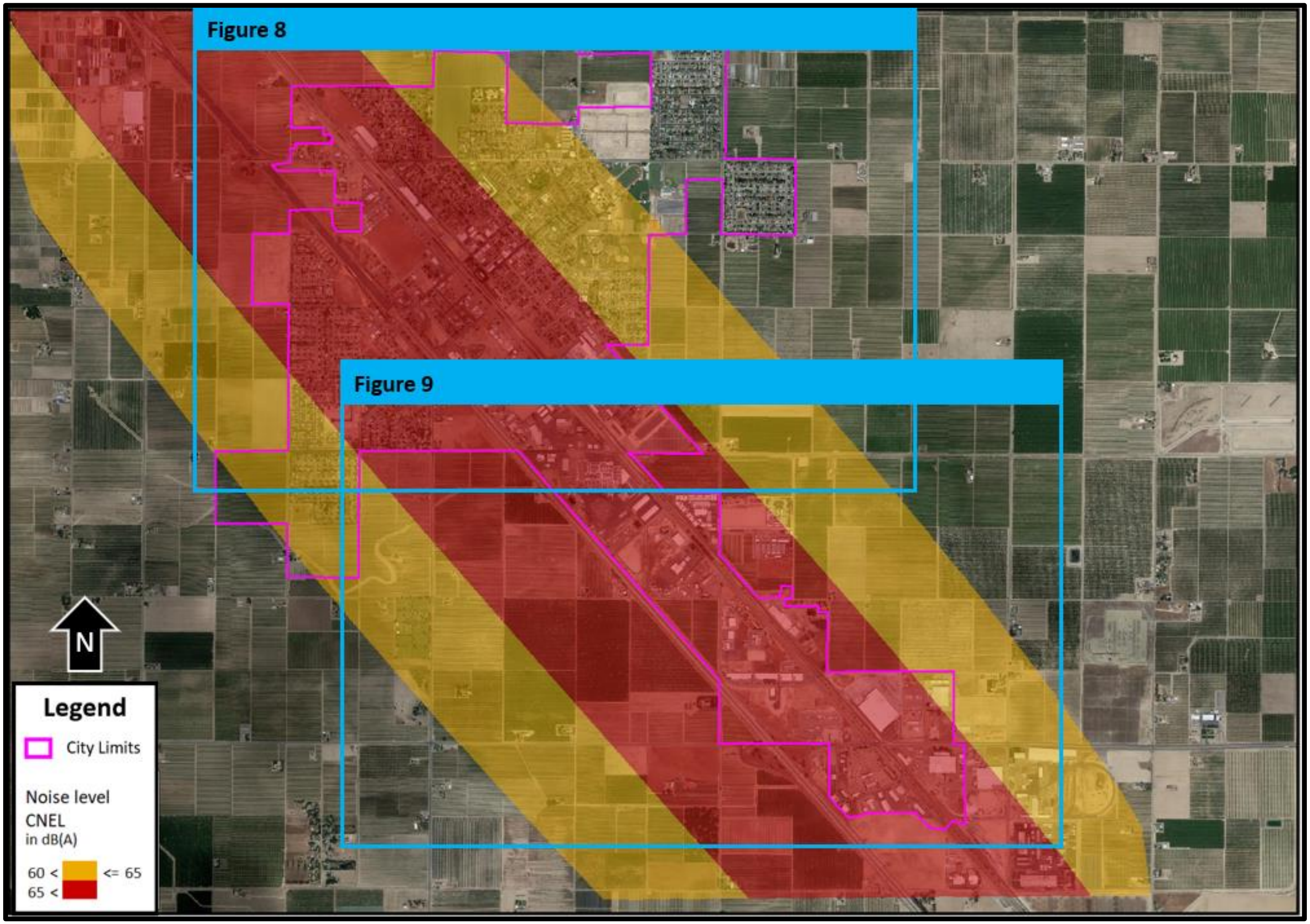
Land Use	Interior Occupied Spaces (dBA)		Outdoor Activity Areas (dBA)[1]
	CNEL	L_{eq}[6]	
Residential	45[4]		65[2,3]
Convalescent Care Facilities, Hospitals	45[4]		70[2,3]
Transient Lodging	45		65[2,3]
Schools, Libraries, Museums and Places of Worship	--	45	--
Playgrounds, Neighborhood Parks	--		70[5]
Office Buildings	--	45	70[3]
Commercial Retail & Light Industrial	--		75

1. To be applied at outdoor activity areas. Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied at the property line of the receiving land use.
2. Where it is not possible to reduce exterior noise levels to 65 dBA CNEL, or less, an exterior noise level of 70 dBA CNEL may be allowed provided that an acoustical analysis has been prepared for the project to identify available exterior noise-reduction measures to be incorporated and interior noise levels are in compliance with this table.
3. Where outdoor activity areas are not included in the project design, only the interior noise level standard shall apply.
4. In locations where railroad noise is the predominant noise source, the interior noise standard for residential land uses shall be reduced by 5 dB to account for the increased potential for sleep disruption to building occupants.
5. Where quiet is a basis for use.
6. This standard is intended to apply to land uses with operational hours predominantly during the daytime hours. The interior noise standard applies to a typical worst-case hour during the period of use.

Significance After Mitigation

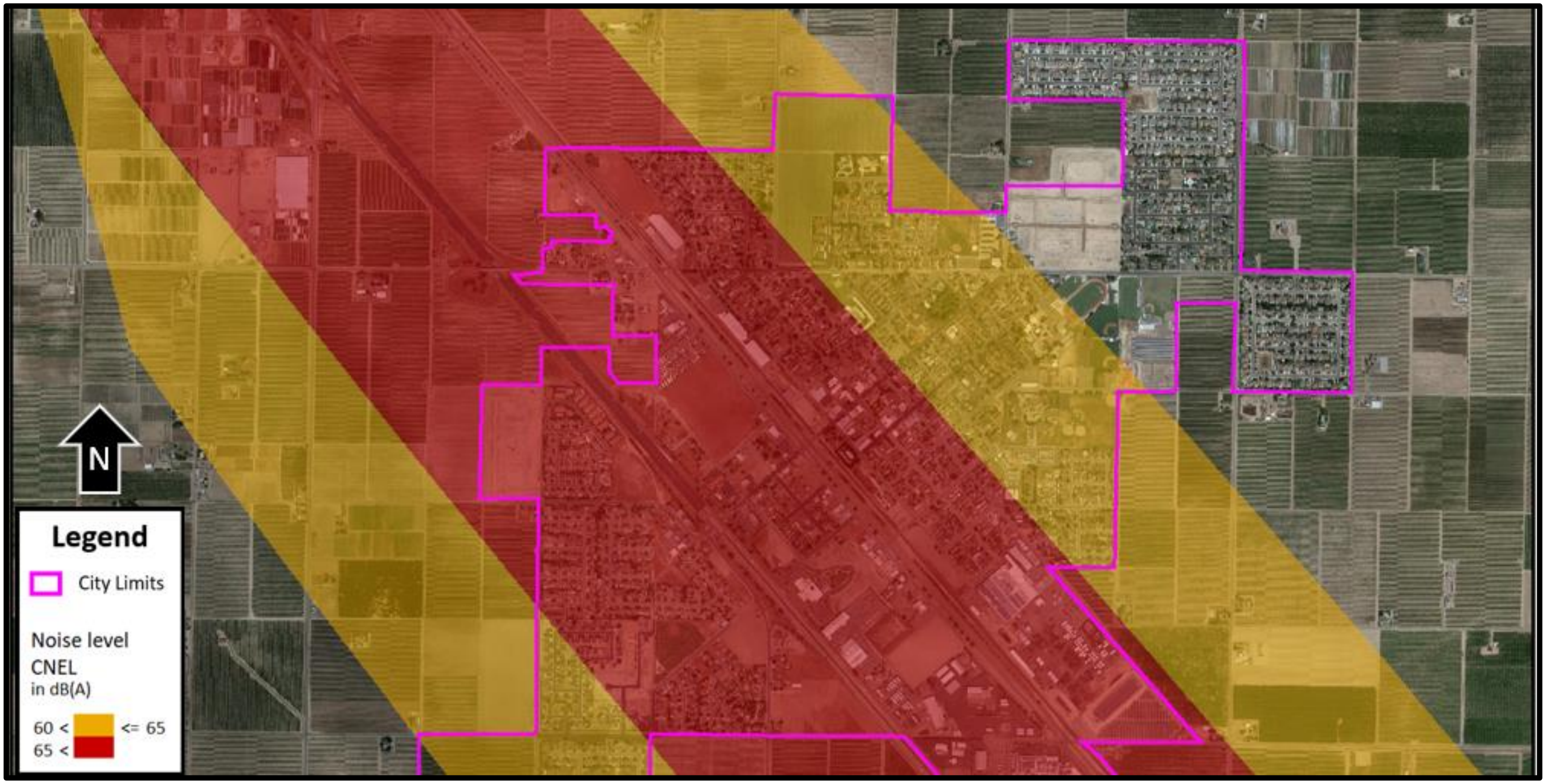
The noise standards identified in Table 11 have been adapted from the State of California General Plan Guidelines for land use compatibility (refer to Table 5). However, for some land uses with operations that are limited primarily to the daytime hours, such as schools and office buildings, the application of an average-daily noise standard may not provide adequate protection with regard to activity interference. For these land uses, an average-hourly interior noise level standard is recommended. Furthermore, in locations that are exposed to railroad noise the recommended interior noise standard should be reduced to account for the increased potential for sleep disruption commonly associated with railroad activities and related noise events. With implementation of the proposed GPU policies and the above recommended mitigation measure, this impact would be considered **less than significant**.

Figure 7. Future Noise Contours – Major Surface Transportation Noise Sources



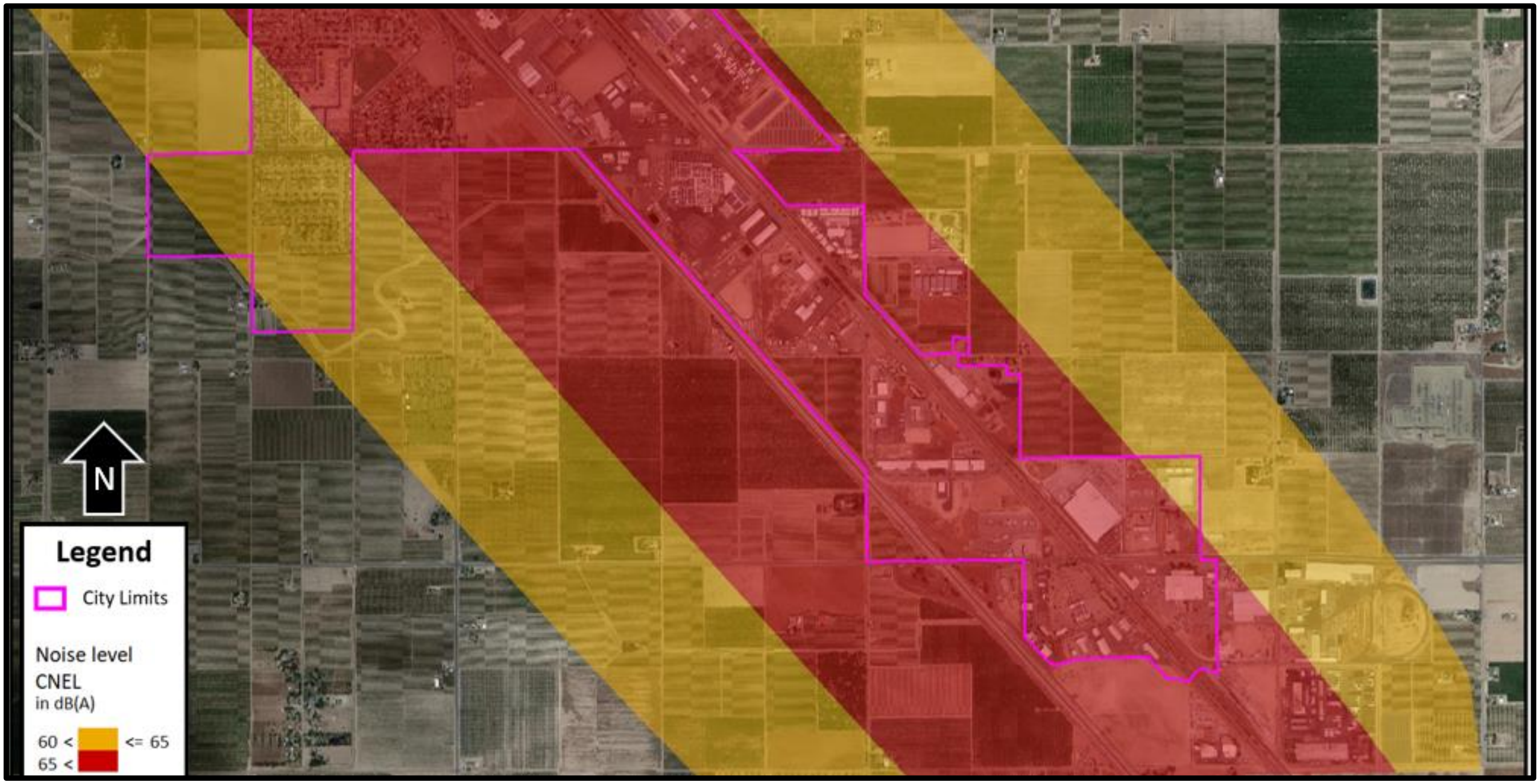
Includes State Route 99, Golden State Boulevard, and Union Pacific Railroad

Figure 8. Future Noise Contours - North Portion of the City of Fowler



Includes State Route 99, Golden State Boulevard, and Union Pacific Railroad

Figure 9. Future Noise Contours - South Portion of the City of Fowler



Includes State Route 99, Golden State Boulevard, and Union Pacific Railroad

Impact N-2: Would the General Plan result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

The effects of ground vibration can vary from no perceptible effects at the lowest levels, low rumbling sounds and detectable vibrations at moderate levels, and slight damage to nearby structures at the highest levels. At the highest levels of vibration, damage to structures is primarily architectural (e.g., loosening and cracking of plaster or stucco coatings) and rarely results in structural damage. The effects of ground vibration are influenced by the duration of the vibration and the distance from the vibration source.

Table 12. Summary of Groundborne Vibration Levels and Potential Effects

Vibration Level (in/sec ppv)	Human Reaction	Effect on Buildings
0.006-0.019	Threshold of perception; possibility of intrusion.	Vibrations unlikely to cause damage of any type.
0.08	Vibrations readily perceptible.	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected.
0.10	Level at which continuous vibrations begin to annoy people.	Virtually no risk of "architectural" damage to normal buildings.
0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations).	Threshold at which there is a risk of "architectural" damage to fragile buildings.
0.4-0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges.	Potential risk of "architectural" damage may occur at levels above 0.3 in/sec ppv for older residential structures and above 0.5 in/sec ppv for newer structures.

The vibration levels are based on peak particle velocity in the vertical direction for continuous vibration sources, which includes most construction activities.
Source: Caltrans 2020

There are no federal, state, or local regulatory standards for vibration. However, various criteria have been established to assist in the evaluation of vibration impacts. For instance, Caltrans has developed vibration criteria based on human perception and structural damage risks. For most structures, Caltrans considers a peak-particle velocity (ppv) threshold of 0.2 inches per second (in/sec) to be the level at which architectural damage (i.e., minor cracking of plaster walls and ceilings) to normal structures may occur. Below 0.10 in/sec there is "virtually no risk of 'architectural' damage to normal buildings." Damage to historic or ancient buildings could occur at levels of 0.08 in/sec ppv. In terms of human annoyance, continuous vibrations in excess of 0.1 in/sec ppv are identified by Caltrans as the minimum level perceptible level for ground vibration. Short periods of ground vibration in excess of 0.2 in/sec ppv can be expected to result in increased levels of annoyance to people within buildings (Caltrans, 2020).

Groundborne vibration sources located within the City that could potentially affect future development would be primarily associated with construction activities. With the exception of pavement breaking and pile driving, construction activities and related equipment typically generate groundborne vibration levels of less than 0.2 in/sec, which is the architectural damage risk threshold recommended by Caltrans. Based on Caltrans measurement data, use of off-road tractors, dozers, earthmovers, and haul trucks generates groundborne vibration levels of less than 0.10 in/sec, or one half of the architectural damage risk level, at 10 feet. The highest vibration level associated with a pavement breaker was 2.88 in/sec at 10 feet. During pile driving, vibration levels near the source depend mainly on the soil's penetration resistance as well as the type of pile driver used. Impact pile drivers tend to generate higher vibration levels than vibratory or drilled piles. Groundborne vibration levels of pile drivers can range from approximately 0.17 to 1.5 in/sec ppv. Caltrans indicates that the distance to the 0.2 in/sec ppv criterion for pile driving activities would occur at a distance of approximately 50 feet. However, as with construction-generated noise levels, pile driving can result in a high potential for human annoyance from vibrations, and pile-driving activities are typically considered as potentially significant if these activities are performed within 200 feet of occupied structures (Caltrans, 2020). As a result, short-term exposure to vibration levels would be considered a **potentially significant impact**.

Proposed General Plan Policies that Provide Mitigation

The proposed GPU includes numerous goals and policies that would help to further reduce short-term noise and vibration impacts to nearby sensitive land uses. Relevant policies include policies: CH-33, CH-34, CH-35, and CH-36.

Due to the short-term nature of construction vibrations, the intermittent frequency of construction vibrations, and the required compliance with the City's hourly restrictions related to construction activities, construction vibration level increases will not result in exposure of persons to or generation of excessive groundborne vibration that would result in a significant increase in annoyance. By restricting the hours of construction to avoid vibrations during times when it could potentially be more of a nuisance, the impact of new construction vibration is reduced to a **less-than-significant** level through the application of the GPU's mitigating policies. In addition, individual development projects will be subject to site-specific environmental review, which will necessitate identification of site-specific mitigation in the event that significant impacts are identified.

Mitigation Measures

None required.

Impact N-3:	***Would the General Plan expose people residing or working in the project area to excessive noise levels for a project located within an airport land use plan area or, where such a plan has not been adopted, or within two miles of a public airport or a public use airport?***

The nearest active airport to the City of Fowler is the Selma Airport, located about 1.5 miles to the south. The City of Fowler is not located within the Selma Airport planning area or the projected noise contours of this airport (County of Fresno 1983). As a result, implementation of the 2042 GPU would not subject residents or workers to excessive noise levels. As a result, impacts from air travel would be considered **less than significant**.

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APPENDIX A

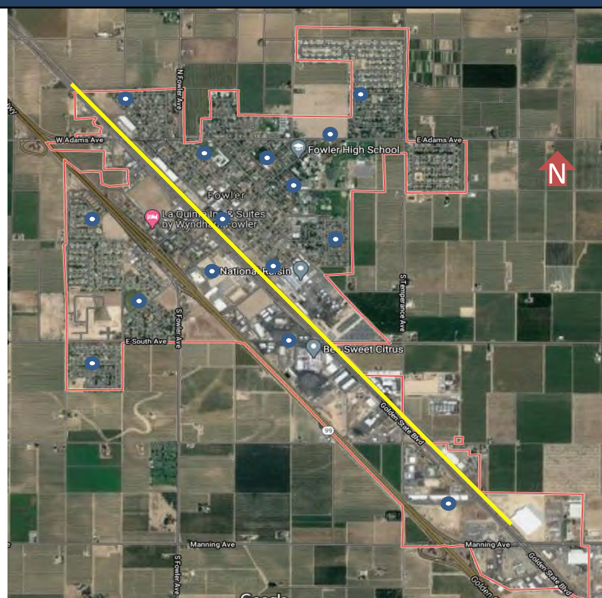
Transportation Noise Modeling

NOISE MEASUREMENT SURVEY FORM

SHEET 1 OF 4

DATE:	3/24/2021
PROJECT:	Fowler GP
LOCATION:	Fowler, CA
MONITORING STAFF:	**Jon Pambakian**

LOCATION MAP: *(Include a map of noise measurement locations AND photographs for measurement locations on attached worksheet. Include additional sheets as necessary. Where possible include GPS coordinates.)*



NOISE MEASUREMENT CONDITIONS & EQUIPMENT

MET CONDITIONS & MONITORING EQUIPMENT:	TEMP: 50 - 61 F. | HUMIDITY: 46 - 78% | WIND SPEED: 6 MPH | WIND DIR: NW | GROUND: Dry			
	CLOUD COVER BY CLASS (OC=OVERCAST):	3	(1. HEAVY OC, 2. LIGHT OC, 3. SUNNY, 4. CLEAR NIGHT, 5. OC NIGHT)	
	MET. METER:	Kestrel 5500		
NOISE MONITORING EQUIPMENT:	LARSON DAVIS SLM MODEL:	LxT	S/N:	5741
	MICROPHONE:		S/N:	
	CALIBRATOR:	CAL200	S/N:	2744
NOISE MONITORING SETUP:	WITHIN 10 FT OF REFLECTIVE SURFACE?:	NO	MICROPHONE HEIGHT AGL (FT):	5
CALIBRATED PRIOR TO AND UPON COMPLETION OF MEASUREMENTS:			METER SETTINGS:	A-WHT | SLOW

NOISE & TRAFFIC MEASUREMENTS

MEASUREMENT LOCATION	DATE/TIME	DURATION (Minutes)	MEASUREMENT LOCATION	PRIMARY NOISE SOURCES NOTED	MEASURED NOISE LEVELS LEQ	LMIN	LMAX	
ST1	9:53 - 10:03	10	355 N. Jonna Ave.	Birds	47.6			
ST2	10:08 - 10:18	10	800 block E. Adams Ave.	traffic, reverse beeps	62.5			
ST3	10:27 - 10:37	10	Panzak Park	traffic, birds	52.3			
ST4	10:43 - 10:53	10	229 S. 3rd St.	traffic, birds, bus idle	54			
ST5	11:00 - 11:10	10	1540 E. Sumner Ave.	birds, dod	48.4			
ST6	11:16 - 11:26	10	519 S. 7th St.	birds, industrial fans	54.3			
ST7	11: 34 - 11:44	10	106 E. Main St.	traffic	54.7			
ST8	11:50 - 12:00	10	314 N. 5th St.	birds	49.9			
ST9	12:06 - 12:16	10	81 Carter Ave.	birds	47.9			
ST10	12:56 - 13:06	10	Valley Childrens Park	traffic	55.5			
ST11	13:14 - 13:24	10	1362 E. South Ave	industrial fans, speaker	60.8			
ST12	13:45 - 13:55	10	E. Valley Dr./Felix	traffic, forklift	54.8			
ST13	14:06 - 14:16	10	1122 W. Jameson Ave.	traffic, birds	58.9			
ST14	14:31 - 14:41	10	Donny Wright Park	traffic, birds, train horn, people	59.7			
ST15	14:51 - 15:01	10	Sandy Ave./Clara Ct.		48.0			

TRAFFIC COUNTS LOCATION	DATE/TIME	DURATION (Minutes)	TRAFFIC DIRECTION/ LANE ASSIGNMENT	VEHICLE CLASSIFICATION LDV	MDV	HDV	BUS	AVG. VEHICLE SPEEDS

VEHICLE COUNTS:	■	MANUALLY	☐	VIDEO
VEHICLE SPEEDS:	■	IN TRAFFIC	☐	RADAR

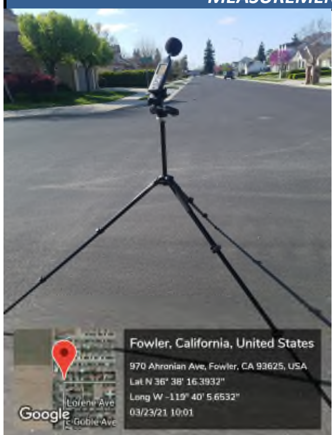
NOISE MEASUREMENT SURVEY FORM

SHEET	2	OF	4

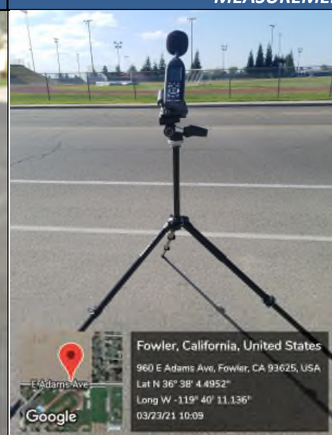
DATE:	
PROJECT:	
LOCATION:	
MONITORING STAFF:	

SITE PHOTO(S): (Refer to data sheets for noise measurement locations)

MEASUREMENT LOCATION 1

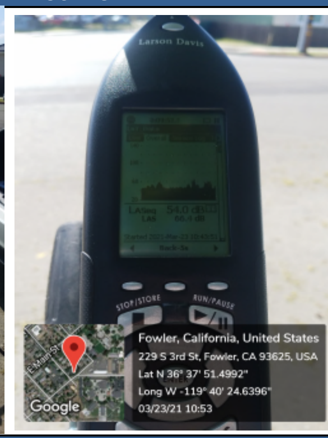


MEASUREMENT LOCATION 2

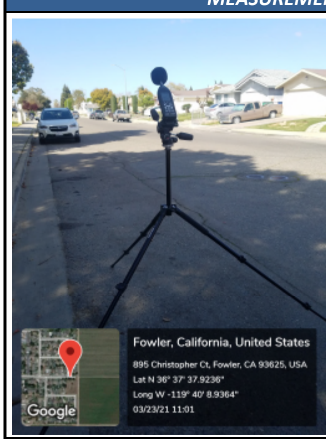


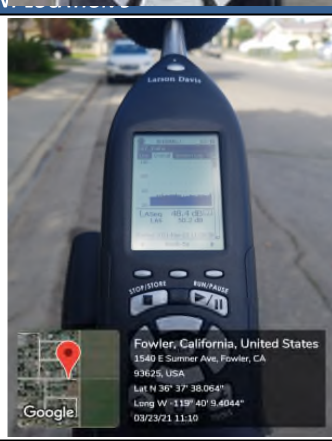
MEASUREMENT LOCATION 3

MEASUREMENT LOCATION 4



MEASUREMEN





MEASUREMENT LOCATION 6

AMBIENT
AIR QUALITY & NOISE CONSULTING

NOISE MEASUREMENT SURVEY FORM

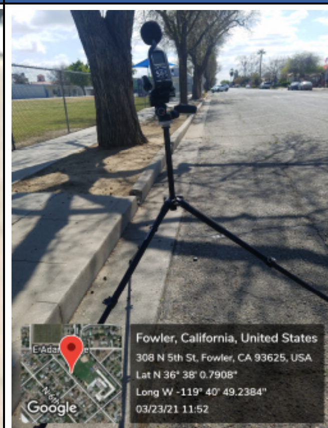
	SHEET	***3***	***OF***	***4***

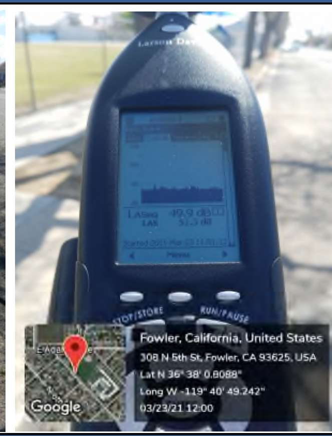
DATE:	
PROJECT:	
LOCATION:	
MONITORING STAFF:	

SITE PHOTO(S): (Refer to data sheets for noise measurement locations)

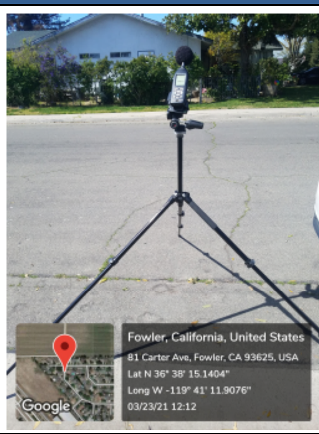
MEASUREMENT LOCATION 7

MEASUREMENT LOCATION 8

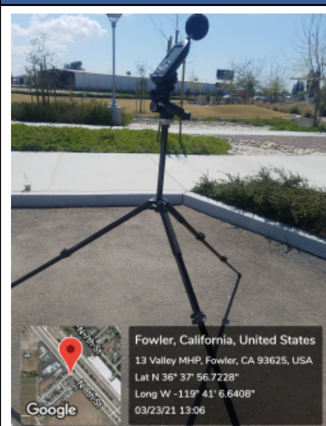




MEASUREMENT LOCATION 9

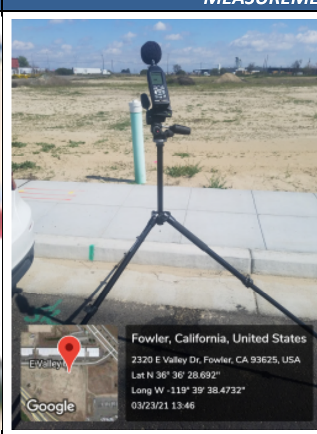


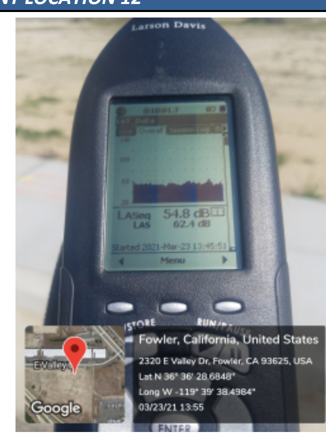
MEASUREMENT LOCATION 10



MEASUREMENT LOCATION 11

MEASUREMENT LOCATION 12





NOISE MEASUREMENT SURVEY FORM

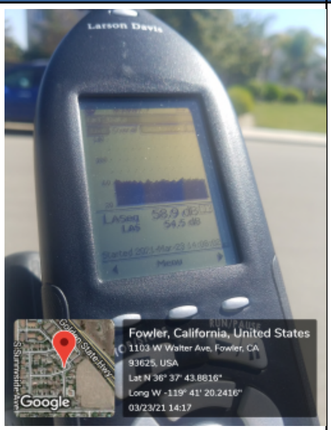
AMBIENT AIR QUALITY & NOISE CONSULTING

SHEET	4	OF	4

DATE:	
PROJECT:	
LOCATION:	
MONITORING STAFF:	

SITE PHOTO(S): (Refer to data sheets for noise measurement locations)

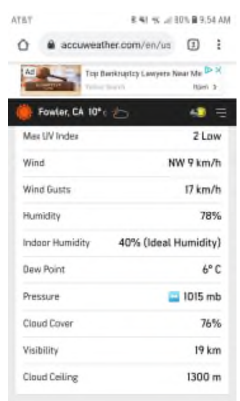
MEASUREMENT LOCATION 13

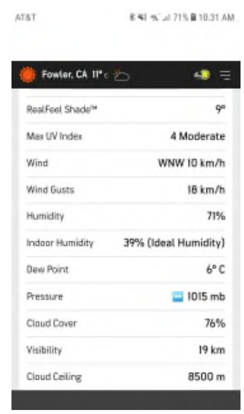


MEASUREMENT LOCATION 14

MEASUREMENT LOCATION 15

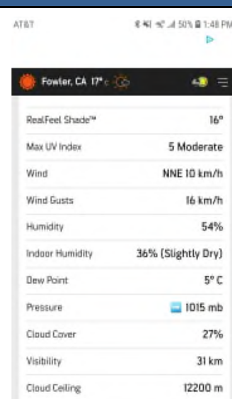
Met Data





Met Data

Met Data



2019								
Road Segment	ADT Volumes	Speed	AHW	CNEL at 50ft. From Near travel-lane Centerline	CNEL Contour 70	CNEL Contour 65	CNEL Contour 60	CNEL Contour 55
American Ave,SR-99 to Golden State Blvd	4238	50	6	64.3	0	50.4	108	232.2
Adams Ave,SR-99 to Golden State Blvd	4539	40	9	63.2	0	0	95	203.9
Adams Ave,Golden State Blvd to 7th St	4247	30	9	58.6	0	0	0	101.1
Adams Ave,East of 5th St	3412	30	9	57.6	0	0	0	87.5
Adams Ave,Armstrong Ave to Temperance Ave	3667	30	14.5	57.4	0	0	0	92.4
Adams Ave,Temperance Ave to Locan Ave	2685	30	9.5	56.5	0	0	0	74.8
Sumner Ave,Sunnyside Ave to Merced St	3108	35	8	58.9	0	0	0	105
Manning Ave,W of 99 SB Ramps	5802	45	6	64.5	0	52.1	111.5	240
Manning Ave,E of 99 NB Ramps	21738	45	29.5	68.4	64.9	127.9	269.6	578
Manning Ave,E of Golden State	16414	45	29.5	67.2	0	107.3	224.2	479.7
Clovis Ave,S of Lincoln Ave	15876	50	23	68.6	60.5	122.6	260.5	559.4
Clovis Ave,N of SR 99 NB Ramps, S of GS Fronta	16736	50	28.5	68.5	64.5	127.9	270.1	579.3
Clovis Ave,SR 99 SB off to Adams Ave	4513	50	6	64.6	0	52.5	112.6	242.6
Clovis Ave,Adams Ave to Summer Ave	3904	50	6	64.0	0	0	102.2	219.9
Clovis Ave,Summer Ave to South	3428	50	6	63.4	0	0	93.8	201.7
Clovis Ave,South Ave to Parlier Ave	3163	50	6	63.0	0	0	88.9	191.2
S Fowler Ave,Merced St. to Fresno St.	7448	40	6	64.3	0	50.6	108.4	233.2
S Fowler Ave,Fresno St. to South Ave.	4607	45	6	63.5	0	0	95.7	205.9
S Fowler Ave,South Ave to Parlier Ave	3596	50	6	63.6	0	0	96.8	208.2
Golden State Blvd,American Ave to Lincoln Ave	6584	65	44.25	66.5	0	113.6	229.6	113.6
Golden State Blvd,Lincoln Ave to Clayton Ave	5525	65	44.25	65.7	0	103.1	205.3	434.1
Golden State Blvd,Clayton Ave to Adams Ave	5509	65	44.25	65.7	0	102.9	204.9	433.2
Golden State Blvd,Adams Ave to Merced St.	6084	50	40.25	63.7	0	75.2	142.5	297.2
Golden State Blvd,Merced St. to South Ave	8524	55	40.25	65.9	0	101.7	205.1	435.1
Golden State Blvd,South Ave to Temperance Av	8846	55	39.75	66.1	0	103.7	210	445.9
Golden State Blvd,Temperance Ave to Valley Dr	10058	55	39.75	66.7	0	111.6	228.1	485.5
Golden State Blvd,Valley Dr of Manning Ave	9065	55	39.75	66.2	0	105.1	213.3	453.2
Golden State Blvd,Manning Ave to Springfield A	10722	50	39.75	65.9	0	100.8	203.4	431.5
SR-99,South of Merced	94000	65	32	82.4	508.6	1093.7	2355.1	5072.6
SR-99,Merced St to Adams Ave	97000	65	32	82.6	519.3	1116.9	2405	5179.9
SR-99,Adams Ave to Clovis Ave	99000	65	32	82.6	526.4	1132.2	2437.9	5250.9

2042							
Road Segment	ADT Volumes	Speed	AHW	CNEL at 50ft. From Near travel-lane Centerline	CNEL Contour 70	CNEL Contour 65	CNEL Contour 60
American Ave,SR-99 to Golden State Blvd	15022	50	6	69.8	54.3	116.5	250.6
Adams Ave,SR-99 to Golden State Blvd	17352	40	9	67.7	0	88.7	190.4
Adams Ave,Golden State Blvd to 7th St	11407	30	9	62.9	0	0	90.8
Adams Ave,East of 5th St	7694	30	9	61.1	0	0	70
Adams Ave,Armstrong Ave to Temperance Ave	6277	30	14.5	59.8	0	0	62.3
Adams Ave,Temperance Ave to Locan Ave	5079	30	9.5	59.3	0	0	53.5
Sumner Ave,Sunnyside Ave to Merced St	11485	35	8	64.6	0	54.5	116.4
Manning Ave,W of 99 SB Ramps	29134	45	6	71.5	70.6	151.7	326.6
Manning Ave,E of 99 NB Ramps	39103	45	29.5	71.0	90.4	186.4	397.5
Manning Ave,E of Golden State	32092	45	29.5	70.1	80.5	164	348.7
Clovis Ave,S of Lincoln Ave	36041	50	23	72.2	99.3	209.3	448.8
Clovis Ave,N of SR 99 NB Ramps, S of GS Frontage Connector	39075	50	28.5	72.2	105.8	221.3	473.6
Clovis Ave,SR 99 SB off to Adams Ave	16123	50	6	70.1	56.9	122.1	262.7
Clovis Ave,Adams Ave to Summer Ave	17174	50	6	70.4	59.3	127.3	274
Clovis Ave,Summer Ave to South	9493	50	6	67.8	0	85.9	184.6
Clovis Ave,South Ave to Parlier Ave	6719	50	6	66.3	0	68.3	146.7
S Fowler Ave,Merced St. to Fresno St.	19438	40	6	68.5	0	95.4	205.3
S Fowler Ave,Fresno St. to South Ave.	15352	45	6	68.8	0	99.1	213.2
S Fowler Ave,South Ave to Parlier Ave	16055	50	6	70.1	56.8	121.7	261.9
Golden State Blvd,American Ave to Lincoln Ave	31974	65	44.25	73.4	146.1	303.2	647.5
Golden State Blvd,Lincoln Ave to Clayton Ave	26225	65	44.25	72.5	129.8	266.5	567.8
Golden State Blvd,Clayton Ave to Adams Ave	22354	65	44.25	71.8	118.3	240.4	510.8
Golden State Blvd,Adams Ave to Merced St.	28845	50	40.25	70.0	94.2	184.4	388.2
Golden State Blvd,Merced St. to South Ave	25114	55	40.25	70.4	99.4	196.8	415.5
Golden State Blvd,South Ave to Temperance Ave	23504	55	39.75	70.2	96	188.8	397.8
Golden State Blvd,Temperance Ave to Valley Dr	33283	55	39.75	71.7	116.2	235.6	500.4
Golden State Blvd,Valley Dr of Manning Ave	35200	55	39.75	71.9	120	244.3	519.3
Golden State Blvd,Manning Ave to Springfield Ave	27929	50	39.75	69.9	92.6	180.7	380
SR-99,South of Merced	139,306	65	32	84.1	660.5	1421.4	3061.2
SR-99,Merced St to Adams Ave	146,209	65	32	84.3	682.1	1468	3161.5
SR-99,Adams Ave to Clovis Ave	152,422	65	32	84.5	701.3	1509.3	3250.4