4.9 NOISE

This section describes the existing noise environment in the Town of Truckee and provides an evaluation of potential noise impacts from the Truckee General Plan. Analysis is based on a noise assessment completed by Illingworth and Rodkin, Inc.[1]

A. Existing Setting

In Truckee, noise interference is a critical concern given the interest in preserving the Town's peaceful mountain environment by minimizing community exposure to noise. This chapter defines and discusses various scales of measurement for noise, regulations pertaining to noise level increases, and the current noise environment in the community.

1. Noise Definitions

Noise can be defined in many ways, but is usually defined as unwanted sound; it is usually objectionable because it is disturbing or annoying. The objectionable nature of sound can be caused by its pitch or its loudness. Pitch is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. Loudness is the intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave, in that it is a measure of the amplitude of the sound wave. Loudness is measured on several scales, which include decibels, A-weighted sound levels, Equivalent Noise Levels and Community Noise Equivalent Levels. These and other technical terms are defined in Table 4.9-1.

[1] Illingworth and Rodkin, Technical Noise Appendix, September, 2004.

TABLE 4.9-1 **DEFINITIONS OF ACOUSTICAL TERMS**

Term	Definitions
Decibel, dB	A unit describing the amplitude of sound. Sound levels in decibels are calculated on a logarithmic basis. A 10 decibel increase represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, and 30 decibels is 1,000 times more intense.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	Decibel level as measured using the A-weighting filter network which de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlating well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels to sound levels measured from 7:00 pm to 10:00 pm and 10 decibels to sound levels measured between 10:00 pm and 7:00 am.
Day/Night Noise Level, L_{dn}	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	Noise which intrudes over and above the existing ambient noise at a given location. Relative intrusiveness depends on amplitude, duration, frequency, time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Illingworth & Rodkin, Inc.

A decibel (dB) is a unit of measurement that indicates the relative amplitude of a sound. A measure of 0 decibels indicates the lowest sound level that the healthy, unimpaired human ear can detect. A one dB change is the minimum generally perceivable in a laboratory setting. Each 10 dB increase in noise level is perceived as an approximate doubling of loudness over a fairly wide range of intensities.

In California, sound is commonly measured with the A-weighted sound level, or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Sound levels, particularly those that are characterized as "environmental" or general noise, can vary markedly over a short period of time. Representative outdoor and indoor noise levels in units of dBA are shown in Table 4.9-2. For example, light traffic heard from a distance of 100 feet would have a level of 50 dBA. A jet taking off 200 feet away would create 120 dBA, but this noise would be of relatively short duration. Thus, noise specialists often calculate averages to describe the character of sound over time. Equivalent Noise Level (L_{eq}) is the measure most commonly used to describe these average noise levels. Noise is usually averaged over the period of an hour, but L_{eq} can describe any series of noise events of arbitrary duration. Generally, a 3dBA change in environmental noise causes a just perceptible difference.

Since sensitivity to noise increases during the evening and at night (because excessive noise interferes with the ability to sleep) 24-hour descriptors have been developed that increase the weighting for noise that occurs during quiet times of day. The increase is referred to as a penalty. For example, the Community Noise Equivalent Level (CNEL) measures the cumulative noise exposure in a place, with a 5 dB penalty added to evening (7:00 p.m. - 10:00 p.m.) and a 10 dB penalty added to nocturnal (10:00 p.m. - 7:00 a.m.) noise levels. The Day/Night Average Sound Level, Ldn, is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

TABLE 4.9-2 **TYPICAL ENVIRONMENTAL NOISE LEVELS**

Common Outdoor Noise Source	Noise Level (dBA)	Common Indoor Noise Source
	120 dBA	
Jet fly-over at 300 meters		Rock concert
	110 dBA	
Pile driver at 20 meters	100 dBA	
		Night club with live music
	90 dBA	
Large truck pass by at 15 meters		
	80 dBA	Noisy restaurant
		Garbage disposal at 1 meter
Gas lawn mower at 30 meters	70 dBA	Vacuum cleaner at 3 meters
Commercial or Urban area daytime		Normal speech at 1 meter
Suburban expressway at 90 meters	60 dBA	
Suburban daytime		Active office environment
	50 dBA	
Urban area nighttime		Quiet office environment
	40 dBA	
Suburban nighttime		
Quiet rural areas	30 dBA	Library
		Quiet bedroom at night
Wilderness area	20 dBA	
Most quiet remote areas	10 dBA	Quiet recording studio
Threshold of human hearing	0 dBA	Threshold of human hearing

Source: Illingworth & Rodkin, Inc.

2. Regulatory Setting

Noise is addressed in regulations, standards, and policies at the Federal, State and Town-level, as described below. This section summarizes the imposed standards and promoted guidelines.

a. Federal Regulations

The federal Department of Housing and Urban Development (HUD), and the Federal Transit Administration (FTA) both provide standards related to noise.

i. Department of Housing and Urban Development

HUD environmental noise regulations, presented in the Code of Federal Regulations (24 CFR Part 51B), require that new HUD-financed housing construction meet the following noise standards. Exterior noise levels are considered:

- Acceptable at 65 dBA Ldn or less.
- Normally unacceptable if they exceed 65 dBA Ldn but not 75 dBA Ldn, unless appropriate sound attenuation measures are provided, which include 5 decibels additional attenuation over standard construction in the 65 to 70 dBA Ldn zone or 10 decibels of additional attenuation in the 70 to 75 dBA Ldn zone.
- Unacceptable if they exceed 75 dBA Ldn.

Interior noise levels and attenuation requirements are geared toward achieving an interior noise level of 45 dBA Ldn. The HUD guidelines assume that standard construction will provide sufficient attenuation to achieve interior levels of 45 dBA Ldn or less if the exterior noise level is 65 dBA Ldn or less. These regulations apply to new residential projects that receive federal funding. If housing developed in Truckee receives federal funding, the federal noise standards may be applicable in the Town.

ii. Federal Transit Administration (FTA)

Groundborne vibration impacts are typically associated with fast moving railroad operations, and large industrial equipment. The Federal Transit Administration (FTA) of the U.S. Department of Transportation has developed vibration impact assessment criteria for evaluating vibration impacts associated with train and rapid transit projects. These criteria for groundborne vibration impacts on occupants inside buildings are shown in Table 4.9-3. Note that there are criteria for frequent events (more than 70 events per day) and infrequent events (less than 70 events per day).

FTA criteria are based primarily on experience with passenger train operations, such as rapid transit and commuter rail systems. The main difference between passenger and freight operations is the time duration of individual events. A passenger train passing lasts a few seconds whereas a long freight train passing may last several minutes, depending on speed and length. Although the criteria are based on shorter duration events reflected by passenger trains, they are used in this EIR assessment to evaluate the potential of vibration annoyance due to large freight trains as well. It should also be noted that the FTA criteria limits contained in Table 4.9-3 are not appropriate for evaluating the potential of structural or cosmetic damage to buildings due to train operations. It is extremely rare that train operations can cause any such damage, except in the case of weakened structures or historic buildings. Even in such cases, structural damage is unlikely unless the buildings are located very close to the tracks.

b. State Regulations

In California, noise is regulated as an environmental impact under the California Environmental Quality Act (CEQA). Standards for construction noise are also included in the State Building Code, and the State Office of Noise Control provides guidelines about appropriate noise levels for particular land uses.

TABLE 4.9-3 **GROUNDBORNE VIBRATION IMPACT CRITERIA**

Land Use Category	Groundborne Vibration Impact Limits (Re 1,μinch/sec., rms)[a]	
	Frequent Events	Infrequent Events
Category 1: Buildings where low ambient is essential for interior operations	65Vdb	65Vdb
Category 2: Residences and buildings where people normally sleep	72 Vdb	80 Vdb
Category 3: Institutional land uses with primarily daytime uses	75 Vdb	83 Vdb

[a] These criteria are based on root mean square (rms) average vibration velocity levels calculated over a 1 second period to relate to average, maximum, vibration levels experienced by humans.

Source: U.S. Department of Transportation, Federal Transit Administration, Transit Noise and Vibration Impact Assessment, April 1995, DOT-T

i. California Building Code

New multi-family housing in California is subject to the environmental noise limits set forth in Title 24, Part 2, of the State Building Code. The interior noise level limit in Title 24 is 45 dBA CNEL, which is consistent with the HUD standard. Where exterior noise levels exceed 60 dBA Ldn, a report must be submitted to the local building department with the building plans describing the noise control measures that have been incorporated into the design of the proposed project to achieve an interior noise level of 45 dBA CNEL in interior living spaces. If the windows must remain closed in order to meet the required noise level, an alternate means of ventilation such as air-conditioning must be provided.

The State building code also has requirements for airborne and impact noise isolation between adjacent dwelling units. The airborne and impact sound isolation requirements are typically handled in the architectural design and project-level review phase, versus at a General Plan's programmatic level of analysis.

ii. Noise Sensitive Land Uses

Different types of land uses are considered to have various sensitivities to noise based on the types of activities that are expected to take place at those uses. The State of California Office of Noise Control (ONC) has developed a noise/land use compatibility matrix that identifies varying degrees of acceptability for noise levels among different land use categories. The matrix is intended to provide guidelines for the development of municipal noise elements. These basic guidelines may be tailored to reflect the existing noise and land use characteristics of a particular community.

Land uses deemed noise sensitive by ONC include schools, hospitals, rest homes, long-term care and mental care facilities. Many jurisdictions also consider residential uses particularly noise sensitive because families and individuals expect to use time in the home for rest and relaxation, and noise can interfere with those activities. Some variability in standards for noise sensitivity may apply to different densities of residential development, and single-family uses are frequently considered the most sensitive. Jurisdictions may identify other uses as noise sensitive such as churches, libraries, day care centers, and parks.

Land uses that are less sensitive to noise include some office and retail developments. There is a range of insensitive noise receptors which generate significant noise levels or where human occupancy is typically low. Examples of insensitive uses include industrial and manufacturing uses, utilities, agriculture, vacant land, parking lots, salvage yards, highway-related businesses, and transit terminals.

c. Town of Truckee Regulations

The Town of Truckee establishes local regulations concerning noise through noise compatibility guidelines set forth in the General Plan, as well as through the municipal Noise Ordinance.

i. Noise Compatibility Guidelines

Based on the ONC State noise guidelines, described above, Truckee has created its own interior and exterior noise standards, which apply to exterior ground transportation noise (excluding airport noise) for various land uses in Truckee, and provides definitions of compatibility standards. Compatibility standards for exterior airport noise are found in the most recently-adopted Airport Comprehensive Land Use Plan. The matrix defines noise in terms of a community noise equivalent level (CNEL) expressed in decibel units (dB or dBA), which account for noise levels occurring over a 24-hour period.

The Noise Compatibility Matrix is used as a guideline by the Town and development project proponents to achieve long-term noise compatibility for land uses in the Town of Truckee. These guidelines shall be used both to determine the compatibility of situating land uses within a certain noise environment, and for the location of development and transportation system projects that may impact existing uses. Guidance for both sensitive land uses (homes, schools, hospital, and congregate care facility) and those uses considered less sensitive (commercial, office, industrial, and recreation areas) are provided. The standards identified are consistent with the State Office o Noise Control Guidelines and the California Noise Insulation Standards. In the environs of the Truckee-Tahoe Airport, the compatibility criteria for noise set forth in the adopted Truckee-Tahoe Airport Land Use Compatibility Plan shall be used by the Town for evaluating the effects of aircraft noise.

ii. Noise Ordinance

Section 18.44.030 of the Municipal Code (Exterior Noise Standards) states that it is unlawful "for any person, at any location within the Town, to create any noise or to allow the creation of any noise on property leased, occupied, owned, or otherwise controlled by the person which does not comply with the provisions of this Section, unless the provision of either Section 18.44.050 (Residential Interior Noise Standards) or 18.44.070 (Exceptions), below have been met." Exterior noise level criteria in Section 18.44.040 are shown in Table 4.9-4.

TABLE 4.9-4 **TRUCKEE MUNICIPAL CODE NOISE STANDARDS BY RECEIVING LAND USE**

	Noise Level Standards, dBA	
Cumulative Number of Minutes in any Hour	**Day-7:00 a.m. to 10:00 p.m.**	**Night – 10:00 p.m. to 7:00 a.m.**
Hospital, Library, Religious, Institution, Residential, or School Uses		
30	55	50
151	60	55
5	65	60
1	70	65
0	75	70
Commercial Uses		
30	65	60
15	70	65
5	75	70
1	80	75
0	85	80

Source: Town of Truckee Development Code, Truckee Municipal Code, Title 18, Amended Date, August 4, 2003, Chapter 18.44.

d. Truckee-Tahoe Airport Land Use Compatibility Plan

The Truckee-Tahoe Airport Land Use Compatibility Plan, which was adopted in 2004, sets forth a series of policies to avoid the establishment of noise sensitive land uses in the airport environs that could be exposed to significant levels of aircraft noise. The maximum CNEL considered normally acceptable for new residential land uses in the vicinity of the Truckee-Tahoe Airport is 60 dB, calculated for future busy-season aircraft activity levels.

Noise level compatibility standards for other types of land uses shall be applied in the same manner as the residential noise level criteria. Examples of acceptable noise levels for other land uses in the airport's vicinity, such as hospitals, schools, parks, and offices are also presented in the Compatibility Plan.

3. Truckee's Noise Environment

A comprehensive noise monitoring survey was conducted to document noise generated by the predominant transportation noise sources that affect the Town of Truckee; namely highways, local arterial and collector roadways, the Union Pacific Railroad, and the Truckee-Tahoe Airport. The noise monitoring survey included a combination of long-term (24-hour durations) and short-term (15-minute durations) noise measurements throughout the Truckee Town limits. The measurements included a combination of 12 long-term measurements conducted during the daytime, evening, and nighttime and seven short-term measurements throughout the town. The locations of the long-term (LT) and short-term (ST) noise measurements and the results of the measurements are summarized in Tables 4.9-5 and 4.9-6 and shown in Figure 4.9-1. Additional noise measurements conducted in Truckee within the last several years have also been included in the data summary. The primary sources of noise in Truckee are discussed below.

a. Interstate 80

I-80 is the major transportation corridor in the planning area and the dominant source of noise affecting the Town of Truckee. Noise levels at a distance of 100 feet from the center of I-80 range from approximately 78 to 82 CNEL. I-80 affects the noise environment in the community over a distance of several thousand feet from the roadway.

b. SR 89

SR 89 provides access from the Town of Truckee northward to Sierraville and southward to Tahoe City. Noise levels at a distance of 100 feet from the center of SR 89 North range from approximately 70 to 71 CNEL. Along SR 89

TABLE 4.9-5 **LONG-TERM NOISE DATA SUMMARY**

Noise Measurement Location	Date	Time	Leq(hr) Range Daytime Nighttime	CNEL
LT-1 ~ 114 feet from the centerline of SR 89 just south of Prosser Dam Road. Predominant noise source is vehicular traffic.	5/13/04 to 5/14/04	9:00 to 9:00	64-69 56-67	70
LT-2 ~ 81 feet from the centerline of Glenshire Drive between Olympic Boulevard and Highland Avenue. Noise sources include vehicular and train traffic.	5/13/04 to 5/14/04	10:00 to 10:00	58-64 50-62	65
LT-3 ~ 99 feet from the centerline of Brockway Road at Truckee River Regional Park. Predominant noise source is vehicular traffic.	5/13/04 to 5/14/04	10:00 to 10:00	61-66 50-64	67
LT-4 ~ 75 feet from the centerline of West River Street across from Donner Creek Mobile Home Park. Predominant noise source is vehicular traffic.	5/13/04 to 5/14/04	11:00 to 11:00	62-67 55-65	67
LT-5 ~ 93 feet from the centerline of SR 89, one-quarter mile south of West River Street. Dominant noise source is vehicular traffic.	5/13/04 to 5/14/04	11:00 to 11:00	66-72 57-70	72
LT-6 ~ 69 feet from the centerline of Northwoods Boulevard. Predominant noise source is vehicular traffic.	5/13/04 to 5/14/04	12:00 to 12:00	67-73 55-69	72
LT-7 ~ 168 feet from the centerline of I-80 and 51 feet from the center of Donner Pass Road near Coldstream Road. Predominant noise sources are I-80 and Donner Pass Road.	5/13/04 to 5/14/04	12:00 to 12:00	73-74 69-74	78
LT-8 ~ Northwest of the Truckee-Tahoe Airport near intersection of Martis Drive and Reynolds Way Noise sources include aircraft overflights and distant traffic.	5/14/04 to 5/15/04	12:00 to 12:00	47-57 44-54	56
LT-9 ~ 93 feet from the centerline of SR 89 near Placer County Line. Noise sources include vehicles and aircraft.	5/14/04 to 5/15/04	12:00 to 12:00	66-71 58-66	71
LT-10 ~ 300 feet from the centerline of I-80 near Hirschdale Road. Dominant noise source is I-80.	5/14/04 to 5/15/04	13:00 to 13:00	60-68 61-66	71
LT-11 ~ 27 feet from the centerline of Donner Pass Road at Donner Lake Road. Dominant noise source is vehicle traffic on Donner Pass Road.	5/14/04 to 5/15/04	14:00 to 14:00	58-68 49-59	65
LT-12 ~ 75 feet from the centerline of Donner Pass Road and 1000 feet east of Northwoods Boulevard. Predominant noise source is vehicular traffic along Donner Pass Road.	5/14/04 to 5/15/04	14:00 to 14:00	61-63 51-61	65
LT-13 ~ 100 feet from the Center of the UPRR Right-of-Way at McIver Hill. Predominant noise source is railroad trains.	11/2/01 to 11/3/01	13:00 to 13:00	56-77 49-76	76

Source: Illingworth and Rodkin, 2004.

TABLE 4.9-6 **SUMMARY OF SHORT-TERM NOISE MEASUREMENTS TAKEN ON MAY 13 AND 14, 2004**

Noise Measurement Location (Date – Time of Noise Measurement)	Noise Level (dBA)					
	L_{eq}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	Est. CNEL
ST-1 ~ 78 feet from the centerline of SR 267 near Placer County Line. Noise sources include vehicles and aircraft. (5/13/04 – 11:05 to 11:20)	68	75	73	67	53	70
ST-2 ~ 34 feet from the centerline of SR 89, just north of the intersection of SR 89 and I-80. Dominant noise source is vehicle traffic on SR 89. (5/13/04 – 11:43 to 11:58)	68	78	72	64	52	71
ST-3 ~ 75 feet from railroad track at Amtrak Depot in Old Town Truckee. Predominant noise source is railroad trains with vehicles and aircraft contributing to the background. (5/14/04 – 9:43 to 9:58)	79	95	65	58	54	77
ST-4 ~ 27 feet from the centerline of Hansel Drive between Northwoods Boulevard and Oslo Drive. (5/14/04 – 11:10 to 11:25)	53	70	47	41	37	55
ST-5 ~ End of Bridge Street and 450 feet from the centerline of I-80. Dominant Noise Source is I-80. (5/14/04 – 12:00 to 12:15)	58	64	61	57	53	62
ST-6 ~ 400 feet from Donner Pass Road at the Nevada County Courthouse. Noise sources include Donner Pass Road and I-80. (5/14/04 – 12:33 to 12:48)	55	60	56	55	53	58
ST-7 ~ 20 feet from the centerline of Donner Lake Road and ~200 feet from I-80. Predominant noise source is vehicular traffic along I-80 and Donner Lake Road. (5/14/04 – 13:10 to 13:25)	63	75	64	60	57	68

Source: Illingworth and Rodkin, 2004.

South, average noise levels are 72-73 CNEL, slightly higher than SR 89 North as a result of higher traffic volumes along the roadway.

c. SR 267

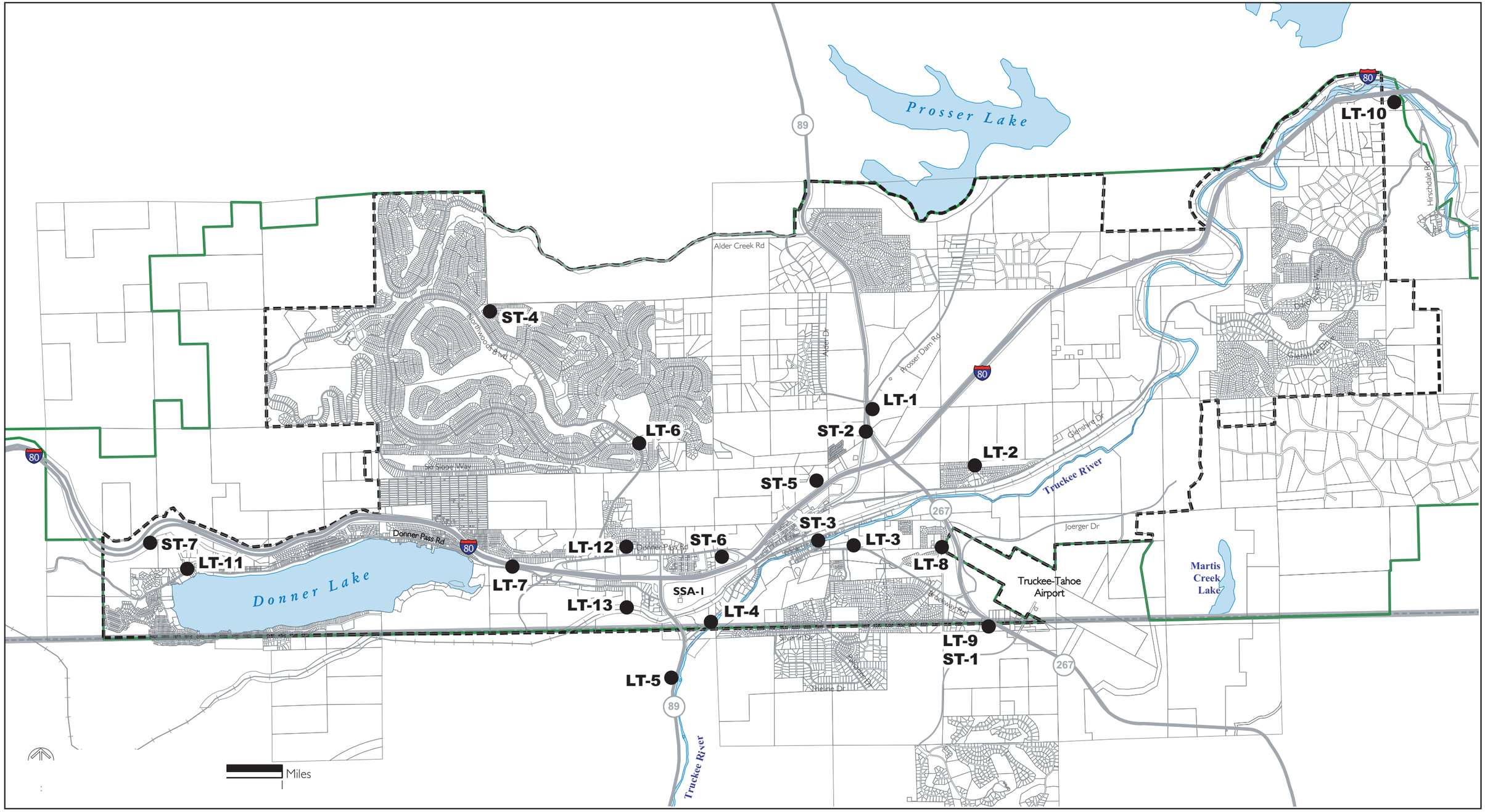
SR 267 connects SR 89 North, I-80, and the Town of Truckee to the North Lake Tahoe area. Noise levels at a distance of 100 feet from the center of SR 267 range from approximately 70 to 71 CNEL.

d. Union Pacific Railroad

The Union Pacific Railroad bisects Truckee from east to west. Both freight and passenger trains use the railroad, which generates intermittent, loud sounds during passbys. Noise generated by an individual train depends on the train type, length, speed, and whether the train uses its warning whistle. Trains are required to sound their warning whistle near "at-grade" vehicle crossings to warn motorists of the on-coming train. Oftentimes, trains also sound their warning whistles when entering or leaving the train station in Old Town Truckee and at bridges. At a distance of 100 feet, a train warning whistle can generate maximum noise levels of about 100 to 105 dBA. Train engines typically generate maximum noise levels of approximately 80 to 85 dBA while train cars generate noise levels of about 70 to 75 dBA. Noise measurements indicate that the intermittent loud sounds of trains control the average noise level along the railroad right-of-way over the course of a day. Noise levels at a distance of 100 feet from the railroad are approximately 76 CNEL.

e. Truckee-Tahoe Airport

The Truckee-Tahoe airport is a general aviation airport located east of SR 267, south of Truckee. The airport is accessed by a mix of general aviation and jet aircraft. The primary flight paths follow the highways in the area (I-80, SR 89 North, and SR 267). Noise generated by the airport wasmeasured northwest of the airport during the noise monitoring survey. The measured level at the nearest residential land uses was 56 CNEL. Individual measurements of maximum instantaneous sounds generated by aircraft typically



Source: Illingworth & Rodkin, 2004.

Truckee Town Limits

Proposed Sphere of Influence

Noise Measurment Location

ST: Short Term

LT: Long Term

FIGURE 4.9-1

NOISE MEASURMENT LOCATIONS

Back of Figure 4.9-1: Noise Measurement Locations

ranged from 55 to 71 dBA. During the peak summer travel season, CNEL noise levels would be approximately 60 dBA at the nearest residential receivers.

f. Stationary Noise Sources

Truckee is not significantly affected by stationary noise sources. Most large, noise generating operations (e.g., aggregate mining) are located away from residential areas. Noise generating businesses are generally limited to commercial or industrial areas where noise generation does not generally pose compatibility problems. In the few cases where industrial and commercial uses do occur in proximity to sensitive receptors, such as in mixed use districts of the Downtown, the noise generated by these uses is of a type and level that does not significantly affect sensitive uses.

g. Long-term Noise Measurements

Long-term measurements were taken at 12 locations throughout Truckee in May 2004 to characterize typical daytime noise levels and to collect traffic and noise data to be used subsequently in the computation of traffic noise contours for the General Plan. An additional measurement from 2001 is also included in this analysis. As with the short-term measurements, vehicular traffic on the street network was the dominant noise source for the majority of the measurements.

h. Short-term Noise Measurements

Short-term spot measurements were made at seven additional locations throughout Truckee in May 2004 to characterize typical daytime noise levels and to collect traffic and noise data to be used subsequently in the computation of traffic noise contours for the General Plan. The noise measurement locations are shown in Figure 4-9.1. The measured data is summarized in Table 4-9.6. As with the long-term measurements, vehicular traffic on the street network was the dominant noise source for the majority of the measurements.

i. Construction Noise

Construction activities generate considerable amounts of noise, especially during the demolition phase and the construction of project infrastructure when heavy equipment is used. Noise impacts resulting from construction depend on the noise generated by various pieces of construction equipment, the timing and duration of noise generating activities, and the distance between construction noise sources and noise sensitive receptors.

The highest maximum noise levels generated by project construction would typically range from about 90 to 105 dBA at a distance of 50 feet from the noise source. Typical hourly average construction generated noise levels are about 81 dBA to 89 dBA measured at a distance of 50 feet from the center of the site during busy construction periods, such as when earth moving equipment and impact tools are being used. Construction generated noise levels drop off at a rate of about 6 dBA per doubling of distance between the source and receptor. Shielding by buildings or terrain often result in much lower construction noise levels at distant receptors.

Typically, small residential, commercial, or office construction projects do not generate significant noise impacts when standard construction noise control measures are enforced at the project site and when the duration of the noise generating construction period is limited to one construction season (typically one year) or less. Construction noises associated with projects of this type are disturbances that are necessary for the construction or repair of buildings and structures in urban areas. Reasonable regulation of the hours of construction, as well as regulations of the arrival and operation of heavy equipment and the delivery of construction materials, are necessary to protect the health and safety of persons, promote the general welfare of the community, and maintain the quality of life.

Larger construction projects are typically built out over more than one construction season, and some construction methods, such as pile driving, gener-

ate higher noise levels and noise that would be considered impulsive.[2] Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (early morning, evening, or nighttime hours), the construction occurs in areas immediately adjoining noise sensitive land uses, or when construction durations last over extended periods of time. Limiting the hours when construction can occur to daytime hours is often a simple method to reduce the potential for noise impacts. In areas immediately adjacent to construction, controls such as constructing temporary noise barriers and utilizing "quiet" construction equipment can also reduce the potential for noise impacts.

B. Standards of Significance

Implementation of the Truckee General Plan update would result in a significant noise impact if it would:

- Expose people to noise exceeding "normally acceptable" in relation to General Plan Noise Compatibility Guidelines.
- Cause the CNEL at noise-sensitive uses to increase by 3 dBA or more and exceed the "normally acceptable" level.
- Cause the CNEL at noise-sensitive uses such as residential uses, schools, and hospitals to increase 5 dBA or more and remain "normally acceptable" in relation to General Plan Noise Compatibility.
- Cause new noise levels to exceed the Town of Truckee Noise Ordinance limits.
- Expose persons to or generate excessive ground-borne vibration or ground-borne noise levels, as identified by the FTA guidelines.
- Cause a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

[2] Impulsive noise is that consisting of a series of bursts of sound energy, each burst having a duration less than approximately 1 second.

- Cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. Construction activities that would cause noise levels to exceed an hourly average of 60 dBA Leq, exceed existing ambient noise levels by 5 dBA or more at a sensitive receiver, and would last more than one construction season, would be considered to cause a substantial temporary or periodic increase in ambient noise.
- Expose people residing or working in the project area to excessive aircraft noise levels.

C. Impact Discussion

1. Conformance with General Plan Land Use Noise Compatibility Guidelines

The 2025 General Plan establishes Noise Compatibility Criteria of exterior ground transportation noise (excluding airport noise) for various land uses in Truckee, and provides definitions of compatibility standards. These are illustrated in Figure 4.9-2. Compatibility standards for exterior airport noise are addressed in the 2004 Airport Comprehensive Land Use Plan, and are discussed section C.4., below. The matrix in Figure 4.9-2 defines noise in terms of a community noise equivalent level (CNEL) expressed in decibel units (dB or dBA). As noted in Section A, above, these measures account for noise levels which occur over a 24-hour period. When computing the CNEL, noise levels occurring during evening and night-time hours are weighted more heavily than daytime noise in recognition of increased sensitivity to sound during these hours.

As shown in the matrix, the guidelines establish a "normally acceptable" exterior noise level of 60 dBA Ldn for new noise sensitive land uses including single family development and mobile homes, and of 65 dBA Ldn for new residential uses in mixed-use projects, for hospitals, schools and congregate care facilities, and for neighborhood parks and RV parks. Less sensitive land uses including office, medical and light industrial uses, commercial uses and

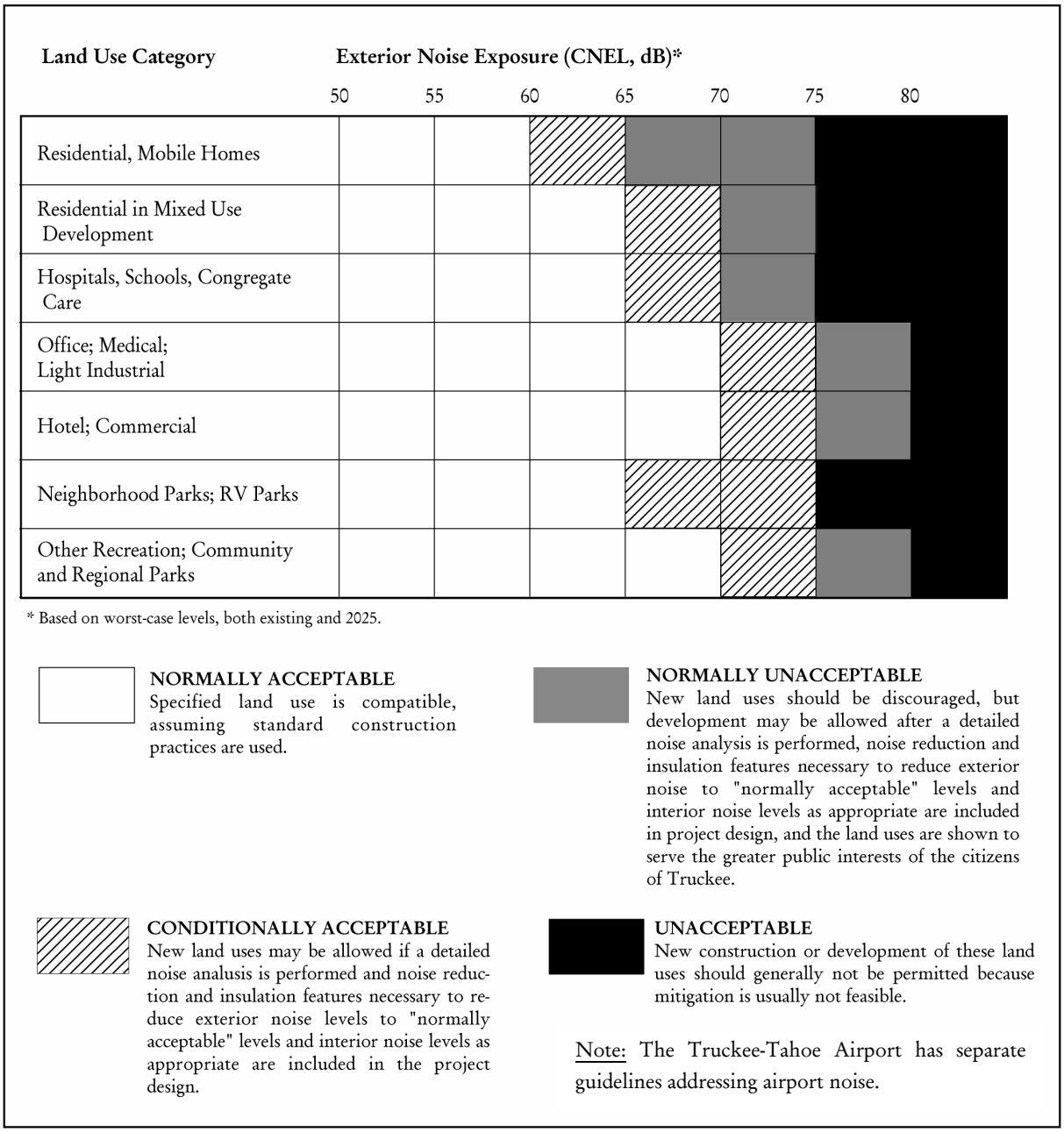


FIGURE 4.9-2 **2025 GENERAL PLAN NOISE COMPATIBILITY GUIDELINES**

hospitals have a normally acceptable noise level of 70 dBA Ldn, as do other types of recreation facilities and parks.

Residential development is sensitive to community noise both outdoors and indoors. Under the 2025 General Plan, residential development is proposed near I-80, SR 89, and SR 267, and also near the Truckee-Tahoe Airport. Single-family residential developments, schools, libraries, hospitals, convalescent homes, and places of worship are the most noise-sensitive land uses. High-density/mixed-use residential, commercial, and industrial development is less noise sensitive because uses are primarily indoors, and mitigated with building design and construction. However, noise exposure along I-80 and the railroad, and near the airport, could exceed "normally acceptable" levels for these uses. Therefore, acoustical analyses should be conducted to design mitigation that would reduce noise as low as practical in exterior use areas which maintain interior noise levels at the "normally acceptable" level of 45 Ldn. These could include technologies such as forced-air mechanical ventilation systems, or windows and doors with high Sound Transmission Class (STC) ratings.

As part of the noise analysis completed for the 2025 General Plan, noise impact contours were defined for roadways and the Truckee-Tahoe Airport. Traffic noise exposure contours are shown in Figure 4.9-3 and aircraft noise exposure contours are shown in Figure 4.9-4. Noise sensitive land uses within the illustrated contours could be impacted by future noise levels based on the noise compatibility guidelines set forth in the 2025 General Plan.

However, the proposed goals, policies, and actions in the 2025 General Plan Noise Element would reduce potential impacts associated with noise and land use compatibility to a less-than-significant level. The implementation of Noise Element Policy P1.1 would allow new development projects only where they can comply with the ground transportation noise compatibility discussed above. Policy P1.2 requires noise analyses of new development proposals when appropriate in order to maintain consistency with the interior and exterior noise standards in the Noise Element. Policy P1.3 requires new development to mitigate exterior noise to "normally acceptable" levels in

Source: Illingworth & Rodkin, 2004

Note: Noise contours shown reflect generalized noise projections, and do not take into account site specific topography, natural vegetation, site orientation or other localized factors. This figure is intended to be used for planning purposes in determining where land uses may be affected by noise, and where additional studies or analysis may be required to provide detailed informationn on potential noise exposure.

Note: This figure shows future noise from highways, streets and the railroad. It does not include noise from the airport.

— 65 — **2025 Noise Contour (CNEL dBA)**

Truckee Town Limits

Proposed Sphere of Influence

FIGURE 4.9-3

FUTURE ROADWAY NOISE CONTOURS

Back of Figure 4.9-3: Roadway Noise Contours

outdoor areas where quiet is the benefit, such as in backyards of single-family homes. Noise Element Policy P1.4 requires enforcement of the California Noise Insulation Standards for interior noise levels attributable to exterior sources and applies this standard to all proposed new single- and multi-family residences. Noise Element Policy P1.5 allows land uses within "normally unacceptable" categories only where the allowed use can be shown to serve the greater public interest of the citizens of Truckee. Policies P2.1, P2.2, and P2.3 require evaluation of noise impacts upon new developments. Policy P2.4 provides guidance regarding project-level mitigation measures. Lastly, Policy P2.5 specifically extends the interior noise limits set forth in the State Building Code to all new single-family housing in Truckee.

Based on the implementation of these polices, buildout of the 2025 General Plan would result in *less-than-significant* impacts related to Truckee's land use/noise compatibility standards.

2. Groundborne Vibration and Noise

Development occurring under the 2025 General Plan would not introduce new sources of significant groundborne vibration. However, impacts would result from railroad operations if vibration sensitive development, such as residential land uses, are proposed within 100 feet to the railroad tracks. Such development could expose residents to vibration levels in excess of Federal standards. To address this potential impact, the 2025 General Plan includes Policy P1.7 in the Noise Element, which would require site specific analysis of vibration impacts to sensitive uses located in proximity to the railroad, and the identification of site design or construction features to be included that would minimize any potential vibration impacts identified. With this policy in place, impacts from ground-borne vibration would be *less than significant*.

3. Substantial Noise Increases – 1996 General Plan versus 2025 General Plan

As development proceeds in Truckee and the surrounding areas, vehicular traffic on roadways would increase. The anticipated increase in vehicular traffic would result in increased traffic noise. Traffic noise levels throughout Truckee were modeled to determine how changes in vehicular traffic volumes would affect traffic noise levels. Traffic noise levels were projected for General Plan build-out for the year 2025. These traffic volumes included traffic growth due to the General Plan as well as other development outside of Truckee, including the Martis Valley Community Plan.

Noise impacts resulting from build-out of the 2025 General Plan are assessed by comparing projected noise levels to the future baseline condition, which is build-out of the 1996 General Plan. Increases in traffic noise above existing levels at buildout of the 1996 and 2025 General Plans and other growth in the area are shown in Table 4.9-7. Future noise levels along area roadways would be essentially equivalent under the 1996 General Plan and the 2025 General Plan.

Therefore, the increase in future noise levels that would occur under the 2025 General Plan would not represent a substantial increase above and beyond future noise levels that would occur under the baseline condition (buildout of the 1996 General Plan). As a result, there would be a *less than significant* impacts at noise sensitive locations in Truckee.

4. Airport Noise Exposure

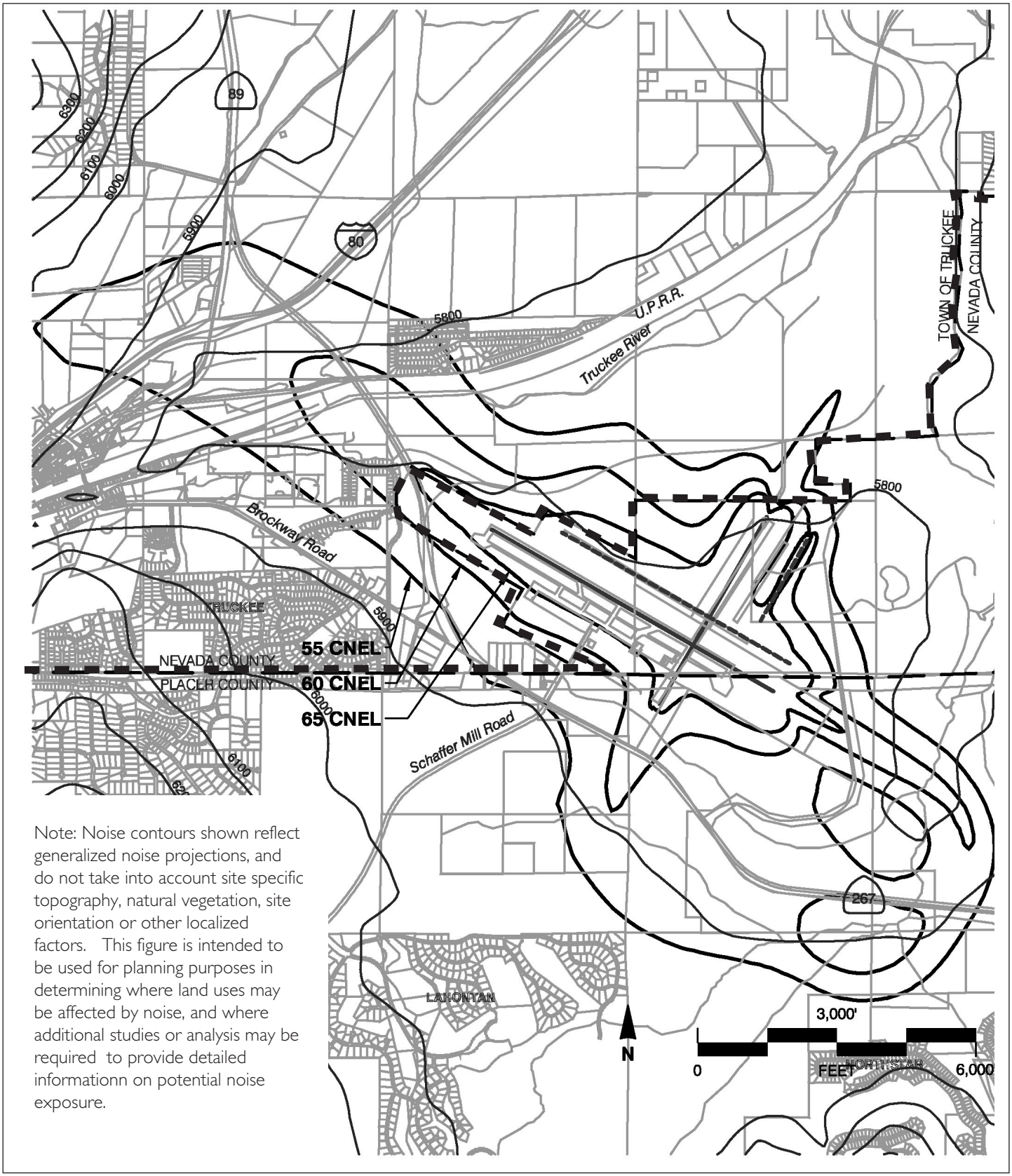
The Truckee-Tahoe Airport is a source of community noise. Residential land uses proposed in the 2025 General Plan are subject to elevated aircraft noise exposure levels and any noise-sensitive development within these areas should be carefully considered with respect to aircraft noise impact. When such development is permitted, not only does the aircraft noise cause a real physical impact on the future users, but the concerns of those affected can also pose a constraint upon future airport operations. Future noise contours associated with the airport are illustrated in Figure 4.9-4.

TABLE 4.9-7 **INCREASES IN TRAFFIC NOISE ALONG AREA ROADWAYS BY 2025 GENERAL PLAN BUILDOUT**

Roadway Segment	Increases at buildout above Existing Levels (1996 Plan), dB CNEL	Increases at buildout above Existing Levels (2025 Plan) dB, CNEL	Differences by 2025 Between 1996 Plan and 2025 Plan, dB, CNEL
Donner Pass immediately west of Cold Stream Road	1	1	0
Northwood Boulevard immediately north of Donner Pass Road	1	0	-1
Northwoods Boulevard immediately south of Northwoods Boulevard	2	2	0
Donner Pass Road immediately west of SR 89 South	1	0	-1
Deerfield Drive immediately west of SR 89 South	1	1	0
West River Street immediately east of SR 89 South	2	2	0
SR 89 South immediately south of West River Street	2	2	0
SR 89 South immediately north of West River Street	1	1	0
Donner Pass Road immediately west of the Central I-80 Interchange	1	1	0
McIver Undercrossing	2	2	0
Bridge Street under I-80 (not applicable)	na	na	na
Donner Pass Road immediately West of Bridge Street	1	2	0
West River Street immediately west of Bridge Street	4	4	0
Bridge Street immediately south of Donner Pass Road	3	3	0
Brockway Road immediately east of Palisades Road	4	4	0
Glenshire Drive immediately east of Donner Pass Road	3	4	1
Hirschdale Road Drive immediately south of I-80	-1	1	2
Donner Pass Road immediately north of Pioneer Trail	5	6	1
Pioneer Trail immediately west of Donner Pass Road	7	7	1
SR 89 North between Alder Drive and Donner Pass Road	2	2	0
SR 267 immediately south of I-80	5	5	0

Roadway Segment	Increases at buildout above Existing Levels (1996 Plan), dB CNEL	Increases at buildout above Existing Levels (2025 Plan) dB, CNEL	Differences by 2025 Between 1996 Plan and 2025 Plan, dB, CNEL
SR 67 at the Truckee/Placer County line	4	4	0
Brockway Road immediately west of SR 267	5	5	0
Airport Road immediately east of SR 267	2	2	0
Schaffer Mill Road immediately west of SR 267	7	7	0
SR 267 between Airport Road and Northstar Drive	4	4	0
Northstar Drive immediately west of SR 267	5	5	0
SR 267 over Brockway Summit	1	1	0
SR 28 immediately west of SR 267	1	1	0
SR 28 immediately east of SR 267	2	2	0
SR 28 immediately east of SR 89	2	2	0
SR 89 immediately south of SR 28	1	1	0
SR 89 immediately west of SR 28	1	1	0
SR 89 immediately south of Alpine Meadows Road	2	2	0
SR 89 between Alpine Meadows Road and Squaw Valley Road	2	2	0

Source: Illingworth and Rodkin, 2004



Note: Noise contours shown reflect generalized noise projections, and do not take into account site specific topography, natural vegetation, site orientation or other localized factors. This figure is intended to be used for planning purposes in determining where land uses may be affected by noise, and where additional studies or analysis may be required to provide detailed informationn on potential noise exposure.

Source: Truckee Tahoe Airport Land Use Compatibility Plan. December 2, 2004

FIGURE 4.9-4

Truckee Town Limits

FUTURE AIRPORT NOISE CONTOURS AVERAGE DAY, PEAK SEASON

Residential development is planned in proximity to the Truckee-Tahoe Airport where the CNEL is projected to be 55 to 65 dB. Residential land uses not associated with mixed-use development proposed within the 60 CNEL noise contour of the Truckee-Tahoe Airport would be exposed to exterior noise levels above "normally acceptable" levels.

Several policies set forth in the Noise Element of the 2025 General Plan address this issue. Policy P1.6 in the Noise Element would enforce the noise and land use compatibility criteria and policies adopted in the Truckee-Tahoe Airport Land Use Plan. Policy P2.3 requires the preparation of a study that would include mitigation measures to reduce noise to normally acceptable noise. Policies P3.9 and P3.10 would encourage cooperation between the Town and the Truckee-Tahoe Airport to minimize aircraft noise over residential neighborhoods and the coordination of long-range planning activities to minimize community noise exposure. As a result of these policies, noise impacts related to sensitive use in proximity to the airport would be reduced to a *less than significant* level.

5. Construction Noise

The nature of construction noise and the potential impacts associated with such noise are discussed earlier in this chapter. As noted previously, construction activities can generate considerable amounts of noise, especially during demolition and the construction of project infrastructure when heavy equipment is used.

Construction-related noise levels typically range from about 90 to 105 dBA at a distance of 50 feet from the noise source. Typical hourly average construction generated noise levels are about 81 dBA to 89 dBA measured at a distance of 50 feet from the center of the site during busy construction periods. Construction generated noise levels drop off at a rate of about 6 dBA per doubling of distance between the source and receptor.[3]

[3] Legal Compilation, Noise, U.S. Environmental Protection Agency, 1973.

Development allowed under the 2025 General Plan may result in new construction activity, which could temporarily elevate noise levels at adjacent noise sensitive uses. Policy P3.2 of the Noise Element states that noise from construction activities should be regulated in accordance with the Municipal Noise Ordinance. While the Truckee Development Code does regulate construction noise to some extent, it does exempt most construction occurring during the day from those standards, and single family residential construction is exempted altogether.[4]

Development occurring under the 2025 General Plan could result in noise levels at adjacent land uses that could be temporarily elevated by 15 to 20 dB or more during construction activities, which would potentially be a *significant* impact. However, this impact would be mitigated by Policy P3.13 in the Noise Element, which would require the incorporation of a series of standard noise control measures in construction projects, including measures such as siting equipment away from sensitive receptors, utilizing "quiet" air compressors, and designating a noise coordinator to deal with noise complaints. With this policy in place, construction-related impacts would be *less than significant*.

D. Cumulative Impact Discussion

The cumulative noise analysis evaluates what the future noise levels in Truckee would be under the 2025 General Plan compared to existing noise levels.

Increases of noise higher than 3 dB along roadways that adjoin residential development are substantial and cause a noise impact upon existing residents. Implementation of the 2025 General Plan, in combination with other development outside Truckee, would cause a substantial increase in traffic noise. The increase in traffic noise above existing levels expected by the buildout of

[4] Town of Truckee Development Code, Chapter 18.44.070

the General Plan is due to the cumulative effects of implementation of the 2025 General Plan combined with increased through traffic from outside the area. This impact is due largely to through traffic. As shown in Table 4.9-7, there are twelve locations in the study area at which the noise level increase would exceed the 3dB threshold increase. There are no measures that are feasible and reasonable to mitigate this impact. As a result, this is a *significant and unavoidabl*e cumulative impact.

E. Impacts and Mitigation

Since all project-specific impacts resulting from implementation of the 2025 General Plan would be *less than significant*, no mitigation measures are required.