13. NOISE AND VIBRATION

This chapter describes the existing noise and vibration conditions in the General Plan Planning Area.

13.1 ENVIRONMENTAL SETTING

13.1.1 GLOSSARY

The following are brief definitions of terminology used in this section:

- **Sound.** A disturbance created by a vibrating object, which when transmitted by pressure waves through a medium such as air, is capable of being detected by the human ear or a microphone.
- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- **Decibel (dB).** A measure of sound on a logarithmic scale.
- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- **Equivalent Continuous Noise Level (L_{eq}).** The mean of the noise level, energy averaged over the measurement period.
- **L_{max}.** The maximum root-mean-square noise level during a measurement period.
- **Statistical Sound Level (L_n).** The sound level that is exceeded "n" percent of time during a given sample period. For example, the L_{50} level is the statistical indicator of the time-varying noise signal that is exceeded 50 percent of the time (during each sampling period). This is also called the "median sound level." The L_{10} level, likewise, is the value that is exceeded 10 percent of the time (i.e., near the maximum) and this is often known as the "intrusive sound level." The L_{90} is the sound level exceeded 90 percent of the time and is often considered the "effective background level" or "residual noise level."
- **Day-Night Sound Level (L_{dn} or DNL).** The energy-average of the A-weighted sound levels occurring during a 24-hour period, with 10 dBA added to the sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
- **Community Noise Equivalent Level (CNEL).** The energy-average of the A-weighted sound levels occurring during a 24-hour period, with 5 dBA added to the levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dBA added to the sound levels occurring during the period from 10:00 p.m. to 7:00 a.m. Note: For general community/environmental noise, CNEL and L_{dn} values rarely differ by more than 1 dBA. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent/interchangeable.
- **Peak Particle Velocity (PPV).** The peak rate of speed at which soil particles move (e.g., inches per second) due to ground vibration.

13.1.2 SOUND FUNDAMENTALS

Sound is a pressure wave transmitted through the air. It is described in terms of loudness or amplitude (measured in decibels), frequency or pitch (measured in Hertz [Hz] or cycles per second), and duration (measured in seconds or minutes). The standard unit of measurement of the loudness of sound is the decibel (dB). Changes of 1 to 3 dBA are detectable under quiet, controlled conditions and changes of less than 1 dBA are usually indiscernible. A 3-dBA change in noise levels is considered the minimum change that is detectable with human hearing in outside environments. A change of 5 dBA is readily discernable to most people in an exterior environment whereas a 10-dBA change is perceived as a doubling (or halving) of the sound.

The human ear is not equally sensitive to all frequencies. Sound waves below 16 Hz are not heard at all and are "felt" more as a vibration. Similarly, while people with extremely sensitive hearing can hear sounds as high as 20,000 Hz, most people cannot hear above 15,000 Hz. In all cases, hearing acuity falls off rapidly above about 10,000 Hz and below about 200 Hz. Since the human ear is not equally sensitive to sound at all frequencies, a special frequency dependent rating scale is usually used to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by weighting frequencies in a manner approximating the sensitivity of the human ear.

Noise is defined as unwanted sound and is known to have several adverse effects on people, including hearing loss, speech and sleep interference, physiological responses, and annoyance. Based on these known adverse effects, the federal government, the State of California, and many local governments have established criteria to protect public health and safety and to prevent disruption of certain human activities.

13.1.2.1 Sound Measurement

Sound pressure is measured through the A-weighted measure to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies.

Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. On a logarithmic scale, an increase of 10 dBA is 10 times more intense than 1 dBA, while 20 dBA is 100 times more intense, and 30 dBA is 1,000 times more intense. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud).

Sound levels are generated from a source and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. This phenomenon is known as "spreading loss." For a single point source, sound levels decrease by approximately 6 dBA for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by on-site operations from stationary equipment or activity at a project site. If noise is produced by a line source, such as highway traffic, the sound decreases by 3 dBA for each doubling of distance in a hard site

environment. Line source noise in a relatively flat environment with absorptive vegetation decreases by 4.5 dBA for each doubling of distance.

Time variation in noise exposure is typically expressed in terms of a steady-state energy level equal to the energy content of the time varying period (called Leq), or alternately, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. For example, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time. Half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour. Similarly, the L_2, L_8 and L_{25} values represent the noise levels that are exceeded 2, 8, and 25 percent of the time, or 1, 5, and 15 minutes per hour. These "L_n" values are typically used to demonstrate compliance for stationary noise sources with a city's noise ordinance, as discussed below.

13.1.2.2 Psychological and 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 our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, and thereby affecting blood pressure, functions of the heart and the nervous system. In comparison, extended periods of noise exposure above 90 dBA could result in permanent hearing 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. Table 13-1 shows typical noise levels from familiar noise sources.

TABLE 13-1 TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Onset of physical discomfort	120+	
	110	Rock Band (near amplification system)
Jet Flyover at 1,000 feet		
	100	
Gas Lawn Mower at three feet		
	90	
Diesel Truck at 50 feet, at 50 mph		Food Blender at 3 feet
	80	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime		
	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal speech at 3 feet
Heavy Traffic at 300 feet	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (background)
Quiet Suburban Nighttime		
	30	Library
Quiet Rural Nighttime		Bedroom at Night, Concert Hall (background)
	20	
		Broadcast/Recording Studio
	10	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Source: Caltrans 2013. *Technical Noise Supplement ("TeNS").*

13.1.3 VIBRATION FUNDAMENTALS

Vibration is an oscillating motion. Like noise, vibration is transmitted in waves, but in this case through earth or solid objects. Unlike noise, vibration is typically felt rather than heard.

Vibration can be either natural as in the form of earthquakes, volcanic eruptions, landslides, or man-made as from explosions, heavy machinery or trains. Both natural and man-made vibration may be continuous such as from operating machinery, or impulsive as from an explosion.

As with noise, vibration can be described by both its amplitude and frequency. Amplitude may be characterized in three ways including displacement, velocity, and acceleration. Particle displacement is a measure of the distance that a vibrated particle travels from its original position. For the purposes of soil displacement is typically measured in inches or millimeters. Particle velocity is the rate of speed at which soil particles move in inches per second or millimeters per second. Particle acceleration is the rate of change in velocity with respect to time and is measured in inches per second or millimeters per second. Typically, particle velocity (measured in inches or millimeters per second) and/or acceleration (measured

in gravities) are used to describe vibration. Table 13-2 presents the human reaction to various levels of peak particle velocity.

TABLE 13-2 HUMAN REACTION TO TYPICAL VIBRATION LEVELS

Vibration Level Peak Particle Velocity (in/sec)	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 vibration to which ruins and ancient monuments should be subjected
0.10	Level at which continuous vibration begins to annoy people	Virtually no risk of "architectural" (i.e., not structural) damage to normal buildings
0.20	Vibrations annoying to people in buildings	Threshold at which there is a risk to "architectural" damage to normal dwelling – houses with plastered walls and ceilings
0.4–0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage

Source: Caltrans 2013. *Transportation and Construction Vibration Guidance Manual*.

Vibrations also vary in frequency and this affects perception. Typical construction vibrations fall in the 10 to 30 Hz range and usually occur around 15 Hz. Traffic vibrations exhibit a similar range of frequencies; however, due to their suspension systems, buses often generate frequencies around 3 Hz at high vehicle speeds. It is less common, but possible, to measure traffic frequencies above 30 Hz.

The way in which vibration is transmitted through the earth is called propagation. As vibration waves propagate from a source, the energy is spread over an ever-increasing area such that the energy level striking a given point is reduced with the distance from the energy source. This geometric spreading loss is inversely proportional to the square of the distance. Wave energy is also reduced with distance as a result of material damping in the form of internal friction, soil layering, and void spaces. The amount of attenuation provided by material damping varies with soil type and condition as well as the frequency of the wave.

13.1.4 REGULATORY FRAMEWORK

13.1.4.1 Federal Regulations

Federal Highway Administration

Proposed federal or federal-aid highway construction projects at a new location, or the physical alteration of an existing highway that significantly changes either the horizontal or vertical alignment, or increases the number of through-traffic lanes, requires an assessment of noise and consideration of noise abatement pursuant to 23 Code of Federal Regulations Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise." The Federal Highway Administration (FHWA) has adopted noise abatement criteria (NAC) for sensitive receivers such as picnic areas, recreation areas, playgrounds, active

sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals when "worst-hour" noise levels approach or exceed 67 dBA L_{eq}. The California Department of Transportation (Caltrans) has further defined approaching the NAC to be 1 dBA below the NAC for noise sensitive receivers identified as Category B activity areas (e.g., 66 dBA L_{eq} is considered approaching the NAC).[1]

United States Environmental Protection Agency

In addition to FHWA standards, the United States Environmental Protection Agency (USEPA) has identified the relationship between noise levels and human response. The USEPA has determined that over a 24-hour period, a L_{eq} of 70 dBA will result in some hearing loss. Interference with activity and annoyance will not occur if exterior levels are maintained at a L_{eq} of 55 dBA and interior levels at or below 45 dBA. While these levels are relevant for planning and design and useful for informational purposes, they are not land use planning criteria because they do not consider economic cost, technical feasibility, or the needs of the community.

The USEPA has set 55 dBA L_{dn} as the basic goal for exterior residential noise intrusion. However, other federal agencies, in consideration of their own program requirements and goals, as well as difficulty of actually achieving a goal of 55 dBA L_{dn}, have settled on the 65 dBA L_{dn} level as their standard. At 65 dBA L_{dn}, activity interference is kept to a minimum, and annoyance levels are still low. It is also a level that can realistically be achieved.

Occupational Health and Safety Administration

The federal government regulates occupational noise exposure common in the workplace through the Occupational Health and Safety Administration (OSHA) under the USEPA. Such limitations would apply to the operation of construction equipment and could also apply to any proposed industrial land uses. Noise exposure of this type is dependent on work conditions and is addressed through a facility's Health and Safety Plan, as required under OSHA, and is therefore not addressed further in this analysis.

United States Department of Housing and Urban Development

The US Department of Housing and Urban Development (HUD) has set a goal of 65 dBA L_{dn} as a desirable maximum exterior standard for residential units developed under HUD funding. (This level is also generally accepted within the State of California.) While HUD does not specify acceptable interior noise levels, standard construction of residential dwellings typically provides in excess of 20 dBA of attenuation with the windows closed. Based on this premise, the interior L_{dn} should not exceed 45 dBA.

Aircraft Noise Standards

The Federal Aviation Administration (FAA) Advisory Circular Number 150 5020 2, entitled "Noise Assessment Guidelines for New Helicopters" recommends the use of a cumulative noise measure, the 24-hour equivalent sound level [$L_{eq}(24)$], so that the relative contributions of the heliport and other sound sources within the community may be compared. The $L_{eq}(24)$ is similar to the L_{dn} used in assessing the

[1] Caltrans Division of Environmental Analysis, 2020, *Traffic Noise Analysis Protocol.*

impacts of fixed wing aircraft. The helicopter $L_{eq}(24)$ values are obtained by logarithmically adding the single-event level (SEL) values over a 24-hour period.

Public Law 96 193 also directs the FAA to identify land uses which are "normally compatible" with various levels of noise from aircraft operations. Because of the size and complexity of many major hub airports and their operations, Federal Aviation Regulation (FAR) Part 150 identifies a large number of land uses and their attendant noise levels. These recommended noise levels are included in Table 13-3.

TABLE 13-3 NORMALLY COMPATIBLE COMMUNITY SOUND LEVELS

Type of Area	$L_{eq}(24)$
Residential	
Suburban	57
Urban	67
City	72
Commercial	72
Industrial	77

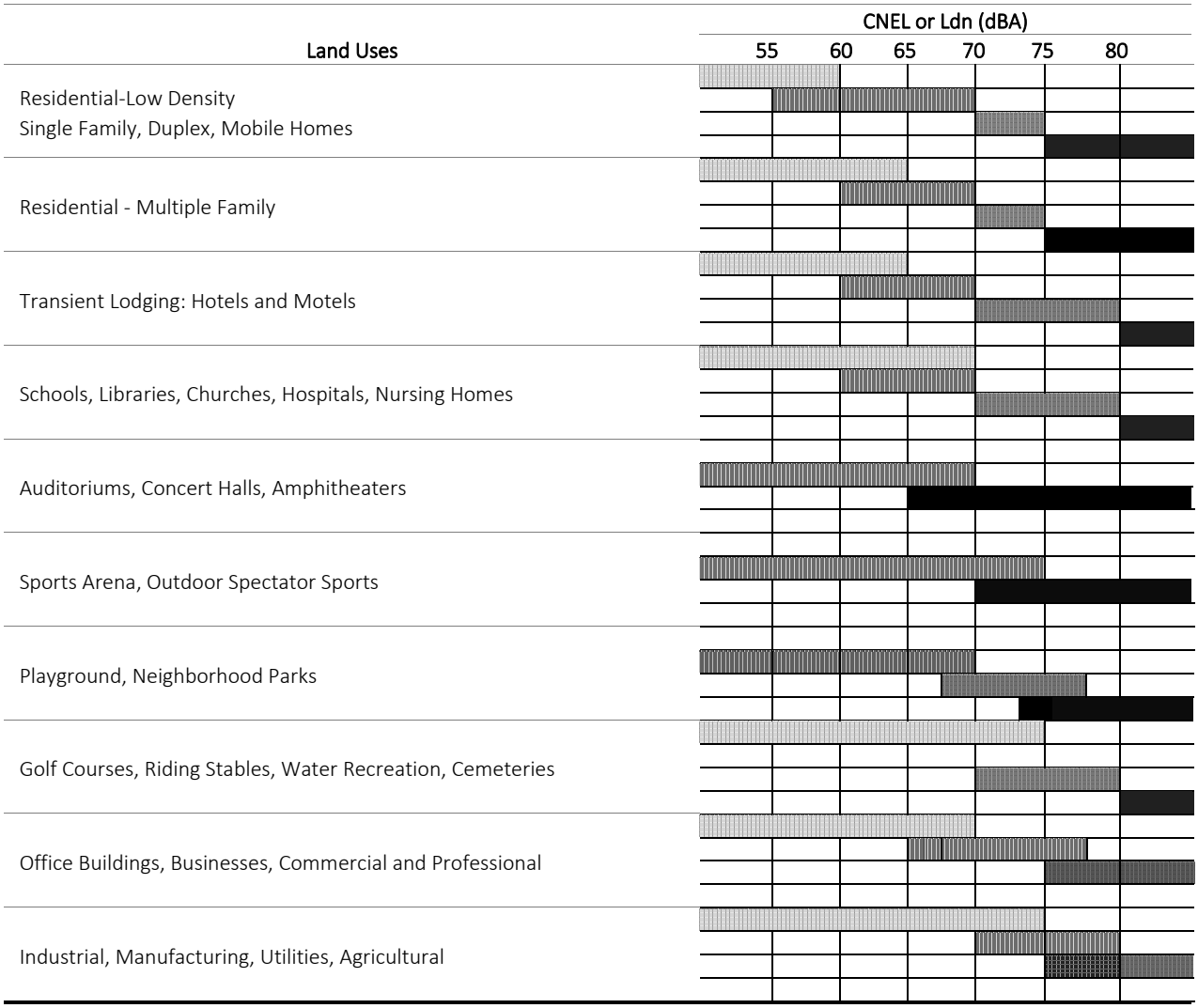
Notes: The L_{eq} is the Equivalent Continuous Noise Level, which describes sound levels that vary over time, resulting in a single decibel value that takes into account the total sound energy over the period of time of interest.
Source: Federal Aviation Administration (FAA) Advisory Circular Number 150 5020 2, 1983.

13.1.4.2 State Regulations

General Plan Guidelines

The State of California, through its General Plan Guidelines, discusses how ambient noise should influence land use and development decisions and includes a table of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable uses at different noise levels, expressed in CNEL. A conditionally acceptable designation implies new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements for each land use and needed noise insulation features are incorporated in the design. By comparison, a normally acceptable designation indicates that standard construction can occur with no special noise reduction requirements. The general plan guidelines provide cities with recommended community noise and land use compatibility standards that can be adopted or modified at the local level based on conditions and types of land uses specific to that jurisdiction. The City of Hollister has not adopted its own noise and land use compatibility guidelines. Therefore, the State of California's guidelines are used (Table 13-4).

TABLE 13-4 STATE COMMUNITY NOISE AND LAND USE COMPATIBILITY



Explanatory Notes

Normally Acceptable:
Specified land use is satisfactory, based on the assumption that any buildings are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable:
New construction or development should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features included in design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

Normally Unacceptable:
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in design.

Clearly Unacceptable:
New construction or development should generally not be undertaken.

Source: Governor's Office of Planning and Research. 2017. *State of California General Plan 2017 Guidelines*, Appendix D

California Building Code

The California Building Code (CBC), Title 24, Part 2, Volume 1, Chapter 12, Interior Environment, Section 1207.11.2, Allowable Interior Noise Levels, requires that interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric is evaluated as either the L_{dn} or the CNEL, consistent with the noise element of the local general plan.

California Building Code: CALGreen

The State of California's noise insulation standards are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 11, California Green Building Standards Code (CALGreen). CALGreen noise standards are applied to new or renovation construction projects in California to control interior noise levels resulting from exterior noise sources. Proposed projects may use either the prescriptive method (Section 5.507.4.1) or the performance method (5.507.4.2) to show compliance. Under the prescriptive method, a project must demonstrate transmission loss ratings for the wall and roof-ceiling assemblies and exterior windows when located within a noise environment of 65 dBA CNEL or higher. Under the performance method, a project must demonstrate that interior noise levels do not exceed 50 dBA $L_{eq(1hr)}$.

Airport Noise Standards

California Code of Regulations Title 21, Subchapter 6, Airport Noise Standards, establishes 65 dBA CNEL as the acceptable level of aircraft noise for persons living in the vicinity of airports. Noise-sensitive land uses in locations where the aircraft exterior noise level exceeds 65 dBA CNEL are generally incompatible, unless an aviation easement for aircraft noise has been acquired by the airport proprietor, or the residence is a high-rise apartment or condominium that has an interior CNEL of 45 dBA or less in all habitable rooms despite aircraft noise and an air circulation or air conditioning system, as appropriate. Assembly Bill (AB) 2776 requires any person who intends to sell or lease residential properties within an airport influence area to disclose that fact to the person buying the property.

13.1.4.3 Local Regulations

City of Hollister General Plan

The City of Hollister General Plan goals, policies, and programs that are relevant to noise are primarily in the Health and Safety Element. As part of the proposed project, some existing General Plan policies would be amended, substantially changed, or new policies would be added.

The Health and Safety Element aims to limit the exposure of the community to excessive noise levels by guiding decisions concerning land use and location of new roads and transit facilities. The City has not adopted its own land use compatibility standards for new development. Therefore, the State of California's guidelines are used and summarized in Table 13-4. This table provides urban planners with a tool to gauge the compatibility of land uses relative to existing and future noise levels.

City of Hollister Municipal Code

The City of Hollister Municipal Code includes various directives pertaining to noise and vibration.

- Chapter 8.28, *Noise*. This chapter provides general policies prohibiting noise sources, for the peace, health, comfort, safety and welfare of its citizens from excessive, unnecessary or unusually loud noises and vibrations from any and all sources in the community. Specific interior and exterior standards are not provided but exemptions to the standards within Chapter 8.28 are identified. The Noise Chapter generally prohibits any excessive, unnecessary or unusual loud noises from any person. Excessive, unnecessary or unusually loud noise is defined as a noise disturbance which occurs at any time of the day, and, because of volume, duration or character, annoys, disturbs, injures or endangers the comfort, response, health, peace or safety of any reasonable person of normal sensitivity residing in the area.

  For any kind of noise regardless of the time of day in which it occurs, the standards which shall be considered in determining whether a violation exists, may include, but shall not be limited to, the following:

  - The volume or intensity of the noise;
  - Citizen complaints;
  - The proximity of the noise to residential properties;
  - The nature and zoning of the area within which the noise emanates;
  - The time and/or day of the week the noise occurs;
  - The duration of the noise;
  - Whether the noise is recurrent, intermittent or constant;
  - Whether the noise is produced by a commercial or noncommercial activity; and
  - A noise level in residential districts exceeding 55 dBA during daylight hours, and 50 dBA after sunset, measured at the property line of the complaining party or inside an affected multiple-dwelling unit.

- Chapter 10.36, *Repair of Vehicles in Residential Districts, Section 060 – Noise*. This section prohibits noise-producing work, whether routine maintenance or major repairs before 8:00 a.m. or after 9:00 p.m. on any day.
- Chapter 17.10, *Industrial/Manufacturing Zones, Section 040 - Industrial Zoning District Performance Standards*. This section states that no approved land use shall generate ground vibration perceptible without instruments at any point along or outside the property line of the use, except for motor vehicle operations.
- Chapter 17.12, *Performance Standards, Section 040 – Airport and Airport Support Zone*. This section provides standards to ensure land use compatibility with the Hollister Municipal Airport related to noise and vibration under parts D and G. Part D states that no approved land use shall generate vibration perceptible without instruments at any point along or outside of the property line of the use, except for operational motor vehicles. Part G states that office buildings, motels, hotels, and

schools shall be designed to include noise attenuation measures to maintain an interior noise level not to exceed 55 dB CNEL.

- Chapter 17.16, *Performance Standards, Section 100 - Noise*. This section provides noise-related limits on commercial construction contiguous to residential properties to the hours of 7:00 am to 6:00 pm Monday through Friday, 8:00 am to 6:00 pm Saturdays, and prohibited Sundays and federal holidays.

  Noise-generating commercial landscaping activities with a duration of one-half hour or less, shall be limited to the hours of 8:00 am to 6:00 pm Monday through Saturday and prohibited Sundays and federal holidays.

  Noise-generating commercial landscaping activities with a duration of one hour or more, shall be limited to the hours of 8:00 am to 6:00 pm Monday through Friday, 8:00 am to 5:00 pm Saturdays and prohibited Sundays and federal holidays.

  This section does not apply to construction, landscaping or grounds maintenance by the occupants of residential property for personal, non-commercial use.

13.1.5 EXISTING CONDITIONS

Primary noise sources in the study area include traffic from surrounding highways, major roadways, residential streets, Hollister Municipal Airport, local railroad activity, and outdoor recreational uses. In commercial and retail areas, truck loading docks can be a source of localized noise.

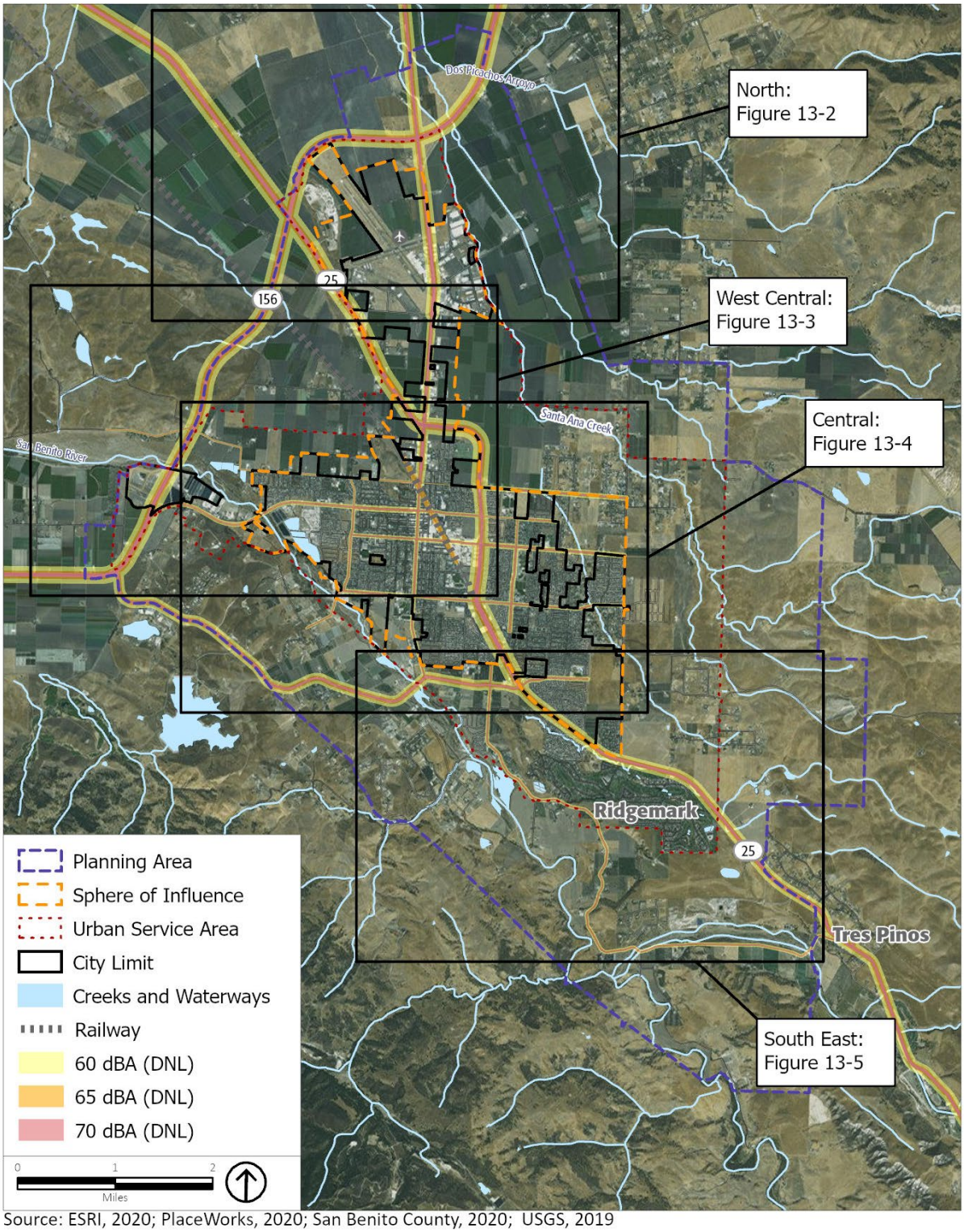
Sensitive Receptors

Certain land uses, such as residences, schools, and hospitals are particularly sensitive to noise and vibration. Sensitive receptors within Hollister include residences, senior housing, schools, libraries, places of worship, and recreational areas. These uses are regarded as sensitive because they are where citizens most frequently engage in activities which are likely to be disturbed by noise, such as reading, studying, sleeping, resting, or otherwise engaging in quiet or passive recreation. Commercial and industrial uses are not particularly sensitive to noise or vibration.

Existing Traffic Noise

On-road vehicles represent the most prominent source of noise in Hollister. Traffic noise levels were estimated using the FHWA Highway Traffic Noise Prediction Model and traffic data provided by Kimley-Horn. The FHWA model predicts noise levels through a series of adjustments to a reference sound level. These adjustments account for distances from the roadway, traffic volumes, vehicle speeds, car/truck mix, number of lanes, and road width. Roadway and highway noise contours of 60, 65, and 70 dBA CNEL noise contours are shown in Figures 13-1 through 13-5 and shown in Table 13-5.

Figure 13-1 Existing Transportation Noise Contours



Source: ESRI, 2020; PlaceWorks, 2020; San Benito County, 2020; USGS, 2019

Figure 13-2 Existing Transportation Noise Contours- North

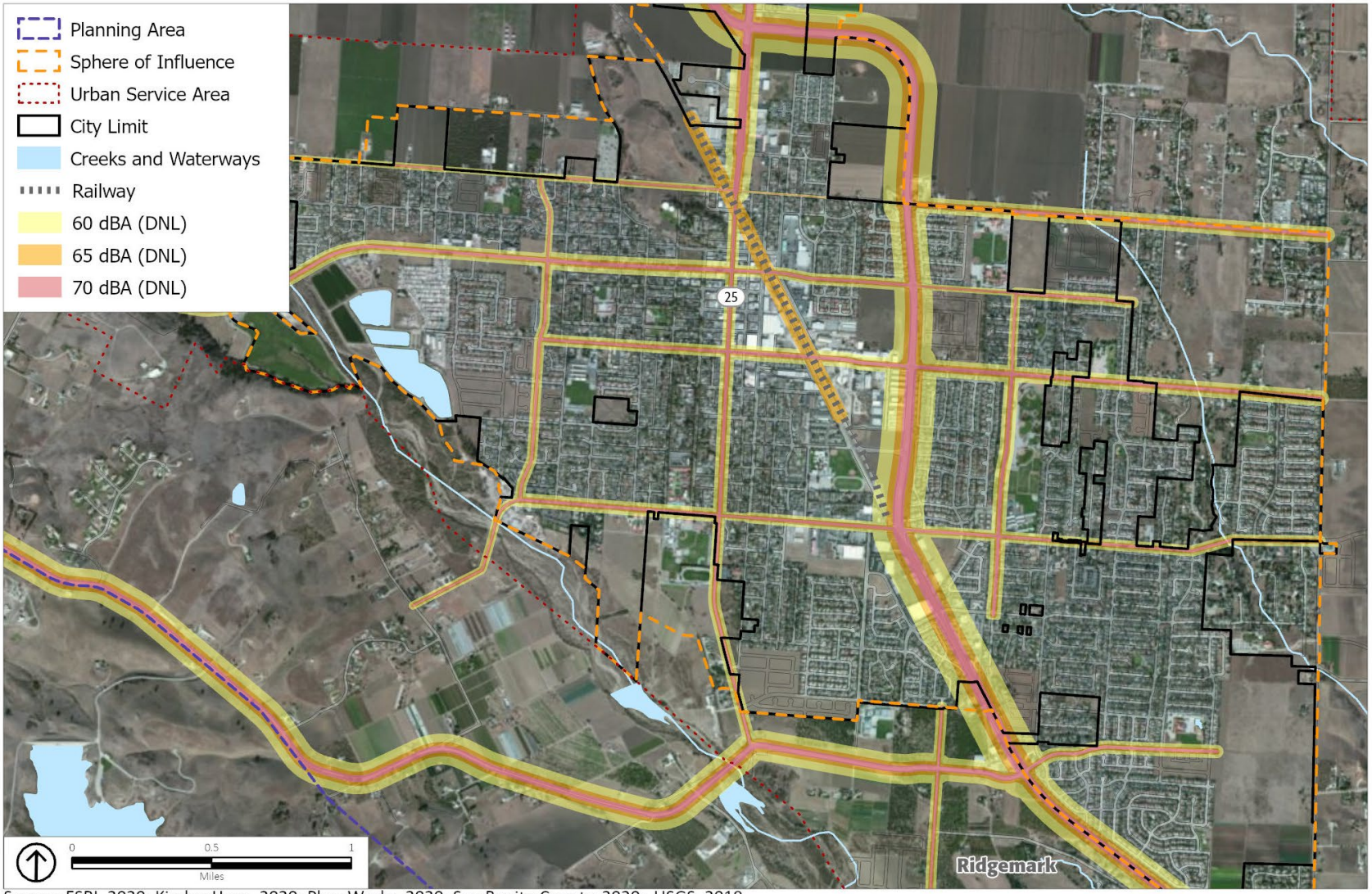
Source: ESRI, 2020; Kimley-Horn, 2020; PlaceWorks, 2020; San Benito County, 2020; USGS, 2019

NOISE AND VIBRATION

Figure 13-3 Existing Transportation Noise Contours – West Central

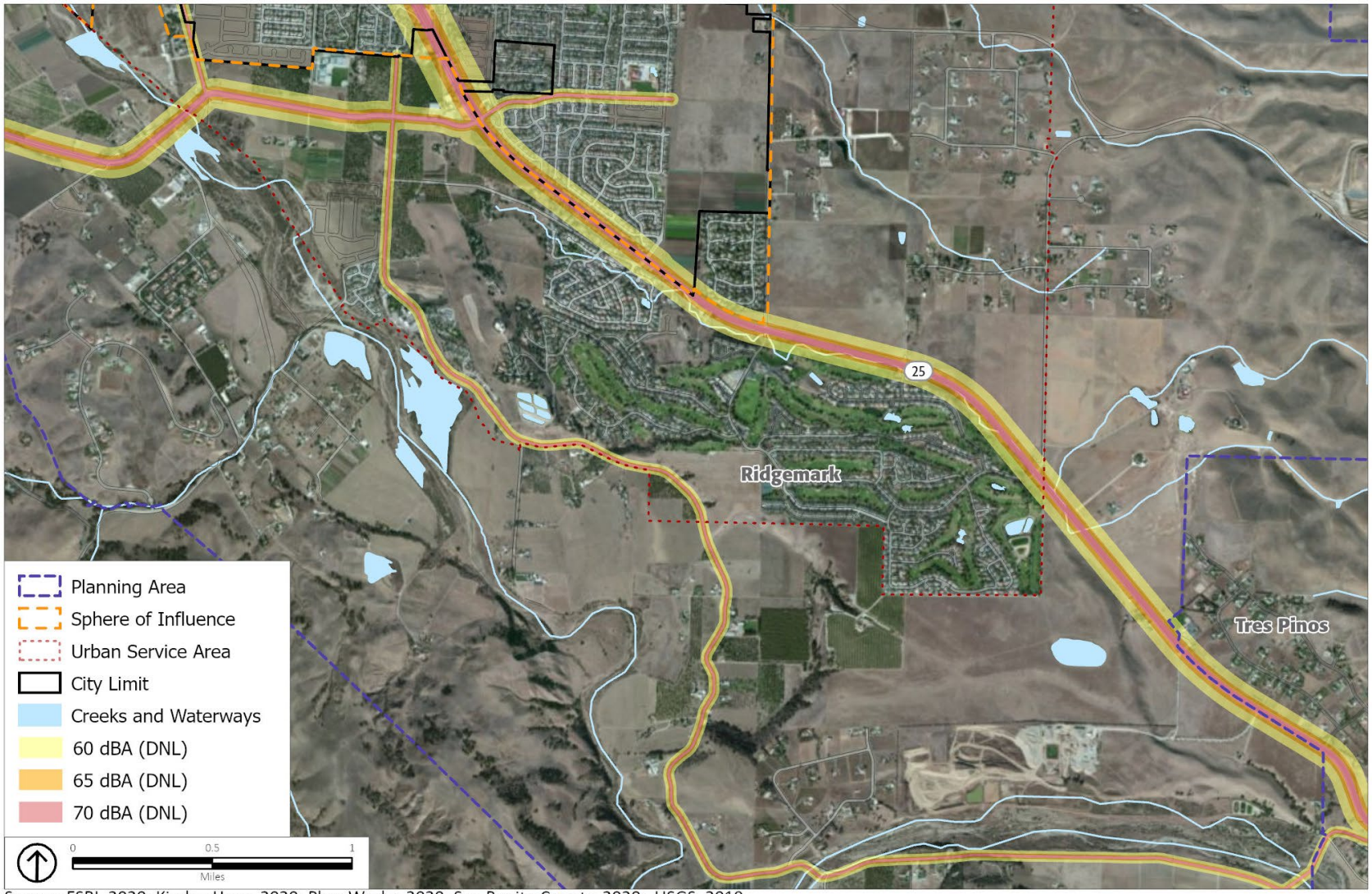
Source: ESRI, 2020; Kimley-Horn, 2020; PlaceWorks, 2020; San Benito County, 2020; USGS, 2019

Figure 13-4 Existing Transportation Noise Contours- Central



Source: ESRI, 2020; Kimley-Horn, 2020; PlaceWorks, 2020; San Benito County, 2020; USGS, 2019

Figure 13-5 Existing Transportation Noise Contours – South East



Source: ESRI, 2020; Kimley-Horn, 2020; PlaceWorks, 2020; San Benito County, 2020; USGS, 2019

TABLE 13-5 EXISTING TRAFFIC NOISE LEVELS

Roadway Segment	DNL dBA at 50 feet	Distance to Noise Contour, feet		
		70+ dBA DNL	65 dBA DNL	60 dBA DNL
San Felipe Rd – north of Flynn Road	72.2	74	160	345
San Felipe Rd – Wright Rd/McCloskey Rd to Flynn Rd	68.9	44	96	206
San Felipe Rd –Wright Rd/McCloskey Rd to SR-25/ Bolsa Rd	69.5	49	105	227
San Felipe Rd – south of SR-25/Bola Road	70.1	54	116	250
San Felipe Rd – south of North Street/Santa Ana Rd	65.0	24	53	113
San Benito Street – north of Nash Road/ Tres Pinos Rd	65.7	27	59	128
San Benito St – south of Nash Rd/ Res Pinos Rd	64.9	24	52	113
SR-25/ Bolsa Rd – west of San Felipe Rd	74.4	102	220	475
SR-25 – west of San Felipe Rd	74.1	97	210	452
SR-25 – Santa Ana Rd to Meridian St	72.2	73	157	338
SR-25 – Meridian Street to Hillcrest Rd	72.6	77	167	360
SR 25/Airline Hwy – north of Union Rd	74.6	105	226	487
SR 25/Airline Hwy – Union Rd to Enterprise Rd	72.4	75	162	348
SR 25/Airline Hwy – south of Enterprise Rd	71.6	67	145	311
Buena Vista Rd – west of Beresini Ln	60.2	12	26	55
Buena Vista Rd – west of Miller Rd	61.1	13	29	63
Buena Vista Rd – west of Westside Rd	60.2	12	26	55
Buena Vista Rd – east of Westside Rd	61.7	15	32	69
Santa Ana Rd – east of San Felipe Rd/San Benito St	53.9	4	10	21
Santa Ana Rd – east of SR-25	66.7	32	68	147
4th St – west of Felice Dr	68.5	42	90	194
San Juan Roadd – east of Westside Blvd	67.5	36	78	168
Meridian St – west of SR-25	64.7	24	51	109
Meridian St – west of Felice Dr	60.7	13	27	59
Hillcrest Rd – east of Westside Blvd	66.4	31	66	142
Hillcrest Rd – west of Memorial Dr	67.3	35	76	163
Nash Rd – west of Westside Blvd	62.4	17	36	77
Nash Rd – west of San Benito St	65.8	28	60	130
Nash Rd – east of San Benito St	64.4	23	49	105
Union Rd – west of San Benito St	71.1	63	136	293
Union Rd – west of Southside Rd	71.0	61	132	285
Union Rd – west of SR-25/Airline Hwy	69.3	48	102	221
Union Rd- east of SR-25/Airline Hwy	65.6	27	58	125

Roadway Segment	DNL dBA at 50 feet	Distance to Noise Contour, feet		
		70+ dBA DNL	65 dBA DNL	60 dBA DNL
SR-156 – north of Buena Vista Rd	74.4	102	220	473
SR-156 – south of Buena Vista Rd	74.2	99	214	461
Westside Blvd East – south of Central Ave	61.4	14	31	66
Westside Blvd East – south of San Juan Rd/4th Street	64.0	21	45	97
San Juan Rd / 4th St – west of Westside Blvd	65.6	27	58	126
Meridian St – east of Memorial Drive	64.6	23	50	108
Memorial Dr – south of Meridian St	63.3	19	41	87
Memorial Dr – south of Hillcrest Rd	66.2	30	64	137
Hillcrest Rd – east of Memorial Dr	66.6	32	68	147
Southside Rd – south of Union Rd	64.2	22	47	102

Source: Calculated using the FHWA RD-77-108 model based on traffic data provided by Kimley Horn. For traffic data provided by Kimley Horn and traffic noise calculations, see Appendix A.

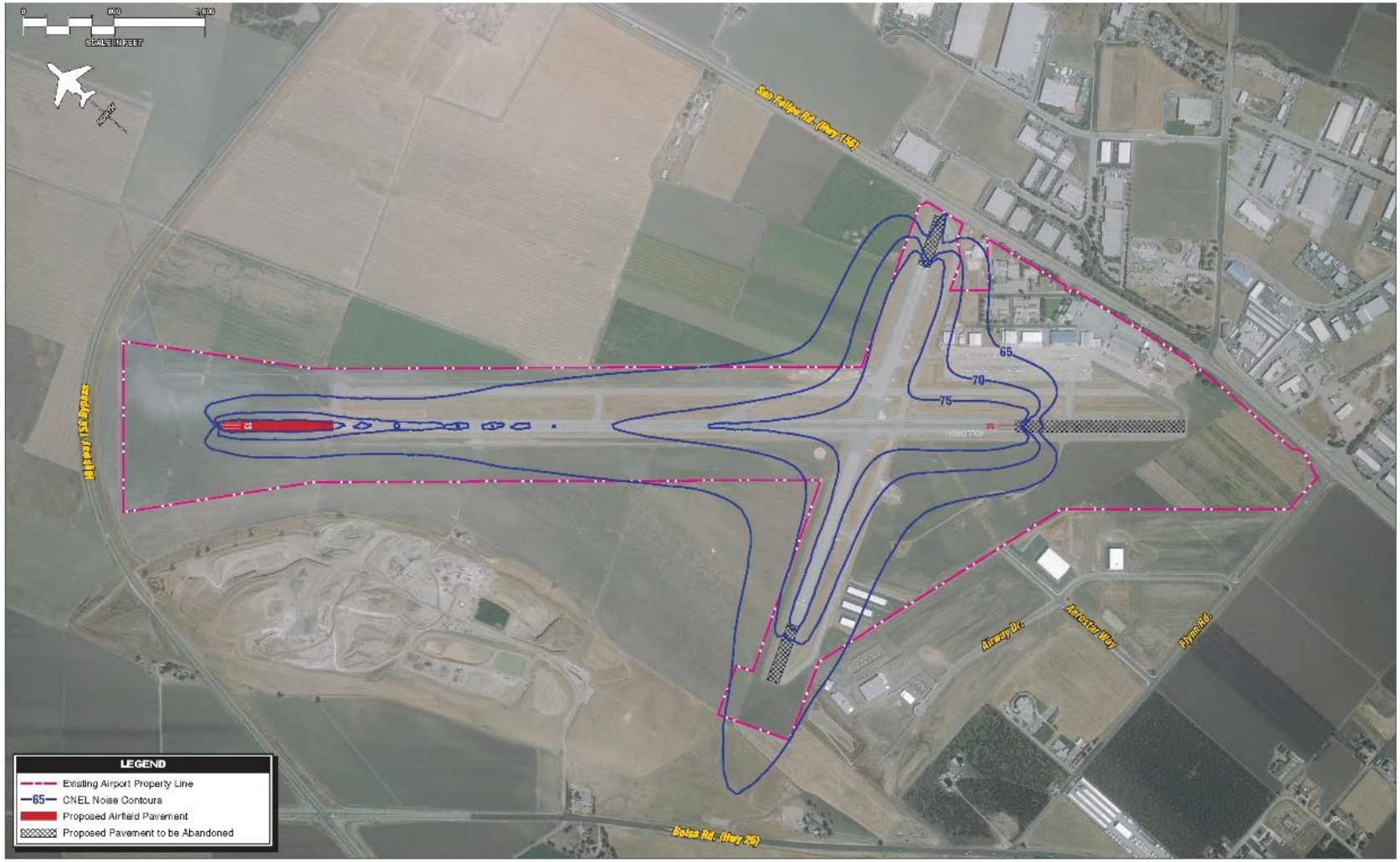
Aircraft Noise

Aircraft noise in the study area is characterized as rare but can be intrusive to nearby sensitive receptors. The Hollister Municipal Airport is the only airport in the City of Hollister and located in the northern portion of the City Limits. The Hollister Municipal Airport is a public airstrip with supporting general aviation activities. Airport noise contours from the Hollister Municipal Airport Master Plan (Figure 13-6) do not extend much beyond the runway and do not substantially affect nearby sensitive receptors.

Railroad Noise

Railroad operations in the City of Hollister are also a substantial source of noise in areas nearest railroad crossings. Day-night average noise levels vary throughout the community depending on the number of trains operating along a given rail line per day, the timing and duration of train pass-by events, and whether or not trains must sound their warning whistles near “at-grade” crossings. When railroad trains approach a passenger station or at-grade crossing, they are required to sound their warning whistle within ¼ mile. Trains are required to sound a long signal followed by a short signal when approaching stations, curves, or other points where view may be obscured, and when approaching passenger or freight trains. When passing a standing train, the moving train is required to sound two long signals followed by a short signal followed by a long signal, the same requirement when signaling for at-grade crossings. Train warning whistles typically generate maximum noise levels of approximately 105 dBA at 100 feet.

Figure 13-6 Hollister Municipal Airport 2025 Noise Contours



Source: Hollister Municipal Airport, Airport Plans.

The City of Hollister has one rail line that runs roughly through center of the northern half of the City Limits. The rail line is the Union Pacific Hollister Industrial Lead. It is a 12-mile long rail line from Carnadero, California to Hollister. On average, trains have two locomotives and eight cars traveling 10 miles per hour. Currently, there are local trains that run two times a week, Tuesday and Thursday, servicing San Benito Foods. This rail has seven rail crossings in the City of Hollister, of which none are "Quiet Zones."[2]

Existing railroad noise levels were calculated using the FTA CREATE rail noise model and the Federal Rail Administration (FRA) Grade Crossing Horn Model, the average number of pass-bys, time of day, number of locomotives and type, number of rail cars and type, and speed. Hollister currently has one track owned San Benito Railroad LLC (as of 2013) and operated by Union Pacific (UP), which services The Hollister Industrial Lead. Table 13-6 includes the calculated distances to the 65 dBA CNEL contours from existing railroad noise, both from the mainline and within ¼ mile of grade crossings where horn warnings are required. As mentioned above, there are no "Quiet Zones" at any of the seven crossings: North Street, 1st Street, 2nd Street, East St, 3rd Street, 4th Street, and South Street.

TABLE 13-6 EXISTING RAILROAD NOSIE LEVELS

Operator	Subdivision	Distance (feet) to 65 dBA CNEL Contour (Mainline)	Distance (feet) to 65 dBA CNEL Contour (within ¼ mile of grade crossing)
Union Pacific	Hollister Industrial Lead	7	143

Source: Calculated using the FTA CREATE Model and FRA Grade Crossing Horn Model. See Appendix A.

Stationary Noise Source

Stationary sources of noises may occur from all types of land uses. Residential uses would generate noise from landscaping, maintenance activities, and air conditioning systems. Commercial uses would generate noise from heating, ventilation, air conditioning (HVAC) systems, generators, loading docks, rail yards and other sources. Industrial uses may generate HVAC systems, loading docks and possibly machinery. Noise generated by residential or commercial uses are generally short and intermittent. Industrial uses may generate noise on a more continual basis due to the nature of the activities. Nightclubs, outdoor dining areas, gas stations, car washes, fire stations, drive-throughs, swimming pool and hot tub pumps, school playgrounds, athletic and music events, and public parks are other common noise sources.

Hollister Hills State Vehicular Recreation Area

The Hollister Hills State Vehicular Recreation Area (SVRA) is a State Park located in the Gabilan Mountains, Hollister, California. It is approximately 5 miles south from the center of the City of Hollister. Though it is outside the General Plan Planning Area, the State Park is in the City of Hollister. The Hollister Hills SVRA encompasses an area of over 6,800 acres and provides access to activities such as hiking, bicycling,

[2] Quiet Zone: A quiet zone is a zone where railroads have been directed to cease the routine sounding of their horns when approaching public highway-rail grade crossings. Train horns may still be used in emergency situations.

horseback riding and off-roading, including the use of motorbikes and all-terrain vehicles. Activities within the park, specifically use of off-highway vehicles, are a major component to noise within the Park and surrounding sensitive receptors.

13.2 IMPLICATIONS FOR THE GENERAL PLAN UPDATE

Based on the information in this chapter, the General Plan Update process should consider the following:

- Coordinate with FRA to establish quiet zones at railroad crossings adjacent to sensitive receptors within the City of Hollister.
- Consider implementing temporary construction noise and vibration thresholds, in addition to the limited hours of construction activity.
- Consider providing standard conditions of approval and best management practices for construction equipment and activity.
- In addition to reviewing noise and land use compatibility for new development near airports, highways, and other areas with existing elevated noise environments, consider expanding policies requiring acoustical studies to ensure interior noise levels of 45 dBA CNEL for sensitive receptors within noise contours of 60 dBA CNEL and above.

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APPENDIX A
NOISE TRAFFIC DATA

Traffic Data

Roadway	Location	Number of Lanes	ADT (BOTH DIRECTIONS)	Posted Speed Limit	% Autos (AM)	% Heavy Vehicles (AM)	% Autos (PM)	% Heavy Vehicles (PM)	Daytime Vehicles (7AM-7PM)	Evening Vehicles (7PM-10PM)	Nighttime Vehicles (10PM-7AM)	Daytime Vehicles (7AM-7PM)	Evening Vehicles (7PM-10PM)	Nighttime Vehicles (10PM-7AM)	% Autos Avg	% Heavy Vehicles Avg
					Raw Data Provided by Kimley Horn							**Day/Evening/Night Split Percentages and Vehicle Mix Percentages Calcuated by PlaceWorks based on data provided by Kimely Horn**				
San Felipe Rd	N of Flynn Rd	4	11,800	55	94%	6%	99%	1%	8,850	1,180	1,770	0.75	0.10	0.15	0.97	0.04
San Felipe Rd	N of Wright Rd/McCloskey Rd	4	10,700	40	94%	6%	99%	1%	8,025	1,070	1,605	0.75	0.10	0.15	0.97	0.04
San Felipe Rd	S of Wright Rd/McCloskey Rd	4	14,100	40	97%	3%	98%	2%	10,575	1,410	2,115	0.75	0.10	0.15	0.98	0.03
San Felipe Rd	S of SR 25/Bolsa Rd	4	16,300	40	97%	3%	98%	2%	12,225	1,630	2,445	0.75	0.10	0.15	0.98	0.03
San Felipe Rd	S of North St/Santa Ana Rd	4	16,100	25	99%	1%	98%	2%	12,075	1,610	2,415	0.75	0.10	0.15	0.99	0.02
San Benito St	N of Nash Rd/Tres Pinos Rd	2	9,900	30	97%	3%	97%	3%	7,425	990	1,485	0.75	0.10	0.15	0.97	0.03
San Benito St	S of Nash Rd/Tres Pinos Rd	2	8,200	30	97%	3%	97%	3%	6,150	820	1,230	0.75	0.10	0.15	0.97	0.03
SR 25/Bolsa Rd	W of San Felipe Rd	2	16,300	55	94%	6%	99%	1%	11,410	1,467	3,423	0.70	0.09	0.21	0.97	0.04
SR 25	N of Santa Ana Rd	4	16,800	55	97%	3%	99%	1%	11,760	1,512	3,528	0.70	0.09	0.21	0.98	0.02
SR 25	Santa Ana Rd to Meridian St	4	18,900	45	98%	2%	99%	1%	13,230	1,701	3,969	0.70	0.09	0.21	0.99	0.02
SR 25	Meridian St to Hillcrest Rd	4	20,700	45	98%	2%	99%	1%	14,490	1,863	4,347	0.70	0.09	0.21	0.99	0.02
SR 25/Airline Hwy	N of Union Rd	2	17,700	55	95%	5%	99%	1%	12,390	1,593	3,717	0.70	0.09	0.21	0.97	0.03
SR 25/Airline Hwy	Union Rd to Enterprise Rd	2	12,300	55	98%	2%	99%	1%	8,610	1,107	2,583	0.70	0.09	0.21	0.99	0.02
SR 25/Airline Hwy	S of Enterprise Rd	2	9,900	55	97%	3%	99%	1%	6,930	891	2,079	0.70	0.09	0.21	0.98	0.02
Buena Vista Rd	W of Beresini Ln	2	2,800	30	97%	3%	97%	3%	2,100	280	420	0.75	0.10	0.15	0.97	0.03
Buena Vista Rd	W of Miller Rd	2	3,400	30	97%	3%	97%	3%	2,550	340	510	0.75	0.10	0.15	0.97	0.03
Buena Vista Rd	W of Westside Rd	2	2,800	30	97%	3%	97%	3%	2,100	280	420	0.75	0.10	0.15	0.97	0.03
Buena Vista Rd	E of Westside Rd	2	3,900	30	97%	3%	97%	3%	2,925	390	585	0.75	0.10	0.15	0.97	0.03
Santa Ana Rd	E of San Felipe Rd/San Benito St	2	1,300	25	98%	2%	99%	1%	975	130	195	0.75	0.10	0.15	0.99	0.02
Santa Ana Rd	E of SR 25	2	7,100	40	97%	3%	97%	3%	5,325	710	1,065	0.75	0.10	0.15	0.97	0.03
4th St	W of Felice Dr	3	12,300	40	97%	3%	99%	1%	9,225	1,230	1,845	0.75	0.10	0.15	0.98	0.02
San Juan Rd	E of Westside Blvd	2	12,200	35	96%	4%	99%	1%	9,150	1,220	1,830	0.75	0.10	0.15	0.98	0.03
Meridian St	W of SR 25	4	7,600	30	97%	3%	97%	3%	5,700	760	1,140	0.75	0.10	0.15	0.97	0.03
Meridian St	W of Memorial Dr	4	3,000	30	97%	3%	97%	3%	2,250	300	450	0.75	0.10	0.15	0.97	0.03
Hillcrest Rd	W of SR 25	2	9,500	35	96%	4%	99%	1%	7,125	950	1,425	0.75	0.10	0.15	0.98	0.03
Hillcrest Rd	W of Memorial Dr	4	7,100	45	97%	3%	99%	1%	5,325	710	1,065	0.75	0.10	0.15	0.98	0.02
Nash Rd	W of Westside Blvd	2	2,800	30	90%	10%	97%	3%	2,100	280	420	0.75	0.10	0.15	0.94	0.07
Nash Rd	W of San Benito St	2	12,500	30	97%	3%	99%	1%	9,375	1,250	1,875	0.75	0.10	0.15	0.98	0.02
Nash Rd	E of San Benito St	3	8,900	30	97%	3%	99%	1%	6,675	890	1,335	0.75	0.10	0.15	0.98	0.02
Union Rd	W of San Benito St	2	9,900	55	96%	4%	98%	2%	7,425	990	1,485	0.75	0.10	0.15	0.97	0.03
Union Rd	W of Southside Rd	2	9,500	55	96%	4%	98%	2%	7,125	950	1,425	0.75	0.10	0.15	0.97	0.03
Union Rd	W of SR 25/Airline Hwy	2	7,100	55	97%	3%	99%	1%	5,325	710	1,065	0.75	0.10	0.15	0.98	0.02
Union Rd	E of SR 25/Airline Hwy	2	9,500	35	98%	2%	99%	1%	7,125	950	1,425	0.75	0.10	0.15	0.99	0.02
SR 156	N of Buena Vista Rd	2	10,500	55	90%	10%	90%	10%	7,350	945	2,205	0.70	0.09	0.21	0.90	0.10
SR 156	S of Buena Vista Rd	2	10,100	55	90%	10%	90%	10%	7,070	909	2,121	0.70	0.09	0.21	0.90	0.10
Westside Blvd East	S of Central Ave	2	3,300	35	99%	1%	97%	3%	2,475	330	495	0.75	0.10	0.15	0.98	0.02
Westside Blvd East	S of San Juan Rd / 4th St	2	5,900	35	98%	2%	98%	2%	4,425	590	885	0.75	0.10	0.15	0.98	0.02
San Juan Rd / 4th St	W of Westside Blvd	2	11,900	30	97%	3%	99%	1%	8,925	1,190	1,785	0.75	0.10	0.15	0.98	0.02
Meridian St	E of Memorial Dr	4	5,600	35	97%	3%	97%	3%	4,200	560	840	0.75	0.10	0.15	0.97	0.03
Memorial Dr	S of Meridian St	4	4,100	35	97%	3%	97%	3%	3,075	410	615	0.75	0.10	0.15	0.97	0.03
Memorial Dr	S of Hillcrest Rd	4	6,200	40	97%	3%	97%	3%	4,650	620	930	0.75	0.10	0.15	0.97	0.03
Hillcrest Rd	E of Memorial Dr	2	7,600	40	96%	4%	99%	1%	5,700	760	1,140	0.75	0.10	0.15	0.98	0.03
Southside Rd	S of Union Rd	2	3,000	45	95%	5%	98%	2%	2,250	300	450	0.75	0.10	0.15	0.97	0.04