

13 NOISE AND VIBRATION

13.1 INTRODUCTION

This chapter includes a description of acoustic fundamentals, a summary of applicable regulations, the existing noise environment in the project vicinity, and analyses of potential short- and long-term noise impacts of the project alternatives.

The primary issues raised during scoping that pertain to noise included:

- ▲ concerns about the Area Plan regarding the noise effects of concentrating development and increasing development densities in town centers, the secondary housing program, increased vehicle miles traveled (VMT), and the commercial floor area (CFA) to tourist accommodation unit (TAU) conversion program;
- ▲ the suitability of mixed-use areas outside of town centers for residential uses;
- ▲ concerns about construction noise and the effects of multiple projects combining to result in prolonged construction noise exposure;
- ▲ noise effects associated with increased traffic on Fairway Drive;
- ▲ noise associated with increased use of motorized boats, off-highway vehicles, snowmobiles, and other motorized engines related to population increases; and
- ▲ noise threshold attainment and maintenance.

As discussed in Chapter 4, “Approach to Environmental Analysis,” this analysis is provided to fully document the environmental effects of the four Area Plan and Lodge alternatives. The broad geography and long timeframe to which the Area Plan applies and the policy-oriented nature of its guidance is such that the EIR/EIS is prepared at a programmatic level, i.e., a more general analysis of each resource area with a level of detail and degree of specificity commensurate with the overall planning level of the Area Plan. Similarly, because the Kings Beach Center design concept lacks sufficient detail for definitive impact analysis, that portion of the project is also evaluated in a programmatic fashion. The proposed Tahoe City Lodge represents a project that contains a greater level of detail and specificity such that a project-level analysis is included in this chapter.

13.1.1 Acoustic Fundamentals

SOUND, NOISE, AND ACOUSTICS

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

FREQUENCY

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz, or thousands of hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

SOUND PRESSURE LEVELS AND DECIBELS

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.0000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this huge range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB). The threshold of hearing for young people is about 0 dB, which corresponds to 20 mPa.

ADDITION OF DECIBELS

Because decibels are logarithmic units, SPL 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 an SPL 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 produce a sound level 5 dB louder than one source.

A-WEIGHTED DECIBELS

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an “A-weighted” sound level (expressed in units of A-weighted decibels) can be computed based on this information.

The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgment correlates well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with highway-traffic noise. Noise levels for traffic noise reports are typically reported in terms of A-weighted decibels. Table 13-1 describes typical A-weighted noise levels for various noise sources. All sound levels expressed as dB in this section are A-weighted sound levels.

Table 13-1 Typical A-Weighted Noise Levels

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
	– 110 –	Rock band
Jet fly-over at 1,000 feet		
	– 100 –	
Gas lawn mower at 3 feet		
	– 90 –	
Diesel truck at 50 feet at 50 miles per hour		Food blender at 3 feet
	– 80 –	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	– 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
	– 20 –	
		Broadcast/recording studio
	– 10 –	
Lowest threshold of human hearing	– 0 –	Lowest threshold of human hearing

Notes: dB=A-weighted Noise Levels

Source: Caltrans 2013a:2-20

13.1.2 Human Response to Changes in Noise Level

As discussed above, the doubling of sound energy results in a 3-dB increase in sound. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different from what is measured.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dB changes in sound levels when exposed to steady, single-frequency (“pure-tone”) signals in the mid-frequency (1,000–8,000 Hz) range. In typical noisy environments, changes in noise of 1–2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a readily noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound would generally be perceived as barely perceptible (Caltrans 2013a:2-45).

13.1.3 Vibration

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, (e.g., operating factory machinery or transient in nature, explosions). Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, or acceleration.

Vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings (Federal Transit Administration [FTA] 2006:7-3; Caltrans 2013b:6). PPV and RMS vibration velocity are normally described in inches per second (in/sec).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. It takes some time for the human body to respond to vibration signals. In a sense, the human body responds to average vibration amplitude. The RMS of a signal is the average of the squared amplitude of the signal, typically calculated over a 1-second period. As with airborne sound, the RMS velocity is often expressed in decibel notation as vibration decibels (VdB), which serves to compress the range of numbers required to describe vibration (FTA 2006:7-3). This is based on a reference value of 1 micro inch per second (μ in/sec).

The typical background vibration-velocity level in residential areas is approximately 50 VdB. Groundborne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels (FTA 2006:7-8).

Typical outdoor sources of perceptible ground vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Construction activities can generate ground vibrations, which can pose a risk to nearby structures. Constant or transient vibrations can weaken structures, crack facades, and disturb occupants.

Construction vibrations can be transient, random, or continuous. Transient construction vibrations are generated by blasting, impact pile driving, and wrecking balls. Continuous vibrations result from vibratory pile drivers, large pumps, and compressors. Random vibration can result from jackhammers, pavement breakers, and heavy construction equipment. Table 13-2 describes the general human response to different levels of ground vibration-velocity levels.

Table 13-2 Human Response to Different Levels of Ground Noise and Vibration

Vibration-Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

Notes: VdB = vibration decibels referenced to 1 μ inch/second and based on the root mean square (RMS) velocity amplitude.

Source: FTA 2006:7-5

13.1.4 Common Noise Descriptors

Noise in our daily environment fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others fluctuate slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors most commonly used in traffic noise analysis.

Equivalent Continuous Sound Level (L_{eq}): L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour A-weighted equivalent sound level ($L_{eq[h]}$) is the energy average of A-weighted sound levels occurring during a 1-hour period and is the basis for noise abatement criteria (NAC) used by Caltrans and Federal Highway Administration (FHWA).

Percentile-Exceeded Sound Level (L_{xx}): L_{xx} represents the sound level exceeded for a given percentage of a specified period (e.g., L_{10} is the sound level exceeded 10 percent of the time, and L_{90} is the sound level exceeded 90 percent of the time).

Maximum Sound Level (L_{max}): L_{max} is the highest instantaneous sound level measured during a specified period.

Day-Night Level (L_{dn}): L_{dn} is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10-dB “penalty” applied to A-weighted sound levels occurring during nighttime hours between 10:00 p.m. and 7:00 a.m.

Community Noise Equivalent Level (CNEL) or Day-Evening-Night Level (L_{den}): Similar to L_{dn} , CNEL or L_{den} is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during the nighttime hours between 10:00 p.m. and 7:00 a.m. and a 5-dB penalty applied to the A-weighted sound levels occurring during evening hours between 7:00 p.m. and 10:00 p.m.

SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist 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 attenuate at a rate of 3 dB for each doubling of distance from a line source.

Ground Absorption

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. 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 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance.

Atmospheric Effects

Receivers 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 because of 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 at least 5 dB of noise reduction. Taller barriers provide increased noise reduction. Vegetation between the highway and receiver is rarely effective in reducing noise because it does not create a solid barrier.

13.2 REGULATORY SETTING

Key federal, state, and local regulatory and conservation planning issues applicable to the project for noise-related impacts are discussed below.

13.2.1 Federal

FEDERAL NOISE CONTROL ACT OF 1972

The Federal Noise Control Act of 1972 established a requirement that all federal agencies must comply with applicable federal, state, and local noise control regulations. Federal agencies are directed to administer their programs in a manner that promotes an environment free from noise that jeopardizes public health or welfare.

U.S. DEPARTMENT OF TRANSPORTATION

In an effort to address the human response to ground vibration, the Federal Transit Administration (FTA) of the U.S. Department of Transportation (DOT) established guidelines for maximum-acceptable vibration criteria for different types of land uses. These guidelines are used to determine potential impacts from plan-related construction and operational-related ground vibrations, and include the following:

- ▲ 65 VdB, referenced to 1 microinch per second ($\mu\text{in}/\text{sec}$) and based on the root mean square (RMS) velocity amplitude, for land uses where low ambient vibration is essential for interior operations (e.g., hospitals, high-tech manufacturing, laboratory facilities);
- ▲ 80 VdB for residential uses and buildings where people normally sleep; and

- ▲ 83 VdB for institutional land uses with primarily daytime operations (e.g., schools, churches, clinics, offices) (FTA 2006: p. 8-3).

13.2.2 Tahoe Regional Planning Agency

LAKE TAHOE REGIONAL PLAN

The elements of the Tahoe Regional Planning Agency (TRPA) Regional Plan related to noise include the following: Noise Subelement of the Goals and Policies of the Regional Plan (TRPA 2012a); the TRPA Code of Ordinances (TRPA Code), Chapter 68, “Noise Limitations”; plan area statements (PASs), community plans, and area plans; and detailed modeling parameters. (TRPA 2012b). These elements are described below, followed by a summary of TRPA’s best construction practices policy for construction-generated noise and vibration, region-wide traffic noise mitigation program, and exterior noise policy for mixed-use development.

Goals and Policies

The Regional Plan Noise Subelement of the Goals and Policies includes a goal to attain and maintain CNEL standards that is relevant to the project (Goal N-2) (TRPA 2012a:2-26 through 2-28). The underlying policy intended to help achieve that goal includes: establishing specific site design criteria for projects to reduce noise from transportation corridors and which may include using earthen berms, and barriers (Policy N-2.1). The transportation corridor CNEL values override land use-based CNELs within 300 feet of the applicable roadway (TRPA 2012a:2-26).

Code of Ordinances

Chapter 68, “Noise Limitations,” of the TRPA Code is intended to implement the Noise Subelement of the Goals and Policies document and to attain and maintain the TRPA Environmental Threshold Carrying Capacities (shown below).

TRPA Code Section 68.4, “Community Noise Levels,” states that TRPA shall use CNELs to measure community noise levels and that PASs shall set forth CNELs that shall not be exceeded by any one activity or combination of activities (see PASs below). The CNELs set forth in the PASs are based on the land use classification, the presence of transportation corridors, and the applicable threshold standard.

Plan Area Statements/Community Plans

Existing PASs and community plans that are in effect today include 51 PASs and the following community plans:

- ▲ Tahoe City Community Plan
- ▲ Carnelian Bay Community Plan
- ▲ Tahoe Vista Community Plan
- ▲ Kings Beach Community Plan
- ▲ Kings Beach Industrial Community Plan
- ▲ California North Stateline Community Plan

Each of these planning documents includes CNEL standards that generally limit noise levels to between 50 and 65 CNEL, depending on the land use classification and proximity to highways. The proposed Area Plan carries forward the existing CNEL standards from these planning documents. Noise standards for the Tahoe City Community Plan, Kings Beach Community Plan, and PAS 002 (Fairway Tract) are summarized below as these are the planning statements that are most relevant to the focus of changes in the Area Plan and the Tahoe City Lodge Project.

Tahoe City Community Plan

The Tahoe City Community Plan, consistent with the TRPA transportation corridor noise thresholds, designates a transportation noise corridor maximum 55 CNEL override for the SR 28 and SR 89 corridors.

Additionally, the community plan sets forth a number of special areas for which the noise standards are listed below:

- ▲ The maximum CNEL for Special Areas #3 and #4 and #5 is 55 CNEL.
- ▲ The maximum CNEL for Shorezone Tolerance Districts 4, 6 and 7 is 55 CNEL and the maximum for the lakezone is 50 CNEL

The maximum CNEL for all other areas of the community plan is 65 CNEL.

Kings Beach Community Plan

The Kings Beach Community Plan, consistent with the TRPA transportation corridor noise thresholds, designates a transportation noise corridor maximum 55 CNEL override for the SR 28 corridor. Additionally, the community plan sets forth a number of special areas for which the noise standards are listed below:

- ▲ The maximum CNEL for Special Areas #3 and #4 is 55 CNEL.
- ▲ The maximum CNEL for Shorezone Tolerance Districts 6 and 7 is 55 CNEL and the maximum for the lakezone is 50 CNEL.

The maximum CNEL for all areas of the community plan is 65 CNEL.

PAS 002 (Fairway Tract)

The maximum CNEL for PAS 002 (Fairway Tract) is 55 CNEL (TRPA 2002:3).

Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration

TRPA requires the following standard conditions, among others, for all project construction activity that involves grading; these conditions also apply to the construction of residential projects (TRPA [no date]a:6; TRPA [no date]b:4 to 5).

- ▲ Any normal construction activities creating noise in excess of the TRPA noise standards shall be considered exempt from said standards provided all such work is conducted between the hours of 8:00 a.m. and 6:30 p.m.
- ▲ Engine doors shall remain closed during periods of operation except during necessary engine maintenance.
- ▲ Stationary equipment (e.g. generators or pumps) shall be located as far as feasible from noise-sensitive receptors and residential areas. Stationary equipment near sensitive noise receptors or residential areas shall be equipped with temporary sound barriers.

Region-Wide Traffic Noise Mitigation Program

TRPA developed a region-wide traffic noise mitigation program pursuant to the requirements of Mitigation Measure 3.6-1 in the Regional Plan Update (RPU) EIS (TRPA 2012c:3.6-15 through 3.6-16) and Mitigation Measure 3.6-4 in the RTP/SCS EIR/EIS (Tahoe Metropolitan Planning Organization [TMPO] and TRPA 2012d:3.6-25 and 3.6-26). The region-wide traffic noise mitigation program aims to attain and maintain TRPA's contour-based CNEL thresholds in the highway transportation corridors in the region. The attainment status of these transportation corridor noise thresholds is evaluated every four years in the noise chapter of TRPA's Threshold Evaluation. The *2011 Threshold Evaluation Report* is the most recent version of this report published by TRPA (TRPA 2012b). TRPA is currently preparing the 2015 Threshold Evaluation Report, which is expected to be released in 2016.

Exterior Noise Policy for Mixed-Use Development

TRPA developed new project review requirements for mixed-use development pursuant to the requirements of Mitigation Measure 3.6-4 in the RPU EIS (TRPA 2012c:3.6-23 through 3.6-24). These requirements were developed to address the fact that new residential units and TAUs with outdoor activity areas that are included as part of redevelopment in town centers (as well as in the Regional Center the High Density Tourist District, which are not included in the Plan area) could be located in areas that are exposed to high exterior noise levels (TRPA 2012c:3.6-23 [See the impact discussion for the selected RPU Alternative, Alternative 3]). TRPA requires that each project be evaluated to determine whether it would result in the placement of residential or tourist accommodation uses in areas where the existing noise level exceeds 60 CNEL or is otherwise incompatible. TRPA also requires that each project be assessed to determine whether it would result in the generation of incompatible noise levels in close proximity to existing residential or tourist accommodation uses (see TRPA Initial Environmental Checklist questions 6d and 6e). This 60 CNEL level as stated in TRPA Initial Environmental Checklist questions 6d is not a threshold standard and does not supersede any applicable TRPA land use-based or contour-based noise threshold standards. Rather, this 60 CNEL standard, as well as question 6e in the TRPA Initial Environmental Checklist, serve as a screening criteria to determine whether a project-specific noise analysis is needed, in which case a project-specific noise analysis would be required to examine whether a proposed project would result in incompatible noise levels or the exceedance of any TRPA noise threshold standards. If a proposed project would result in incompatible noise levels, feasible mitigation measures would be required prior to approval.

ENVIRONMENTAL THRESHOLD CARRYING CAPACITIES

TRPA has established environmental thresholds for nine resources, including noise. There are two noise threshold indicators: single noise events and cumulative noise events. The Tahoe Basin's status in 2011 was non-attainment for single noise events and for cumulative noise. However, TRPA's 2011 *Threshold Evaluation Report* (TRPA 2012b) indicates that noise standards and approaches within TRPA's jurisdiction need to be re-evaluated because of the 'no exceedance' interpretation of the standards and TRPA's limited enforcement ability to address many noise issues—in particular, single event noise.

Single Noise Events

A noise event can be defined as an unexpected increase in acoustic. Single Noise Event Threshold Standards adopted by TRPA are based on the numerical value associated with the maximum measured level in acoustical energy during an event. This threshold establishes maximum noise levels (Table 13-3) for aircraft, watercraft, motor vehicles, motorcycles, off-road vehicles, and snowmobiles.

Cumulative Noise Events

TRPA adopted CNEL standards for different zones within the region to account for expected levels of serenity. The standards, established in the Goals and Policies, apply to the entire Lake Tahoe region. Table 13-3 summarizes thresholds for single events (L_{max}) and thresholds for community noise events.

The noise limitations established in Chapter 68 of the TRPA Code, including the noise standards of individual PASSs, community plans, and area plans, do not apply to noise from TRPA-approved construction or maintenance projects, or the demolition of structures, provided that such activities are limited to the hours between 8:00 a.m. and 6:30 p.m. Further, the noise limitations of Chapter 68 shall not apply to emergency work to protect life or property.

Table 13-3 TRPA Regional Plan Cumulative Noise Levels

Single Noise Events	Noise Measurement
Boats (not to exceed any of 3 tests)	82 dB measured at 50 feet with engine at 3,000 rpm
	SAE test J1970 or SAEJ1970, Shoreline Test, 75 dB (standard adopted 7/03)
	SAE Test J2005, Stationary Test, 88 dB if watercraft manufactured on or after 1/1/93 and 90 dB if watercraft manufactured before 1/1/93 (standard adopted 7/03)
Motor Vehicles (less than 6,000 pounds GVW)	76 dB running at <35/mph (82 dB running at >35/mph) measured at 50 feet
Motor Vehicles (greater than 6,000 pounds GVW)	82 dB running at <35/mph (86 dB running at >35/mph) measured at 50 feet
Motorcycles	77 dB running at <35/mph (86 dB running at >35/mph) measured at 50 feet
Off-road Vehicles	72 dB running at <35/mph (86 dB running at >35/mph) measured at 50 feet
Snowmobiles	82 dB running at <35/mph measured at 50 feet
[Land Use-Based] Community Noise Equivalent Levels: Background levels shall not exceed the following:¹	
Land Use Category	CNEL, dB
High Density Residential	55
Low Density Residential	50
Hotel/motel facilities	55
Commercial area	65
Industrial	65
Urban Outdoor Recreation	55
Rural Outdoor Recreation	50
Wilderness and Roadless Areas	45
Critical Wildlife Areas	45

Policy Statement: It shall be a policy of the TRPA Governing Board in the development of the Regional Plan to define, locate, and establish CNEL levels for transportation corridors.

Transportation [Corridor Noise Standards]²

U.S. 50	65 ⁽³⁾ dB CNEL
State Routes 89, 207, 28, 267 and 431	55 ⁽³⁾ dB CNEL
South Lake Tahoe Airport	60 ⁽⁴⁾ dB CNEL

Notes: CNEL = community noise equivalent level measurements are weighted average of sound level gathered throughout a 24-hour period; dB = decibels; dB = A-weighted decibels; mph = miles per hour; rpm = revolutions per minute

¹ The title of this table used in the TRPA Code is "TRPA Regional Plan Cumulative Noise Levels."

² For this analysis, these standards are referred to as "land use-based CNEL thresholds."

³ For this analysis, these CNEL standards are referred to as "transportation corridor noise thresholds."

⁴ This transportation corridor noise threshold overrides the land use CNEL thresholds and is limited to an area within 300 feet from the edge of the road.

⁵ This threshold applies to those areas impacted by the approved flight paths.

Source: TRPA Code of Ordinances, Chapter 68

13.2.3 State

The State of California has adopted noise standards in areas of regulation not preempted by the federal government. State standards regulate noise levels of motor vehicles, sound transmission through buildings, occupational noise control, and noise insulation.

CALIFORNIA DEPARTMENT OF TRANSPORTATION

California State Building Code Title 24

The State of California's noise insulation standards are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2, California Building Code. Title 24 is applied to new construction in California and states that interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. An acoustical analysis documenting compliance with the interior sound level standards shall be prepared for structures containing habitable rooms within the CNEL noise contours of 60-dB or greater.

California Department of Transportation Standard Specification 14-8.02

Caltrans Standard Specification 14-8.02, Noise Control, states that noise levels from construction activity between the hours of 9:00 p.m. and 6:00 a.m. shall not exceed 86 dB L_{max} at a distance of 50 feet from the construction site (Caltrans 2015:215).

Transportation-and Construction-Induced Vibration

In 2004, Caltrans published the Transportation-and Construction-Induced Vibration Manual, which provides general guidance on vibration issues associated with construction and operation of projects in relation to human perception and structural damage. Table 13-4 below presents recommendations for levels of vibration that could result in damage to structures exposed to continuous vibration.

Table 13-4 Caltrans Recommendations Regarding Vibration Levels	
PPV (in/sec)	Effect on Buildings
0.4-0.6	Architectural damage and possible minor structural damage
0.2	Risk of architectural damage to normal dwelling houses
0.1	Virtually no risk of architectural damage to normal buildings
0.08	Recommended upper limit of vibration to which ruins and ancient monuments should be subjected
0.006-0.019	Vibration unlikely to cause damage of any type
Notes: PPV= Peak Particle Velocity.	
Source: Caltrans 2004	

13.2.4 Local

Policies and ordinances of local agencies applicable to the proposed project are described in this section.

PLACER COUNTY

The Placer County General Plan Noise Element contains noise policies and standards (e.g., exterior and interior noise-level performance standards for new projects affected by or including non-transportation noise sources, and maximum allowable noise exposure levels for transportation noise sources) (Placer County 2013). The Placer County Noise Ordinance (Placer County Code Article 9.36) contains noise limits for sensitive receptors (Placer County 2004). The applicable policies and standards contained in the General Plan and Ordinance are summarized below. Placer County land use noise standards are shown in Table 13-5.

Placer County General Plan

Policies from the Placer County General Plan that are relevant to the proposed project are described below.

- ▲ **Policy 9.A.2:** The County shall require that noise created by new non-transportation noise sources be mitigated so as not to exceed the noise level standards (as shown below in Table 13-5) as measured immediately within the property line of lands designated for noise-sensitive uses.
- ▲ **Policy 9.A.5:** Where proposed non-residential land uses are likely to produce noise levels exceeding performance standards (as shown in Table 13-5) at existing or planned noise-sensitive uses, the County shall require submission of an acoustical analysis as part of the environmental review process so that noise mitigation may be included in the project design.

The maximum allowable noise exposure limits for transportation noise sources in Placer County are summarized in Table 13-6.

Table 13-5 Placer County Allowable L_{dn} Noise Levels Within Specified Zone Districts¹ Applicable to New Projects Affected by or Including Non-Transportation Noise Sources

Zone District of Receptor	L_{dn} (dB) at Property Line of Receiving Use	Interior Spaces (dB) ²
Residential Adjacent to Industrial ³	60	45
Other Residential ⁴	50	45
Office/Professional	70	45
Transient Lodging	65	45
Neighborhood/General Commercial/Shopping Center	70	45
Heavy Commercial/Limited Industrial/Highway Service	75	45
Industrial	-	45
Industrial Park	75	45
Industrial Reserve	-	-
Airport	-	45
Unclassified	-	-
Farm/Agriculture Exclusive ⁶	-	-
Recreation and Forestry	70	-

Notes: L_{dn} = Day-Night Noise Level; dB = decibels

Except where noted otherwise, noise exposures will be those which occur at the property line of the receiving use.

Where existing transportation noise levels exceed the standards of this table, the allowable L_{dn} shall be raised to the same level as that of the ambient level.

If the noise source generated by, or affecting, the uses shown above consists primarily of speech or music, or if the noise source is impulsive in nature, the noise standards shown above shall be decreased by 5 dB.

Where a use permit has established noise level standards for an existing use, those standards shall supersede the levels specified in this table. Similarly, where an existing use which is not subject to a use permit causes noise in excess of the allowable levels in this Table, said excess noise shall be considered the allowable level. If a new development is proposed which will be affected by noise from such an existing use, it will ordinarily be assumed that the noise levels already existing or those levels allowed by the existing use permit, whichever are greater, are those levels actually produced by the existing use.

Existing industry located in industrial zones will be given the benefit of the doubt in being allowed to emit increased noise consistent with the state of the art⁵ at the time of expansion. In no case will expansion of an existing industrial operation because to decrease allowable noise emission limits. Increase emissions above those normally allowable should be limited to a one-time 5 dB increase at the discretion of the decision-making body.

The noise level standards applicable to land uses containing incidental residential uses, such as caretaker dwellings at industrial facilities and homes on agriculturally-zoned land, shall be the standards applicable to the zone district, not those applicable to residential uses.

Where no noise level standards have been provided for a specific zone district, it is assumed that the interior and/or exterior spaces of these uses are effectively insensitive to noise.

¹ Overriding policy on interpretation of allowable noise levels: Industrial-zoned properties are confined to unique areas of the County, and are irreplaceable. Industries which provide primary wage-earner jobs in the County, if forced to relocate, will likely be forced to leave the County. For this reason, industries operating upon industrial zoned properties must be afforded reasonable opportunity to exercise the rights/privileges conferred upon them by their zoning. Whenever the allowable noise levels herein fall subject to interpretation relative to industrial activities, the benefit of the doubt shall be afforded to the industrial use.

Where an industrial use is subject to infrequent and unplanned upset or breakdown of operations resulting in increased noise emissions, where such upsets and breakdowns are reasonable considering the type of industry, and where the industrial use exercises due diligence in preventing as well as correcting such upsets and breakdowns, noise generated during such upsets and breakdowns shall not be included in calculations to determine conformance with allowable noise levels.

² Interior spaces are defined as any locations where some degree of noise-sensitivity exists. Examples include all habitable rooms of residences, and areas where communication and speech intelligibility are essential, such as classrooms and offices.

³ Noise from industrial operations may be difficult to mitigate in a cost-effective manner. In recognition of this fact, the exterior noise standards for residential zone districts immediately adjacent to industrial, limited industrial, industrial park, and industrial reserve zone districts have been increased by 10 dB as compared to residential districts adjacent to other land uses.

Table 13-5 Placer County Allowable L_{dn} Noise Levels Within Specified Zone Districts¹ Applicable to New Projects Affected by or Including Non-Transportation Noise Sources

For purposes of the Noise Element, residential zone districts are defined to include the following zoning classifications:

AR, R-1, R-2, R-3, FR, RP, TR-1, TR-2, TR-3, and TR-4.

⁴ Where a residential zone district is located within an -SP combining district, the exterior noise level standards are applied at the outer boundary of the -SP district. If an existing industrial operation within an -SP district is expanded or modified, the noise level standards at the outer boundary of the -SP district may be increased as described above in these standards.

Where a new residential use is proposed in an -SP zone, an Administrative Review Permit is required, which may require mitigation measures at the residence for noise levels existing and/or allowed by use permit as described under "NOTES," above, in these standards.

⁵ State of the art should include the use of modern equipment with lower noise emissions, site design, and plant orientation to mitigate offsite noise impacts, and similar methodology.

⁶ Normally, agricultural uses are noise insensitive and will be treated in this way. However, conflicts with agricultural noise emissions can occur where single-family residences exist within agricultural zone districts. Therefore, where effects of agricultural noise upon residences located in these agricultural zones are a concern, an L_{dn} of 70 dB will be considered acceptable outdoor exposure at a residence.

Source: Placer County 2013

Table 13-6 Placer County Maximum Allowable Noise Exposure for Transportation Noise Sources

Land Use	Outdoor Activity Areas ¹	Interior Spaces	
	$L_{dn}/CNEL$	$L_{dn}/CNEL$	L_{eq}, dB^2
Residential	60 ³	45	
Transient Lodging	60 ³	45	
Hospitals, Nursing Homes	60 ³	45	
Theaters, Auditoriums, Music Halls			35
Churches, Meeting Halls	60 ³		40
Office Buildings			45
Schools, Libraries, Museums			45
Playgrounds, Neighborhood Parks	70		

Notes: CNEL = community noise equivalent level

¹ Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use.

² As determined for a typical worst-case hour during periods of use.

³ Where it is not possible to reduce noise in outdoor activity areas to 60 $L_{dn}/CNEL$ or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB $L_{dn}/CNEL$ may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

Source: Placer County General Plan 2013

Placer County Noise Ordinance

Article 9.36 Noise of the Placer County Code defines sound level performance standards for sensitive receptors. Relevant standards are listed below.

Article 9.36 Noise

Noise level standards for sensitive receptors from Placer County Code Article 9.36 are shown in Table 13-7 below. The ordinance states that it is unlawful for any person at any location to create any sound, or to allow the creation of any sound, on property owned, leased, occupied, or otherwise controlled by such a person that causes the exterior sound level, when measured at the property line of any affected sensitive receptor, to exceed the ambient sound level by 5 dB or exceed the sound level standards (as set forth in Table 13-7), whichever is greater.

Table 13-7 Placer County Noise Ordinance Noise Level Standards for Sensitive Receptors^{1,2}

Sound Level Descriptor (dB)	Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
Hourly L_{eq}	55	45
L_{max}	70	65
	– 100 –	

Notes: dB=decibel

¹ Each of the sound level standards specified in this table shall be reduced by five dB for simple tone noises, consisting of speech and music. However, in no case shall the sound level standard be lower than the ambient sound level plus five dB.

² If the intruding sound source is continuous and cannot reasonably be discontinued or stopped for a time period whereby the ambient sound level can be measured, the sound level measured while the source is in operation shall be compared directly to the sound level standards in this table.

Source: Placer County 2004

Each of the sound level standards specified in Table 13-7 shall be reduced by 5 dB for simple tone noises, consisting of speech and music. However, in no case shall the sound level standard be lower than the ambient sound level plus 5 dB.

Section 9.36.030 Exemptions

According to Section 9.36.030, “Exemptions,” some noise-generating activities are exempt from the above noise ordinance standards. These are listed below.

- ▲ Construction that is performed between 6:00 a.m. and 8:00 p.m., Monday through Friday, and between 8:00 a.m. and 8:00 p.m. Saturday and Sunday, provided that all construction equipment is fitted with factory-installed muffler devices and maintained in good working order.
- ▲ Emergencies involving the execution of the duties of duly authorized governmental personnel and others providing emergency response to the general public, including but not limited to sworn peace officers, emergency personnel, utility personnel, and the operation of emergency response vehicles and equipment.

17.02.050 Interpretation

According to Section 17.02.050, “Interpretation,” when conflicts occur between county standards and standards adopted by ordinance in any applicable community plans, including those areas within the jurisdiction of TRPA, the provisions of the community plans shall apply.

13.3 ENVIRONMENTAL SETTING

The predominant noise source in the project area is vehicle traffic traveling on SRs 28, 89, and 267. Other noise sources include motorized watercraft activity on the lake, landscape maintenance and snow removal activities (e.g., grass cutting, leaf blowing, snow plowing and blowing) at residential and commercial land uses, and activities typical of urban and suburban environments, such as people recreating outside.

The extent to which existing land uses in the project area are affected by existing traffic noise depends on their proximity to the roadways and sensitivity to noise. Table 13-8 shows the modeled distance of the 55 CNEL traffic noise contour from the edge of the portions of SR 28, SR 89, and SR 267 that pass through the study area for existing conditions. Existing traffic noise contours were modeled in accordance with the FHWA Traffic Noise Model, Version 2.5 (FHWA 2004) using traffic data (e.g., travel speeds, traffic volumes) from the project-specific transportation impact analysis (See Appendix G – Transportation and Circulation Supplemental Information). Refer to Appendix J for detailed traffic noise modeling input data and output results.

Table 13-8 Existing 55 CNEL Contours along Major Transportation Corridors in Placer County

Roadway Segments with Contour-Based Noise Thresholds	Distance from Edge of Roadway to 55 CNEL Contour under Existing Conditions (ft)
SR 89 west of Tahoe City	371
SR 89 between Fanny Bridge to Sunnyside	343
SR 89 between Mackinaw Road and SR 28	241
SR 28 east of SR 89	201
SR 28 between West Lake Boulevard and Mackinaw Road	200
SR 28 between Mackinaw Road and Grove Street	200
SR 28 between Grove Street and Jackpine Street	224
SR 28 between Dollar Hill to Tahoe Vista	281
SR 28 between Beach Street and SR 267	296
SR 28 east of SR 267	356
SR 28 between SR 267 and Bear Street	355
SR 28 between Bear Street and Coon Street	280
SR 28 between Coon Street and Fox Street	265
SR 267 north of SR 28	289

Notes: CNEL = community noise equivalent level; ft = feet

Refer to Appendix J for detailed traffic noise modeling input data and output results.

Source: Ascent Environmental 2016.

As shown in Table 13-8, the modeled existing 55 CNEL contours extends further than 300 feet from the highway edge along the segments of SR 89 west of Tahoe City, SR 89 between Fanny Bridge and Sunnyside, SR 28 east of SR 267, and SR 28 between Bear Street and Coon Street. Thus, existing traffic noise levels are not in attainment of TRPA's contour-based transportation corridor noise threshold of 55 CNEL for these four highway segments.

The distances to the 55 CNEL contour shown in Table 13-8 are considered to be conservative—that is, more distant from the highway than they actually are—because they do not account for shielding provided by any nearby stands of coniferous trees or buildings and other made-made structures located along the modeled roadway segments. This consideration is important because studies have found that a dense stand of trees can provide additional noise reduction of 5 to 7 dB between a receiver and a noise source (Hoover & Keith Inc. 2000:6-9, as cited in Caltrans 2013a:7-8). Also, for an at-grade facility in an average developed area where the first row of buildings covers at least 40 percent of total area (i.e., no more than 60 percent spacing), the reduction provided by the first row is reasonably assumed to be 3 dB, with 1.5 dB for each additional row (Caltrans 2013a:2-35). For these reasons, the contour distances shown in Table 13-8 indicate whether the 55 CNEL may *potentially* extend more than 300 feet from the highway edge.

Existing sound levels near the golf course were collected for a previous noise study. A 24-hour sound level of 49 CNEL was measured in the rear yard of the First Baptist Church at 390 Fairway Drive and a sound level of 54 CNEL was measured near the third green of the golf course (J.C. Brennan & Associates 2016:2, 5, and 6).

Outdoor events, such as golf tournaments, occasionally take place near the east side of the existing clubhouse at the golf course. These events typically include the use of a public announcement system for raffles and to play amplified music. Noise generated by the gathering of people and the music at these events can be heard at nearby residences. The closest residence is located approximately 200 feet from the existing clubhouse with a direct line of sight to the existing event area. A noise analysis recently conducted for a proposed wintertime ice rink at the golf course used reference noise levels of 70 dB L_{eq} and 65 dB

CNEL at a distance of 50 feet for music and skating activity at the proposed ice rink (J.C. Brennan & Associates 2016:12). Assuming that summertime outdoor events near the clubhouse produce similar sound levels, it is estimated that this residence is exposed to hourly noise levels of 54 dB L_{eq} and 49 dB CNEL during existing golf course events. See Appendix J for calculations of noise attenuation.

13.4 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

13.4.1 Methods and Assumptions

Traffic Noise Increases at Existing Receptors

The potential long-term traffic noise levels resulting from changes in traffic volumes associated with each of the alternatives was assessed by modeling affected highway segments in the Plan area. More specifically, the traffic noise modeling was used to determine the distance from the edge of each highway segment to specific noise contours. Traffic noise modeling was consistent with the FHWA Traffic Noise Model Version 2.5 (FHWA 2004) and used traffic volume data developed for the transportation analysis (Chapter 10, “Transportation and Circulation”). The traffic noise analysis is based on the reference noise levels for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, and default ground attenuation factors. The effect of each alternative on traffic noise levels was analyzed to determine whether long-term traffic noise levels would be different than projected for the Regional Plan in the RPU EIS. For complete details on model inputs, outputs, and assumptions see Appendix J.

TRPA’s noise threshold for the transportation corridors along SRs 89, 28, and 267 are contour based—that is, an exceedance of this threshold occurs if the 55 CNEL contour extends more than 300 feet from the highway edge. For this reason, TRPA’s land use-based CNEL thresholds do not apply within a transportation corridor.

Construction-Generated Noise and Vibration

The types of noise- and vibration-generating construction activities that would occur under each of the Area Plan alternatives was analyzed qualitatively. This analysis focused on whether the levels of noise and ground vibration exposure at existing receptors would be different than identified in the RPU EIS. This analysis was based on the types of construction activity that would be performed, the levels of noise and ground vibration they would produce, and the proximity of construction activity to existing nearby receptors and structures. The analysis of exposure to construction-generated noise and vibration also considers the requirements of TRPA’s Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration.

The potential for construction activities at the Tahoe City Lodge project site to expose receptors to excessive noise levels was assessed based on the types of construction equipment that would be used, the noise levels typically generated by these types of equipment, the proximity of construction activity to existing receptors, and whether construction noise would be generated during noise-sensitive evening and nighttime hours. Referenced noise levels for typical construction equipment are provided by FTA (FHWA 2006).

The potential for construction activities at the lodge site to expose nearby buildings to levels of ground vibration that could result in structural damage and/or negative human response was assessed based on the types of construction equipment that would be used, the levels of ground vibration typically generated by these types of equipment, and the proximity of construction activity to existing nearby buildings. Referenced ground vibration levels for typical construction equipment are provided by FHWA’s Roadway Construction Noise Model (FTA 2006:12-6 and 12-8).

Noise-Land Use Compatibility

This analysis qualitatively examines whether future land uses developed under each Area Plan alternative could be exposed to noise levels that exceed applicable TRPA thresholds. More specifically, this analysis focuses on whether the outdoor activity areas of residential and tourist accommodation land uses could be exposed to high noise levels. It also addresses the potential for existing and future noise-sensitive land uses to be exposed to excessive levels of noise generated by aircraft activity, including helicopters, associated with areas designated as Mixed-Use Recreation (MU-REC) in the Tahoe City Town Center under Area Plan Alternatives 1, 2, and 3.

Detailed, site-specific analysis was conducted for the lodge alternatives to determine whether traffic noise levels from the adjacent segments of SR 28 would exceed applicable TRPA thresholds and or Placer County standards for transportation noise. This analysis also relied on the traffic noise modeling described above.

13.4.2 Significance Criteria

Significance criteria relevant to noise and vibration are summarized below. All significance criteria regard exterior noise levels unless otherwise noted.

TRPA Criteria

The noise and vibration criteria from the TRPA Initial Environmental Checklist were used to evaluate the noise and vibration impacts of the alternatives. In accordance with TRPA's checklist, a project or plan would cause a significant effect if it would:

- ▲ increase existing CNELs beyond those permitted in the applicable plan area statement, Community Plan or Master Plan; or if traffic noise levels would exceed the applicable TRPA noise threshold standards, expressed in CNEL, including the land use-based TRPA Regional Plan Cumulative Noise Level thresholds and the contour-based transportation corridor noise thresholds;
- ▲ cause a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project (i.e., a long-term noise level increase of 3 dB or greater at a noise-sensitive receptor such as a residence, hotel, or tourist accommodation unit).
- ▲ cause a substantial temporary (or periodic) increase in ambient noise levels in the project vicinity above levels existing without the project (i.e., construction noise levels that impact noise-sensitive receptors in during non-daylight hours, for which construction noise is not exempt from TRPA's noise standards;
- ▲ depose existing structures to levels of ground vibration that could result in structural damage (i.e., exceedance of Caltrans's recommended level of 0.2 in/sec PPV with respect to the prevention of structural damage for normal buildings or FTA's maximum acceptable level of 80 VdB with respect to negative human response for residential uses and tourist accommodation units or 83 VdB at commercial land uses [i.e., annoyance]);
- ▲ place residential or tourist accommodation uses in areas where the existing CNEL exceeds 60 dB or is otherwise incompatible; and/or
- ▲ place uses that would generate an incompatible noise level in close proximity to existing residential or tourist accommodation uses.

CEQA Criteria

In accordance with Appendix G of the State CEQA Guidelines, a project would cause a significant noise or vibration impact if it would exceed any of the TRPA criteria listed above. While Placer County has some different 24-hour noise standards than TRPA, this noise impact analysis applies TRPA's CNEL thresholds and standards because they have been specifically developed for the unique noise environment and land use patterns in the Tahoe Basin. This approach is consistent with Section 17.02.050, "Interpretation," of the

Placer County Code. However, the hourly L_{eq} and L_{max} standards of the Placer County Noise Ordinance (Table 13-7) are specifically used to evaluate the impact to noise-sensitive receptors from noise generated by outdoor events at the golf course.

ISSUES NOT WARRANTING DETAILED EVALUATION

The Truckee-Tahoe Airport is the closest airport to the Plan Area, located approximately 4 miles north of the Area Plan boundary. The Area Plan boundary is not located in the Plan Area of the Truckee-Tahoe Airport Land Use Compatibility Plan (Foothill Airport Land Use Commission 2004), the land use plan of any other airport, or within the vicinity of an active private airstrip where people would be exposed to excessive aircraft-generated noise levels.

None of the alternatives would affect the type or number of aircraft operations at the Truckee-Tahoe Airport. Similarly, no changes to levels of activity by recreational watercraft, motorcycles, off-road vehicles, and over-snow vehicles are anticipated under any of the alternatives because they are not expected to result in additional recreational boating facilities, trails, or recreation areas for these types of vehicles. Furthermore, the types of recreational watercraft, motorcycles, off-road vehicles, and over-snow vehicles, as well as on-road vehicles, would not change as a result of any of the alternatives. TRPA single event noise standards, shown in Table 3.16-3 above, would continue to apply to all of these noise sources.

13.4.3 Environmental Effects of the Project Alternatives

Impact 13-1: Long-term traffic noise levels

Traffic noise increases associated with land use development under Area Plan Alternatives 1, 2, 3, and 4 would increase along some highway transportation corridors and decrease along others. For those highway segments that would experience traffic noise increases, these increases would be nominal and not unlike the increases in traffic noise identified in the RPU EIS. Area Plan Alternatives 1, 2, 3, and 4 would generate less noise-generating VMT than anticipated in the RPU EIS. Moreover, as stated in the RPU EIS, TRPA would only approve individual projects that can demonstrate compliance with TRPA's CNEL thresholds (TRPA 2012c:3.6-16). For these reasons, this impact would be **less than significant** for the purposes of TRPA and CEQA environmental review at the program level.

Lodge Alternatives 1, 2, and 3 would result in a decrease in traffic noise levels along all affected highway transportation corridors consistent with the corresponding reduction in daily traffic volumes. Thus, this impact would be **less than significant** for Lodge Alternatives 1, 2, and 3. Lodge Alternative 4 would result in an increase in traffic noise levels along affected highway transportation corridors. Lodge Alternative 4 would also expose the outdoor activity areas of noise-sensitive land uses to traffic noise levels that exceed applicable Placer County standards. Because mitigation cannot be required of a no-action alternative, this impact would be **significant and unavoidable** for the purposes of TRPA and CEQA environmental review at the project level for Alternative 4.

Placer County Tahoe Basin Area Plan Program-Level Analysis

Long-term traffic noise levels along highway corridors in the Plan area would increase due to the increase in traffic volumes associated with future land use development under all the Area Plan alternatives. To make a significance determination for the purpose of TRPA and CEQA environmental review, this program-level analysis of long-term traffic noise levels that would occur under the Area Plan alternatives tiers from the program-level analysis of traffic noise in the RPU EIS.

The program-level analysis in the RPU EIS determined that the traffic noise reduction measures included in TRPA's region-Wide Traffic Noise Mitigation Program would ensure that traffic noise levels resulting from the anticipated land use development under the RPU would not exceed TRPA-established CNEL thresholds. More specifically, according to the RPU EIS, TRPA would only approve projects that can demonstrate compliance

with TRPA's CNEL thresholds (TRPA 2012c:3.6-16). Similarly, TRPA would not approve any individual land use development project proposed under an Area Plan alternative if the vehicle trips associated with that project would cause or contribute to an exceedance of one of TRPA's CNEL thresholds. Thus, all of the Area Plan alternatives would be consistent with the RPU.

Moreover, the transportation analysis prepared for this EIR/EIS determined that the net increase in VMT associated with new development and redevelopment under all of the Area Plan alternatives within the Placer County portion of the Tahoe Basin would be less than the level of VMT for the same area estimated in the RPU EIS. This is explained in Chapter 10, "Transportation and Circulation" of this EIR/EIS. Therefore, traffic noise level increases associated with new development in the study area under the Area Plan alternatives would generally be less than the traffic noise increases evaluated in the RPU EIS.

Nonetheless, to disclose and evaluate long-term traffic noise levels under the Area Plan alternatives, traffic noise levels along the state routes that pass through the study area were estimated using the FHWA Traffic Noise Model, Version 2.5 (FHWA 2004). Key inputs used in the Traffic Noise Model included roadway segment volumes shown in Table 10-6 of Chapter 10, "Transportation and Circulation" for existing conditions and Alternatives 1, 2, 3, and 4, and the speed of vehicle travel along each modeled roadway segment. The projected traffic volumes include trips that would be generated by land uses developed as part of the Kings Beach Center design concept. As explained in the regulatory setting above, TRPA established a specific contour-based noise threshold for the SR 89, SR 28, and SR 267 transportation corridors. The threshold specifies that the 55 CNEL contour generated by vehicle travel on these highways shall not extend more than 300 feet from the highway's edge. Table 13-9 presents the estimated distances to the 55 CNEL contour along all the highway segments in the study area for the Area Plan alternatives. Table 13-9 shows how each Area Plan alternative would affect the extent of the 55 CNEL contours in combination with both existing-no-project and cumulative-no-project conditions. The distances to the 55 CNEL contour shown in Table 13-9 are considered to be conservative for many portions of the modeled highway segments—that is, the 55 CNEL contour distances shown in Table 13-9 are likely more distant from the highway than they actually would be—because they do not account for shielding provided by stands of coniferous trees or buildings and other man-made structures located along the modeled roadway segments. This consideration is important because studies have found that a dense stand of trees can provide additional noise reduction of 5 to 7 dB between a receiver and a noise source (Hoover & Keith Inc. 2000:6-9, as cited in Caltrans 2013a:7-8). Also, for an at-grade facility in an average developed area where the first row of buildings covers at least 40 percent of total area (i.e., no more than 60 percent spacing), the reduction provided by the first row is reasonably assumed to be 3 dB, with 1.5 dB for each additional row (Caltrans 2013a:2-35). For these reasons, the contour distances shown in Table 13-9 indicate whether the 55 CNEL may *potentially* extend more than 300 feet from the highway edge.

Separate analyses for each Area Plan alternative are provided below.

Alternative 1: Proposed Area Plan

As shown in Table 13-9, the 55 CNEL contour along five of the modeled highway segments could potentially extend more than 300 feet from the highway edge, including the segments of SR 28 between Beach Street and SR 267, SR 28 between SR 267 and Bear Street, SR 89 west of Tahoe City, SR 89 between Fanny Bridge and Sunnyside, and SR 267 North of SR 28. (The traffic volumes used to model the traffic noise level estimates shown in Table 13-9 include vehicle trips that would be generated by land uses developed as part of the Kings Beach Center design concept.) In addition, traffic noise levels beyond the highway corridor (i.e., at distances greater than 300 feet from the highway edge) may also potentially exceed CNEL standards established by TRPA for particular land use types, including the 55 CNEL standard for high-density residential land uses, the 50 CNEL standard for low-density residential land uses, the 55 CNEL standard for urban outdoor recreation uses, and the 50 CNEL standard for rural outdoor recreation areas, among others. The traffic noise modeling used to produce the estimates in Table 13-9 also indicated that traffic noise level increases along all the modeled highway segments would be less than 3 dB, which is the minimum a noise level increase that people are able to detect (Caltrans 2013a:2-45). Also, the 55 CNEL contour along some of the highway segments would decrease nominally or stay the same compared to existing conditions and/or compared to cumulative-no-project conditions (represented by cumulative-plus-Alternative 4 conditions).

Table 13-9 Estimated Distances to 55 CNEL Traffic Noise Contour in the Highway Transportation Corridors (feet from roadway edge)

Highway Segment	Existing Conditions	Existing-plus-Area Plan Alternative 1	Existing-plus-Area Plan Alternative 2	Existing-plus-Area Plan Alternative 3	Existing-plus-Area Plan Alternative 4 (No Project)	Cumulative-plus-Area Plan Alternative 1	Cumulative-plus-Area Plan Alternative 2	Cumulative-plus-Area Plan Alternative 3	Cumulative-plus-Area Plan Alternative 4 (No Project)
SR 89 west of Tahoe City	371	381	380	381	371	421	418	419	410
SR 89 between Fanny Bridge and Sunnyside	343	347	346	347	341	368	367	368	362
SR 89 between Mackinaw Road and SR 28	241	131	131	133	132	137	137	139	138
SR 28 east of SR 89	201	208	203	212	211	226	221	230	228
SR 28 west Lake Boulevard and Mackinaw Road	200	207	202	211	210	225	220	229	227
SR 28 between Mackinaw Road and Grove Street	200	205	202	209	214	220	217	224	232
SR 28 between Grove Street and Jackpine Street	224	223	221	226	223	241	238	243	240
SR 28 between Dollar Hill and Tahoe Vista	281	292	295	296	295	307	310	311	310
SR 28 between Beach Street and SR 267	296	307	310	310	309	322	325	326	325
SR 28 east of SR 267	356	359	354	359	358	376	372	377	375
SR 28 between SR 267 and Bear Street	355	357	353	358	356	375	371	376	374
SR 28 between Bear Street and Coon Street	280	288	289	280	290	299	299	290	300
SR 28 between Coon Street and Fox Street	265	267	268	260	268	276	277	269	277
SR 267 north of SR 28	289	298	302	304	302	325	329	330	329

Notes:

Bolded numbers show locations where the 55 CNEL contour would exceed more than 300 feet from the edge of the highway.

All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

All traffic noise modeling assumes average pavement, level roadways (less than 1.5% grade), and constant traffic flow. Estimated distances to the 55 CNEL contour do not account for shielding provided by stands of coniferous trees or buildings located along some portions of the modeled roadway segments or any other types of site-specific features. Studies have found that a dense stand of trees can provide additional noise reduction of 5 to 7 dB between a receiver and a noise source (Hoover & Keith Inc. 2000:6-9, as cited in Caltrans 2013:7-8). Generally, for an at-grade facility in an average developed area where the first row of buildings covers at least 40% of total area (i.e., no more than 60% spacing), the reduction provided by the first row is reasonably assumed to be 3 dB, with 1.5 dB for each additional row (Caltrans 2013:2-35).

Source: Ascent Environmental 2016

Nonetheless, the projection that the 55 CNEL contour along some of the modeled highway segments could potentially extend more than 300 foot from the highway's edge is consistent with the findings identified in the RPU EIS (TRPA 2012c:3.6-13 and 3.6-14 [See the analysis for the selected alternative, Alternative 3, of that document]). These include the segment of SR 89 west of Tahoe City, SR 89 between Fanny Bridge and Sunnyside, SR 28 between Beach Street and SR 267, SR 28 east of SR 267, and SR 28 between SR 267 and Bear Street.

Since the Regional Plan was adopted, however, TRPA developed and has begun to implement a region-wide traffic noise reduction program for attaining and maintaining traffic noise levels to below applicable CNEL standards. The program includes a variety of measures that apply to both existing land uses and future developed land uses in the region. One of the key elements of the traffic noise reduction program is to reduce traffic volumes on highways and roadways by encouraging higher-density and mixed-use development and redevelopment that generates fewer vehicle trips than lower-density land use development. Other key elements of the program include the addition of more bicycle and pedestrian infrastructure, reducing speed limits and/or implementing traffic-calming measures that slow travel speeds, and supporting and encouraging employee carpool and van pool opportunities.

In summary, the traffic noise increases under Alternative 1 would be nominal along some highway segments and not unlike the increases in traffic noise identified in the RPU EIS. Alternative 1 would generate less noise-generating VMT than anticipated in the RPU EIS and, therefore, be consistent with TRPA's region-wide traffic noise reduction program. Moreover, as stated in the RPU EIS, TRPA would only approve individual projects that can demonstrate compliance with TRPA's CNEL thresholds (TRPA 2012c:3.6-16). For these reasons, this impact would be **less than significant** for the purposes of TRPA and CEQA environmental review.

Alternative 2: Area Plan with No Substitute Standards

As shown in Table 13-9, the distances to the 55 CNEL contours for Alternative 2 would generally be the same as for Alternative 1 with the 55 CNEL contour extending more than 300 foot from the highway edge of the same five highway segments by approximately the same distances. (The traffic volumes used to model the traffic noise level estimates shown in Table 13-9 include vehicle trips that would be generated by land uses developed as part of the Kings Beach Center design concept.) Also similar to Alternative 1, traffic noise levels beyond the highway corridor (i.e., at distances greater than 300 feet from the highway edge) may also potentially exceed CNEL standards established by TRPA for particular land use types. The traffic noise increases along these roadway segments would be nominal and not unlike the increases in traffic noise identified in the RPU EIS. Alternative 2 would generate less noise-generating VMT than anticipated in the RPU EIS and, therefore, be consistent with TRPA's region-wide traffic noise reduction program. Moreover, as stated in the RPU EIS, TRPA would only approve individual projects that can demonstrate compliance with TRPA's CNEL thresholds (TRPA 2012c:3.6-16). For these reasons, this impact would be **less than significant** for the purposes of TRPA and CEQA environmental review.

Alternative 3: Reduced Intensity Area Plan

As shown in Table 13-9, the distances to the 55 CNEL contours for Alternative 3 would generally be the same as for Alternative 1 with the 55 CNEL contour extending more than 300 foot from the highway edge of the same five highway segments by approximately the same distances. (The traffic volumes used to model the traffic noise level estimates shown in Table 13-9 include vehicle trips that would be generated by land uses developed as part of the Kings Beach Center design concept.) Also similar to Alternative 1, traffic noise levels beyond the highway corridor (i.e., at distances greater than 300 feet from the highway edge) may also potentially exceed CNEL standards established by TRPA for particular land use types. The traffic noise increases along these roadway segments would be nominal and not unlike the increases in traffic noise identified in the RPU EIS. Alternative 2 would generate less noise-generating VMT than anticipated in the RPU EIS and, therefore, be consistent with TRPA's region-wide traffic noise reduction program. Moreover, as stated in the RPU EIS, TRPA would only approve individual projects that can demonstrate compliance with TRPA's CNEL thresholds (TRPA 2012c:3.6-16). For these reasons, this impact would be **less than significant** for the purposes of TRPA and CEQA environmental review.

Alternative 4: No Project

As shown in Table 13-9, the distances to the 55 CNEL contours for Alternative 4 would generally be the same as for Alternative 1 with the 55 CNEL contour extending more than 300 foot from the highway edge of the same five highway segments by approximately the same distances. (The traffic volumes used to model the traffic noise level estimates shown in Table 13-9 in vehicle trips that would be generated by land uses developed as part of the Kings Beach Center design concept.) Also similar to Alternative 1, traffic noise levels beyond the highway corridor (i.e., at distances greater than 300 feet from the highway edge) may also potentially exceed CNEL standards established by TRPA for particular land use types. The traffic noise increases along these roadway segments would be nominal and not unlike the increases in traffic noise identified in the RPU EIS. Alternative 4 would generate less noise-generating VMT than anticipated in the RPU EIS and, therefore, be consistent with TRPA's region-wide traffic noise reduction program. Moreover, as stated in the RPU EIS, TRPA would only approve individual projects that can demonstrate compliance with TRPA's CNEL thresholds (TRPA 2012c:3.6-16). For these reasons, this impact would be **less than significant** for the purposes of TRPA and CEQA environmental review.

Tahoe City Lodge Project-Level Analysis**Alternative 1: Proposed Lodge**

Under Alternative 1, operation of the lodge would generate 178 fewer vehicle trips per day than the commercial land uses that would be removed. This is shown in Table 10-8 in Chapter 10, "Transportation and Circulation." This net reduction in vehicle trips means that Alternative 1 would not result in increased traffic noise levels along area roadways, including the highway segments listed in Table 13-9. This impact would be **less than significant** for the purposes of TRPA and CEQA environmental review.

Alternative 2: Reduced Scale Lodge

Under Alternative 2, operation of the lodge would generate 922 fewer vehicle trips per day than the commercial land uses that would be removed. This is shown in Table 10-9 in Chapter 10, "Transportation and Circulation." This net reduction in vehicle trips means that Alternative 1 would not result in increased traffic noise levels along area roadways, including the highway segments listed in Table 13-9. This impact would be **less than significant** for the purposes of TRPA and CEQA environmental review.

Alternative 3: Reduced Height Lodge

Similar to Alternative 1, operation of the lodge under Alternative 3 would generate 178 fewer vehicle trips per day than the commercial land uses that would be removed. This is shown in Table 10-10 in Chapter 10, "Transportation and Circulation." This net reduction in vehicle trips means that the lodge with Alternative 3 would not result in increased traffic noise levels along area roadways, including the highway segments listed in Table 13-9. This impact would be **less than significant** for the purposes of TRPA and CEQA environmental review.

Alternative 4: No Project

Under Alternative 4, increased occupancy at the existing commercial complex at the lodge site would generate a net increase of 1,819 vehicle trips per day, as shown in Table 10-11 in Chapter 10, "Transportation and Circulation." Table 13-10 summarizes how the net increase in trips would affect traffic noise levels along highway segments in the Tahoe Basin. More specifically, Table 13-10 shows the distance of the 55, 60, and 65 CNEL contours from the highway edge under existing and existing-plus-Alternative 4 conditions.

As shown in Table 13-10, the increase in vehicle trips under Alternative 4 would cause the 55 CNEL contours to become more distant from the highway edge along all the affected highway segments. Four of these highway segments are already not in attainment of TRPA's transportation corridor noise threshold, including SR 28 between SR 267 to Bear Street, SR 89 west of Tahoe City, SR 89 from Fanny Bridge to Sunnyside, and SR 28 East of SR 267. Because traffic noise levels along these four highway segments are not in attainment of TRPA's transportation corridor noise threshold, the increase in the distance to the 55 CNEL contour along these four highway segments would be considered a cumulative contribution to the exceedance of this threshold. This would be a **significant** impact for the purposes of TRPA environmental review.

Table 13-10 Estimated Distances to 55, 60, and 65 CNEL Traffic Noise Contour in the Highway Transportation Corridors with Lodge Alternative 4 (feet from roadway edge)

Highway Segment	Existing Conditions			Existing-plus-Alternative 4 (No Project)			
	55 CNEL	60 CNEL	65 CNEL	55 CNEL	60 CNEL	65 CNEL	Increase in distance to 60 CNEL
SR 89 west of Tahoe City	371	172	80	379	176	82	4
SR 89 between Fanny Bridge and Sunnyside	343	159	74	350	162	75	3
SR 89 between Mackinaw Road and SR 28	241	112	52	246	114	53	2
SR 28 east of SR 89	201	93	43	206	96	44	3
SR 28 west Lake Boulevard and Mackinaw Road	200	93	43	210	97	45	4
SR 28 between Mackinaw Road and Grove Street	200	93	43	205	95	44	2
SR 28 between Grove Street and Jackpine Street	224	104	48	229	106	49	2
SR 28 between Dollar Hill and Tahoe Vista	281	131	61	288	134	62	3
SR 28 between Beach Street and SR 267	296	137	64	299	139	64	2
SR 28 east of SR 267	356	165	77	359	167	77	2
SR 28 between SR 267 and Bear Street	355	165	76	358	166	77	1
SR 28 between Bear Street and Coon Street	280	130	60	284	132	61	2
SR 28 between Coon Street and Fox Street	265	123	57	269	125	58	2
SR 267 north of SR 28	289	134	62	289	134	62	0

Notes: All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

All traffic noise modeling assumes average pavement, level roadways (less than 1.5% grade), and constant traffic flow. Estimated distances to the 55 CNEL contour do not account for shielding provided by stands of coniferous trees or buildings located along some portions of the modeled roadway segments or any other types of site-specific features. Studies have found that a dense stand of trees can provide additional noise reduction of 5 to 7 dB between a receiver and a noise source (Hoover & Keith Inc. 2000:6-9, as cited in Caltrans 2013:7-8). Generally, for an at-grade facility in an average developed area where the first row of buildings covers at least 40 percent of total area (i.e., no more than 60 percent spacing), the reduction provided by the first row is reasonably assumed to be 3 dB, with 1.5 dB for each additional row (Caltrans 2013:2-35).

Source: Ascent Environmental 2016.

Also shown in Table 13-10, traffic generated by development under Alternative 4 would cause the CNEL contours along all but one of the modeled highway segments to extend further from the highway edge. The 60 CNEL contours along the other highway segments would extend anywhere from 95 to 176 feet from the highway edge. Some outdoor activity areas of existing residential and tourist accommodation land uses would be located within these expanded 60 CNEL contours. Also shown in Table 13-10, the 65 CNEL contours along these affected highway segments would extend 44 to 82 feet from the highway edge. Some, but a lesser number, of activity areas of existing residential and tourist accommodation land uses would be located within these 65 CNEL contours.

Because mitigation cannot be required of a no-action alternative, this impact would be **significant and unavoidable** for the purposes of TRPA and CEQA environmental review.

Impact 13-2: Short-term project-related construction noise levels

Projects proposed under the Area Plan may include development, redevelopment, commercial and tourist uses, transit and transportation, recreation, public/quasi-public facilities, and natural resources restoration. Construction activities to implement such projects would be subject to TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration. As described in the RPU EIS, the implementation of these best construction practices would ensure that off-site noise-sensitive receptors are not exposed to excessive construction noise levels during noise-sensitive times of the day, thus this impact would be **less than significant** for all alternatives.

Noise-generating activities performed for the construction of the Tahoe City Lodge under Alternatives 1, 2, and 3 would not occur outside of the hours exempted by TRPA or Placer County. All noise reduction measures required by TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration would also be implemented. Therefore, this impact would be **less than significant** for Alternatives 1, 2, and 3. Alternative 4 (No Project Alternative) would not include any construction activities. Therefore, there would be **no impact** for Alternative 4 related to construction noise.

Placer County Tahoe Basin Area Plan Program-Level Analysis

The program-level analysis of construction-generated noise levels that would occur under the Area Plan alternatives tiers from the program-level analysis in the RPU EIS.

The mix of new land use development and redevelopment that could occur under the Area Plan alternatives would be different than the mix of land use development in the Placer County portion of the Tahoe Basin anticipated by the RPU. However, the types of noise-generating construction activity and the location of construction activity relative to nearby noise-sensitive receptors would generally be the same. Construction activities would include site preparation (e.g., excavation, grading, tree and vegetation removal), laying of concrete foundations, paving, building erection, equipment installation, finishing, and cleanup. These activities typically involve the use of noise-generating equipment. Table 13-11 shows the maximum noise levels generated by the types of equipment (and activities) that would be used in the construction of land uses developed under the Area Plan.

Table 13-11 Typical Equipment Noise Levels

Type of Equipment	Noise Level (L _{max}) at 50 feet
Impact Pile Driver	101
Vibratory Pile Driver	101
Blasting	94
Crane	85
Excavator	85
Dozer	85
Grader	85
Dump Truck	84
Generator	82
Backhoe	80
Compactor	80
Front End Loader	80
Chain Saw	84
Wood Chipper	75 ^{1a}

^aThe reference sound level for a wood chipper is based on sound levels provided in Berger, Neitzel, and Kladden 2010.

Source: FHWA 2006:3, unless otherwise noted. This information was also presented in Table 3.6-7 of the RPU EIS (TRPA 2012c:3.6-16 through 3.6-17)

The program-level analysis in the RPU EIS concluded that, with the development and implementation of TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration, construction activity associated with land use development in the Tahoe Basin area would not expose noise-sensitive receptors to excessive noise levels or to noise levels that exceed TRPA thresholds and standards (TRPA 2012c:3.6-19). As described in the regulatory setting above, TRPA's Best

Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration requires many measures that would minimize the exposure of nearby receptors to construction-related noise. One of the key required measures is to limit noise-generating construction activity to the hours between 8:00 a.m. and 6:30 p.m. (TRPA 2015a:6; TRPA 2015b:4 to 5). This time-of-day limitation is consistent with Article 9.36.030 of the Placer County noise ordinance, which exempts construction-generated noise from the County's noise standards if it is performed 6:00 a.m. and 8:00 p.m., Monday through Friday, and between 8:00 a.m. and 8:00 p.m. Saturday and Sunday,

Alternative 1: Proposed Area Plan

As shown in Table 11-4 in Chapter 11, "Air Quality," Alternative 1 would result in the development of 180,000 square feet less commercial floor area and 400 more TAUs by 2035 than what was estimated for the Placer County area of the RPU. In addition, the project-specific details of the King Beach Center design concept are unknown at this time, but construction could include up to 58,900 square feet of non-residential space and up to 110 TAUs (see Table 3-4).

Because the types of noise-generating construction activity that would occur under the Alternative 1 would be similar to the types of noise-generating construction activity evaluated in the RPU EIS, and due to the implementation of all noise reduction measures required by TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration, construction noise generated under Alternative 1 would be less than significant at the program level. Construction noise associated with individual development or redevelopment projects would still have to be analyzed at the project level, and individual projects would be required to comply with TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration and Article 9.36.030 of the Placer County noise ordinance.

Alternative 2: Area Plan with No Substitute Standards

As shown in Table 11-4, Alternative 2 would result in virtually no land uses changes in the Placer County area compared to what was anticipated in the RPU EIS. In addition, the project-specific details of the King Beach Center design concept are unknown at this time, but construction could include up to 58,900 square feet of non-residential space and up to 110 TAUs (see Table 3-4). Thus, being consistent with the significance determination made in the RPU EIS, construction noise generated under Alternative 2 would be **less than significant** at the program level. Construction noise associated with individual development or redevelopment projects would still have to be analyzed at the project level and individual projects would be required to comply with TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration and Article 9.36.030 of the Placer County noise ordinance.

Alternative 3: Reduced Intensity Area Plan

As shown in Table 11-4, Alternative 3 would result in the development of 90,000 square feet less commercial floor area and 200 more TAUs by 2035 than what was estimated for the Placer County area in the RPU EIS. There would also be minor differences in the mix of full-time and seasonal/part-time residential units. In addition, the project-specific details of the King Beach Center design concept are unknown at this time, but construction could include up to 58,900 square feet of non-residential space and up to 110 TAUs (see Table 3-4).

Because the types of noise-generating construction activity that would occur under Alternative 3 would be similar to the types of noise-generating construction activity evaluated in the RPU EIS, and due to the requirements of TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration, construction noise generated under Alternative 3 would be **less than significant** at the program level. Construction noise associated with individual development or redevelopment projects would still have to be analyzed at the project level and individual projects would be required to comply with TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration and Article 9.36.030 of the Placer County noise ordinance.

Alternative 4: No Project

Alternative 4 would include implementation of the Regional Plan as adopted in 2012. As analyzed in the RPU EIR/EIS, Alternative 4 would result in the construction of 22 fewer long-term residential units and 24 more

short-term residential units compared to the RPU (see Table 11-4). In addition, the project-specific details of the King Beach Center design concept are unknown at this time, but construction could include up to 58,900 square feet of non-residential space and up to 110 TAUs (see Table 3-4).

Because the types of noise-generating construction activity that would occur under the Alternative 4 would be similar to the types of noise-generating construction activity evaluated in the RPU EIS, and due to the requirements of TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration, construction noise generated under Alternative 3 would be **less than significant** at the program level. Construction noise associated with individual development or redevelopment projects would still have to be analyzed at the project level, and individual projects would be required to comply with TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration and Article 9.36.030 of the Placer County noise ordinance.

Tahoe City Lodge Project-Level Analysis

Noise-generating construction activities associated with the Tahoe City Lodge project would include site preparation (i.e., earth moving, grading, excavation), building construction activities (e.g., foundation, backfill), and paving. No blasting or pile driving would be needed. Construction would occur in several discrete stages, each phase requiring a varying set of equipment types, quantity, and intensity. Construction noise levels in the vicinity of the lodge site would fluctuate depending on the particular type, number, and duration of usage for the varying equipment and construction activities taking place. However, construction activities and equipment use would be generally the same under each alternative. The level of noise exposure at off-site noise-sensitive receptors on any given day depends on the type of construction activities taking place, noise levels generated by those activities, and the proximity of the construction activity to the noise-sensitive receptors.

Based on project-specific data, construction noise levels would be greatest during site preparation activities (i.e., demolition, grading, earth moving, excavation), and building construction (i.e., foundation, backfill). The anticipated types of construction equipment would include large excavating backhoes, a bulldozer, loaders, all-terrain rubber tired cranes, and concrete mixers. Reference noise levels for these equipment types are presented in Table 13-11.

The nearest noise-sensitive receptors are located along Fairway Drive to the northwest of the project site, and southeast of the project site on the opposite side of SR 28 (Exhibit 13-1). A single-family residence is located off of Fairway Drive northwest of the existing golf course clubhouse and approximately 150 feet from where construction staging activities could occur. Transient lodging land uses are located across SR 28, approximately 200 feet from the boundary of the project site.

Alternative 1: Proposed Lodge

Based on the reference noise levels shown in Table 13-11 and typical usage factors of individual equipment types, daytime construction-related activities under Alternative 1 could result in noise levels as high as 85 dB Leq at a distance of 50 feet. Through distance alone, this noise level would attenuate to approximately 81 dB Leq at the private residence on Fairway Drive northeast of the project site and 78 dB Leq at the Tahoe Marina Lodge southwest of the project site. (Details of these calculations are provided in Appendix J.)

Therefore, these noise-sensitive receptors would experience construction noise levels that exceed Placer County's daytime hourly Leq standard of 55 dB (7:00 a.m. to 10:00 p.m.) and Placer County's Lmax standard of 70 dB. However, all noise-generating construction activity, including the use of heavy-duty equipment, would take place during daytime hours exempt by both TRPA (i.e., 8:00 a.m. to 6:30 p.m., daily) and Placer County (i.e., 6:00 a.m. to 8:00 p.m., Monday through Friday, and 8:00 a.m. to 8:00 p.m. Saturday and Sunday). Moreover, all construction activity would implement other requirements of TRPA's Best

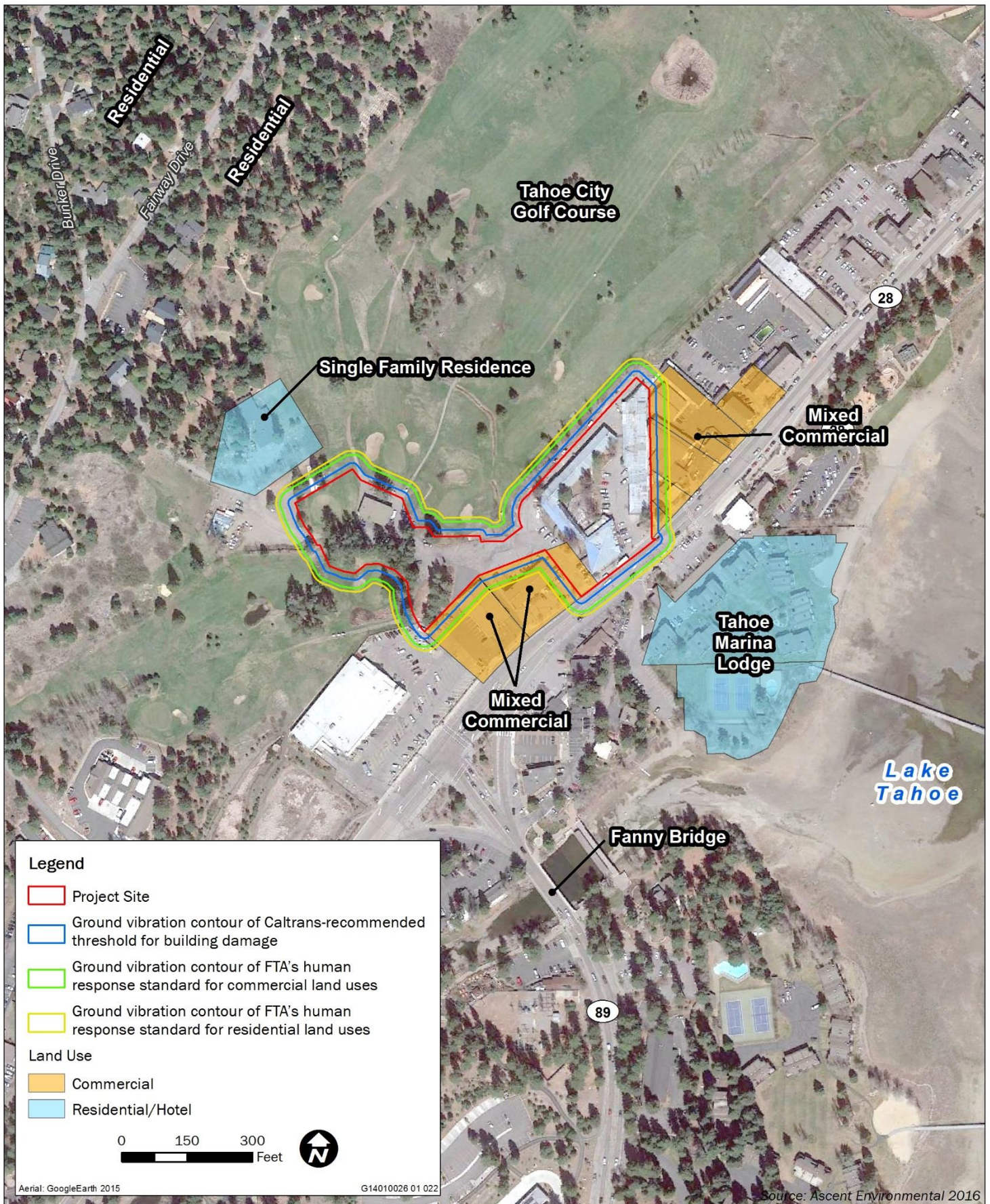


Exhibit 13-1

Noise-Sensitive Receptors Near the Tahoe City Lodge Project Site

Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration. This includes requirements to location stationary equipment (e.g. generators or pumps) as far as feasible from noise-sensitive receptors and residential areas. For these reasons, this impact would be **less than significant**.

Alternative 2: Reduced Scale Lodge

Noise-generating construction activity that would occur under Alternative 2 would involve the same types of construction equipment in approximately the same locations as described for Alternative 1, resulting in similar levels of noise exposure at nearby noise-sensitive receptors. Therefore, short-term construction noise impacts under Alternative 2 would be the same as discussed above under Alternative 1. This impact would be **less than significant**.

Alternative 3: Reduced Height Lodge

Noise-generating construction activity that would occur under Alternative 3 would involve the same types of construction equipment in approximately the same locations as described for Alternative 1, resulting in similar levels of noise exposure at nearby noise-sensitive receptors. Therefore, short-term construction noise impacts under Alternative 2 would be the same as discussed above under Alternative 1. This impact would be **less than significant**.

Alternative 4: No Project

The No Project Alternative would not include any construction activities and therefore would not result in any short-term increases in noise exposure at nearby noise-sensitive receptors. Thus, there would be **no impact** related to construction noise.

Mitigation Measures

No mitigation is required.

Impact 13-3: Ground vibration

Projects proposed under the Area Plan may include development, redevelopment, commercial and tourist uses, transit and transportation, recreation, public/quasi-public facilities, and natural resources restoration. Construction activities to implement such projects would be subject to TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration. As described in the RPU EIS, the implementation of these best construction practices would ensure that off-site ground vibration-sensitive receptors are not exposed to excessive levels of construction-generated ground vibration. For this reason, this impact would be **less than significant** for all the Area Plan alternatives.

For lodge Alternatives 1, 2, and 3, ground vibration generated by heavy equipment used during demolition and construction on the Tahoe City Lodge site could potentially expose nearby off-site those buildings to levels of ground vibration that exceed the Caltrans-recommended standard of 0.2 inch/second PPV for structural damage. In addition, ground vibration generated by heavy construction equipment could expose occupants of nearby buildings to levels of ground vibration that exceed FTA's human response standard of 83 VdB for commercial buildings (i.e., where people do not sleep). This would be a **significant** impact for Alternatives 1, 2, and 3. Implementation of Mitigation Measure 13-3 would ensure that construction-generated ground vibration would not result in damage to offsite buildings and or in a negative human response. Thus, ground vibration impacts associated with demolition and construction activities at the Tahoe City Lodge site for Alternatives 1, 2, and 3 would be reduced to a **less-than-significant** level. For Alternative 4 (No Project Alternative) no heavy off-road construction equipment operations would take place on the lodge site. Therefore, there would be **no impact** for Alternative 4 related to ground vibration.

Placer County Tahoe Basin Area Plan Program-Level Analysis

The program-level analysis of construction-generated vibration levels that would occur under the Area Plan alternatives tiers from the program-level analysis in the RPU EIS.

The mix of new land use development and redevelopment that would occur under the Area Plan alternatives would be different than the mix of land use development in the Placer County portion of the Tahoe Basin anticipated by the RPU. However, the types of ground vibration-generating construction activity and the location of construction activity relative to nearby ground vibration-sensitive receptors would generally be the same. Construction activities would include site preparation (e.g., excavation, grading, tree and vegetation removal), laying of concrete foundations, paving, building erection, equipment installation, finishing, and cleanup. These construction activities typically involve the use of ground vibration-generating equipment. Table 3-13 shows the maximum ground vibration levels generated by the types of equipment (and activities) that would be used in the construction of land uses developed under the Area Plan alternatives.

Table 13-12 Representative Ground Vibration and Noise Levels for Construction Equipment

Equipment	PPV at 25 feet (in/sec) ¹	Approximate L _v (VdB) at 25 feet ²
Pile Driver (impact) upper range	1.518	112
Typical	0.644	104
Pile Driver (sonic) upper range	0.734	105
Typical	0.170	93
Blasting	1.13	109
Large Dozer	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Rock Breaker	0.059	83
Jackhammer	0.035	79
Small Dozer	0.003	58

PPV = peak particle velocity; L_v = the root mean square velocity expressed in vibration decibels (VdB), assuming a crest factor of 4; VdB = vibration decibels.

Source: FTA 2006:p.12-6,12-8

The program-level analysis in the RPU EIS concluded that, with the development and implementation of TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration, construction activity associated with land use development in the Tahoe Basin area would not expose ground vibration-sensitive receptors to excessive ground vibration levels that exceed TRPA standards. As described in the regulatory setting above, TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration requires measures that would minimize the exposure of nearby receptors to construction-related ground vibration levels.

Alternative 1: Proposed Area Plan

As shown in Table 11-4, Alternative 1 would result in the development of 180,000 square feet less commercial floor area and 400 more TAUs by 2035 than what was estimated for the Placer County portion of the Tahoe Basin in the RPU EIS. Though project-specific details of the King Beach Center design concept are unknown at this time, construction could include up to 58,900 square feet of non-residential space and up to 110 TAUs (see Table 3-4).

The types of ground vibration-generating construction activity that would occur under Alternative 1 would be similar to the types of noise-generating construction activity evaluated in the RPU EIS, and measures would be implemented to reduce the potential for exposure of nearby buildings to excessive levels of ground vibration exposure. These measures are required by TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration. Because TRPA would only approve projects with construction activity that would not generate ground vibration levels that would cause damage to nearby structures or negative human response, this impact would be **less than significant** at the

program level. Construction ground vibration associated with individual development or redevelopment projects would still have to be analyzed at the project level.

Alternative 2: Area Plan with No Substitute Standards

As shown in Table 11-4, Alternative 2 would result in virtually no land uses changes in the Placer County portion of the Tahoe Basin when compared to what was anticipated in the RPU EIS. Though project-specific details of the King Beach Center design concept are unknown at this time, the development could include up to 58,900 square feet of non-residential space and up to 110 TAUs (see Table 3-4).

Similar to Alternative 1, the types of ground vibration-generating construction activity that would occur under Alternative 2 would be similar to the types of noise-generating construction activity evaluated in the RPU EIS. Measures would be implemented to reduce the potential for exposure of nearby buildings to excessive levels of ground vibration exposure pursuant to the requirements of TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration. Because TRPA would only approve projects with construction activity that would not generate ground vibration levels that would cause damage to nearby structures or negative human response, this impact would be **less than significant** at the program level. Construction ground vibration associated with individual development or redevelopment projects would still have to be analyzed at the project level.

Alternative 3: Reduced Intensity Area Plan

As shown in Table 11-4, Alternative 3 would result in the development of 90,000 square feet less commercial floor area and 200 more TAUs by 2035 than what was estimated for the Placer County portion of the Tahoe Basin in the RPU EIS. There would also be minor differences in the mix of full-time and seasonal/part-time residential units. In addition, the project-specific details of the King Beach Center design concept are unknown at this time, but construction could include up to 58,900 square feet of non-residential space and up to 110 TAUs (see Table 3-4).

Similar to Alternative 1, the types of ground vibration-generating construction activity that would occur under Alternative 3 would be similar to the types of noise-generating construction activity evaluated in the RPU EIS. Measures would be implemented to reduce the potential for exposure of nearby buildings to excessive levels of ground vibration exposure pursuant to the requirements of TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration. Because TRPA would only approve projects with construction activity that would not generate ground vibration levels that would cause damage to nearby structures or negative human response, this impact would be **less than significant** at the program level. Construction ground vibration associated with individual development or redevelopment projects would still have to be analyzed at the project level.

Alternative 4: No Project

Alternative 4 would include implementation of the Regional Plan as adopted in 2012. As analyzed in the RPU EIR/EIS, Alternative 4 would result in the construction of 22 fewer long-term residential units and 24 more short-term residential units than the RPU (see Table 11-4). In addition, the project-specific details of the King Beach Center design concept are unknown at this time, but construction could include up to 58,900 square feet of non-residential space and up to 110 TAUs (see Table 3-4).

Similar to Alternative 1, the types of ground vibration-generating construction activity that would occur under Alternative 4 would be similar to the types of noise-generating construction activity evaluated in the RPU EIS. Measures would be implemented to reduce the potential for exposure of nearby buildings to excessive levels of ground vibration exposure pursuant to the requirements of TRPA's Best Construction Practices Policy for the Minimization of Exposure to Construction-Generated Noise and Ground Vibration. Because TRPA would only approve projects with construction activity that would not generate ground vibration levels that would cause damage to nearby structures or negative human response, this impact would be **less than significant** at the program level. Construction ground vibration associated with individual development or redevelopment projects would still have to be analyzed at the project level.

Tahoe City Lodge Project-Level Analysis

The Tahoe City Lodge project would not include the development of any new permanent stationary sources of ground vibration; therefore, this analysis focuses on ground vibration that would be generated during demolition and construction on the lodge site. Construction-related ground vibration is normally associated with impact equipment such as pile drivers, jackhammers, and the operation of heavy-duty construction equipment, such as dozers and trucks. The types of equipment that would generate the highest levels of ground vibration during lodge construction are listed in Table 13-13, along with the ground vibration levels they typically generate. No pile driving or blasting would take place during lodge construction.

Table 13-13 Representative Ground Vibration Levels for Construction Equipment

Equipment	PPV at 25 feet (in/sec)	Approximate L_v (VdB) at 25 feet
Large Dozer	0.089	87
Loaded Trucks	0.076	86
Small Dozer	0.003	58

PPV = peak particle velocity; L_v = the root mean square velocity expressed in vibration decibels (VdB), assuming a crest factor of 4

Source: FTA 2006:12-6 and 12-8

The nearest ground vibration-sensitive receptors to the lodge site are the commercial buildings located on the adjacent parcels to the east. These commercial buildings are just across the property line of the lodge site. Another commercial building that houses multiple uses is located approximately 25 feet to the south of the Lodge site.

The reference vibration levels for construction equipment shown in Table 13-13 are for a distance of 25 feet. Receptors closer than 25 feet would be exposed to higher levels of ground vibration than the levels shown in Table 13-13 and receptors further than 25 feet would be exposed to lower levels of ground vibration. Applying FTA-published methods for estimating the attenuation of ground vibration, operation of a large bulldozer within approximately 14.5 feet of a building could expose the building to ground vibration levels that exceed the Caltrans-recommended standard of 0.2 inch/second PPV for structural damage. Operation of a loaded truck within approximately 13 feet of a building could also expose the structure to ground vibration levels that exceed the same Caltrans-recommended standard. Attenuation calculations can also be used to estimate the potential for these construction equipment to exceed FTA's human response standard of 83 VdB for commercial buildings and other buildings where people do not sleep. A large bulldozer operating within approximately 34 feet of a building could result in negative human response at the building. A loaded truck operating within approximately 32 feet of a building could trigger the level that can result in negative human response. Thus, use of these equipment in close proximity to the existing nearby buildings could result in negative human response and, if close enough, cause structural damage to the buildings. Detailed attenuation calculations are provided in Appendix J. The potential for ground vibration impacts to occur is discussed for each alternative below.

Alternative 1: Proposed Lodge

Because large bulldozers and heavy loaded trucks used during demolition and construction may need to operate within 14.5 feet and 13 feet of off-site buildings, respectively, they could potentially expose those buildings to levels of ground vibration that exceed the Caltrans-recommended standard of 0.2 inch/second PPV. Moreover, large bulldozers and heavy loaded trucks used within 34 feet and 32 feet of the nearest off-site commercial buildings, respectively, could expose those buildings to levels of ground vibration that exceed FTA's human response standard of 83 VdB for commercial buildings (i.e., where people do not sleep). This would be a **significant** impact.

Alternative 2: Reduced Scale Lodge

The locations where heavy ground vibration-generating equipment would be used during demolition and construction for Alternative 2 would potentially be as close to off-site buildings as for Alternative 1.

Therefore, construction and demolition activities for Alternative 2 could potentially expose the same off-site buildings to levels of ground vibration that exceed the Caltrans-recommended standard of 0.2 inch/second PPV and/or FTA's human response standard of 83 VdB for commercial buildings. This would be a **significant** impact.

Alternative 3: Reduced Height Lodge

The locations where heavy ground vibration-generating equipment would be used during demolition and construction for Alternative 3 would potentially be as close to off-site buildings as for Alternative 1.

Therefore, construction and demolition activities for Alternative 3 could potentially expose the same off-site buildings to levels of ground vibration that exceed the Caltrans-recommended standard of 0.2 inch/second PPV and/or FTA's human response standard of 83 VdB for commercial buildings. This would be a **significant** impact.

Alternative 4: No Project

Under Alternative 4, it is expected that the project applicant would renovate the existing commercial center to increase occupancy relative to existing conditions. However, renovation activities would not involve the use of heavy equipment such as bulldozers and large trucks that generate relatively high levels of ground vibration that could adversely affect off-site buildings. Therefore, this impact would be **less than significant**.

Mitigation Measure 13-3: Implement measures to avoid exposure of off-site buildings to levels of ground vibration that could result in structural damage and to minimize the level of human annoyance

The following mitigation measure applies to Lodge Alternatives 1, 2, and 3.

The Tahoe City Lodge project applicant shall ensure that off-site buildings will not be exposed to construction-generated ground vibration levels that exceed the Caltrans-recommended standard of 0.2 inch/second PPV for evaluating structural damage. The project applicant shall also ensure that off-site buildings will not be exposed to ground vibration levels that exceed FTA's human response standard of 83 VdB for commercial buildings.

The project applicant shall hire a California-registered geotechnical engineer to perform a site-specific study of the geotechnical conditions at and around the lodge site. The study shall determine the propagation rate of ground vibration in the area, taking into account local soil conditions, the age of the nearby buildings, and other factors. The study shall determine whether nearby structures and buildings could experience structural damage from the types of demolition and construction activities that would take place and the types of heavy equipment that will be used.

The study shall identify detailed site-specific measures to lessen the potential for structural damage and to reduce the potential for negative human response from ground vibration generated by demolition and construction activities and the project applicant shall require construction contractor(s) to implement the measures identified in the study. Such measures shall include, but are not limited to, the following:

- ▲ All heavy equipment used within a specified distance of offsite buildings shall have a reference vibration level no greater than a limit determined by the geotechnical investigation necessary to avoid structural damage and to minimize negative human responses;
- ▲ Equipment, debris piles, and building materials shall not be staged or stored within 34 feet of any off-site buildings;
- ▲ All construction equipment on shall be operated as far away from vibration-sensitive sites as reasonably possible;
- ▲ Earth moving, ground-disturbance, and truck loading activities shall be phased so as not to occur simultaneously in areas close to off-site buildings. The total vibration level produced could be substantially less when each vibration source operated close to off-site buildings is operated separately;

- ▲ The project applicant shall designate a disturbance coordinator and post that person's telephone number conspicuously around the locations where pile driving would be performed. The disturbance coordinator shall receive all public complaints and be responsible for determining the cause of the complaint and implementing any feasible measures to alleviate the problem. The contact information of the disturbance coordinator shall also be provided to the owners of all properties for which a pre-inspection survey is performed; and
- ▲ The project applicant shall also provide advanced notice to owners of all buildings and structures located within 43 feet of any portion of the Lodge site where demolition or construction activity would take place. This noticing shall inform property owners when and where construction equipment would be operated and the types of measures being implemented to lessen the impact at potentially affected receptors. This noticing shall also provide the contact information for the designated disturbance coordinator.

If determined necessary by the geotechnical Engineer based on his/her assessment of the propagation rate of the local soils, this study shall also include a geotechnical inspection of all buildings and structures located within 50 feet of where demolition and construction activities would occur. The inspection shall document pre-existing conditions, including any pre-existing structural damage. The pre-inspection survey of the buildings shall be completed with the use of photographs, videotape, or visual inventory, and shall include inside and outside locations. All existing cracks in walls, floors, driveways shall be documented with sufficient detail for comparison during and upon completion of Lodge construction to determine whether new actual vibration damage has occurred. The results of both surveys shall be provided to the project applicant for review and acceptance of conclusions. Should damage occur during construction, construction operations shall be halted until the problem activity can be identified. Once identified, the problem activity shall be modified to eliminate the problem and protect the adjacent buildings. Any damage to nearby buildings shall be repaired back to the pre-existing condition at the expense of the project applicant.

Significance after Mitigation

Implementation of Mitigation Measure 13-3 would ensure that construction-generated ground vibration would not result in damage to offsite buildings and or in a negative human response. Thus, ground vibration impacts associated with demolition and construction activities at the Tahoe City Lodge site for Alternatives 1, 2, and 3 would be reduced to a **less-than-significant** level.

Impact 13-4: Noise and land use compatibility

For Area Plan alternatives, TRPA would ensure that residential and tourist accommodation land uses with outdoor activity areas would not be developed in locations where they would be exposed to high exterior noise levels. For Area Plan Alternatives 1, 2, and 3, noise generated by potential emergency-related aircraft activity at areas designated as Mixed-Use Recreation would be exempt from applicable noise standards. For Area Plan Alternative 4, none of the areas in the Plan Area would be designations for emergency aircraft use. Therefore, this impact would be **less than significant** for all the Area Plan alternatives at the program level.

With lodge Alternatives 1, 2, 3, and 4, the outdoor activity area on the lodge site would not be exposed to highway noise levels that are not in attainment of TRPA's contour-based transportation corridor noise threshold for SR 28. Also, the outdoor activity area at the lodge would not be exposed to noise levels that exceed Placer County's 60 CNEL exterior transportation noise standard for outdoor activity areas of transient lodging and residential land uses and interior noise levels of the bedrooms would not exceed Placer County's 45 CNEL interior transportation noise standard for residential land uses and transient lodging. Therefore, this impact would be **less than significant** for all the lodge alternatives.

Placer County Tahoe Basin Area Plan Program-Level Analysis

The program-level analysis of noise land use compatibility that would occur under the Area Plan alternatives tiers from the program-level analysis in the RPU EIS. Separate analyses are provided for each Area Plan alternative below.

Alternative 1: Proposed Area Plan

Area Plan Alternative 1 would result in the development of 180,000 square feet less commercial floor area and 400 more TAUs by 2035 than what was estimated for the Placer County area of the RPU. In addition, the project-specific details of the Kings Beach Center design concept are unknown at this time, but construction could include up to 58,900 square feet of non-residential space and up to 110 TAUs (see Table 3-4).

For Area Plan Alternative 1 residential and tourist accommodation uses could be developed in town centers where they could be exposed to high exterior noise levels associated with mixed-use development sites. Noise sources in these locations could include highway and roadway vehicular traffic, commercial delivery trucks, building heating and cooling equipment, and landscape maintenance equipment. As required by the RPU, however, TRPA would not approve any proposed land use development project that would expose outdoor activity areas of tourist accommodation uses to exterior noise levels that exceed applicable land use-based CNEL thresholds established by TRPA. However, TRPA requires that each project be evaluated to determine whether it would result in the placement of residential or tourist accommodation uses in areas where the existing noise level exceeds 60 CNEL or is otherwise incompatible. TRPA also requires that each project be assessed to determine whether it would result in the generation of incompatible noise levels in close proximity to existing residential or tourist accommodation uses (see TRPA Initial Environmental Checklist questions 6d and 6e). TRPA would not approve a proposed project that would result in the exposure of outdoor activity areas that are part of residential or tourist accommodation land uses (even if these land use types were part a mixed-use development) to incompatible noise levels. This would also ensure that these land use types would not be developed in locations where exterior noise levels exceed applicable Placer County noise standards.

With regard to the levels of noise exposure near the Kings Beach Center design concept site, traffic noise levels along the highway segments in this area would not be in attainment of TRPA's contour-based CNEL threshold for this transportation corridor. As shown in Table 13-9, the 55 CNEL contour would extend more than 300 feet from the edge of the segments of SR 28 between Beach Street and Bear Street under cumulative conditions with Alternative 1. Thus, any outdoor activity areas that are part of residential or tourist accommodation land uses along this portion of the SR 28 transportation corridor could be exposed to traffic noise standards that are not in attainment of TRPA's CNEL threshold for the SR 28 transportation corridor. The 60 CNEL contours along these segments of SR 28 would extend 100 to 200 feet from the highway edge—detailed modeling results for the 60 CNEL traffic noise contours is provided in Appendix J. This means that outdoor activity areas of residential and tourist accommodation land uses could be exposed to noise levels that exceed the 60 CNEL criterion stated in question 6d of TRPA's Initial Environmental Checklist. As noted elsewhere, this criterion is a screening criteria rather than a significance criteria per se, and triggers the need for a project-specific noise analysis before project approval; a project-specific noise analysis would be required to examine whether a proposed project would result in incompatible noise levels or the exceedance of any TRPA noise threshold standards. TRPA would not approve a proposed project that would result in the exposure of outdoor activity areas that are part of residential or tourist accommodation land uses (even if these land use types were part a mixed-use development) to incompatible noise levels.

Area Plan Alternative 1 would also designate specific areas as Mixed-Use Recreation in the Tahoe City Town Center. According to Chapter 21 of the TRPA Code, permissible uses in areas designated as Mixed-Use Recreation include transportation facilities that are used for the landing or take-off of aircraft, including helicopters and seaplanes. Areas in the Tahoe City Town Center that would be designated as Mixed-Use Recreation, include an area of Burton Creek State Park, Commons Beach, and an area near the 64-Acre Tract in Tahoe City. These areas are not large enough to accommodate the landing and take-off of landplanes. However, all three locations could accommodate the landing and take of helicopters and the sites at Commons Beach could potentially accommodate seaplanes. For this analysis it is assumed that aircraft would not be parked or staged at these locations but rather these locations would provide landing sites for aircraft used in emergency situations such as a medical rescue and therefore occur infrequently. Due to the short-term nature of aircraft landings and takeoffs and because aircraft-related events at these sites would be infrequent, this activity would not result in exceedance of applicable TRPA land use-based CNEL thresholds or Placer County noise standards at nearby land uses. Moreover, while emergency aircraft

activity at these locations could potential result in sleep disruption or speech disturbance at nearby residential and tourist accommodation land uses, particularly if taking place during noise-sensitive nighttime hours, noise generated by emergency activities is exempt from TRPA and Placer County noise standards. Also, development of landing pads or other aircraft-related facilities at these times would be subject to site-specific conditions of approval.

In summary, TRPA would not approve land use development projects that would result in residential or tourist accommodation land uses being exposed to noise levels that exceed TRPA's 60 CNEL standard. Also, any use of emergency aircraft activity in areas designated as Mixed-Use Recreational would be exempt from any TRPA and Placer County noise standards. Therefore, this impact would be **less than significant** at the program level.

Alternative 2: Area Plan with No Substitute Standards

Alternative 2 would result in virtually no land uses changes in the Plan area compared to what was anticipated in the RPU EIS. In addition, the project-specific details of the Kings Beach Center design concept are unknown at this time, but construction could include up to 58,900 square feet of non-residential space and up to 110 TAUs (see Table 3-4).

Nonetheless, potential noise impacts related to the development of residential and tourist accommodation land uses with outdoor activity areas in town centers (including residential and tourist accommodation land uses developed as part of the Kings Beach Center design concept) and noise impacts related to potential aircraft activity associated with areas designated as Mixed-Use Recreation would be the same under Alternative 2 as described for Alternative 1. Therefore, this impact would be **less than significant** at the program level.

Alternative 3: Reduced Intensity Area Plan

Alternative 3 would result in the development of 90,000 square feet less commercial floor area and 200 more TAUs by 2035 than what was estimated for the Placer County area in the RPU EIS. There would also be minor differences in the mix of full-time and seasonal/part-time residential units. In addition, the project-specific details of the Kings Beach Center design concept are unknown at this time, but construction could include up to 58,900 square feet of non-residential space and up to 110 TAUs (see Table 3-4).

Potential noise impacts related to the development of residential and tourist accommodation land uses with outdoor activity areas in town centers (including tourist accommodation land uses developed as part of the Kings Beach design concept) and noise impacts related to potential aircraft activity associated with areas designated as Mixed-Use Recreation would be the same under Alternative 3 as described for Alternative 1. Therefore, this impact would be **less than significant** at the program level.

Alternative 4: No Project

Alternative 4 would include implementation of the Regional Plan as adopted in 2012. As analyzed in the RPU EIR/EIS, Alternative 4 would result in the construction of 22 fewer long-term residential units and 24 more short-term residential units compared to the RPU (see Table 11-4). In addition, the project-specific details of the Kings Beach Center design concept are unknown at this time, but construction could include up to 58,900 square feet of non-residential space and up to 110 TAUs (see Table 3-4).

With Alternative 4, uses that allow the landing and takeoff of helicopters or other aircraft would be prohibited. Nonetheless, potential noise impacts related to the development of residential and tourist accommodation land uses with outdoor activity areas in close proximity to multiple noise sources (e.g., highway and roadway vehicular traffic, commercial delivery trucks, building heating and cooling equipment, and landscape maintenance equipment) would be the same for Alternative 4 as described for Alternative 1. Potential impacts related to the development of tourist accommodation land uses with outdoor activity areas in the Kings Beach Center design concept would also be similar to those described for Alternative 1. Therefore, this impact would be **less than significant** at the program level.

Tahoe City Lodge Project-Level Analysis

Traffic traveling on the adjacent segment of SR 28 is the predominant source of noise at the project site. The segments of SR 28 between West Lake Boulevard and Mackinaw Road and between Mackinaw Road and Grove Street are the closest modeled highway segments to the lodge site. Separate analyses are provided for each lodge alternative below.

Alternative 1: Proposed Lodge

Under Alternative 1, all the TAUs and ancillary facilities, including the lobby, restaurant, kitchen and fitness room, and back-of-house facilities (i.e., laundry, storage), would be located within 300 feet of the edge of adjacent segments of SR 28, including the segment from West Lake Boulevard to Mackinaw Road and the segment from Mackinaw Road to Grove Street. As shown in Table 13-9, the 55 CNEL contour would not extend more than 300 feet from the edge of these highway segments under cumulative conditions. This means that the lodge would not be exposed to highway noise levels that are not in attainment of TRPA's contour-based transportation corridor noise threshold.

Through distance alone, the 60 CNEL traffic noise contour would extend no more than 108 feet from the highway edge (see Appendix J for detailed modeling results of the 60 CNEL traffic noise contour). Thus, without noise shielding provided by any intervening structures, the 60 CNEL traffic noise contour could extend onto a portion of the outdoor activity area, which would be located near the center of the lodge site. However, additional attenuation would be provided by the buildings located between SR 28 and the outdoor activity area, including the kitchen, restaurant, lobby, and back-of-house facilities, as well as the existing commercial buildings located east of the lodge site. Based on FHWA guidance, these buildings would provide at least 5 dB of attenuation, if not substantially more, because they would break the line of sight between the highway and the outdoor activity area (FHWA 2011:56). Furthermore, the bedrooms at the lodge would be located away from SR 28 and, assuming a standard exterior-to-interior noise reduction of 24 dB (EPA 1978:11), the interior noise levels in these bedrooms would not exceed Placer County's 45 CNEL interior transportation noise standard for residential land uses and transient lodging. Therefore, this impact would be **less than significant**.

Alternative 2: Reduced Scale Lodge

The analysis for Alternative 3 is the same as for Alternative 1. Therefore, this impact would be **less than significant**.

Alternative 3: Reduced Height Lodge

The analysis for Alternative 3 is the same as for Alternative 1. Therefore, this impact would be **less than significant**.

Alternative 4: No Project

Under Alternative 4, the commercial complex at the site would continue to operate. Future renovations would likely lead to occupancy of the commercial spaces. As shown in Table 13-9, the 55 CNEL contour would not extend more than 300 feet from the edge of these highway segments under cumulative conditions. This means that the site would not be exposed to highway noise levels that are not in attainment of TRPA's contour-based transportation corridor noise threshold. Therefore, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 13-5: Outdoor event noise related to the relocated golf course clubhouse

For Area Plan alternatives, the change in land uses would not result in any new land uses that host outdoor events or an increase in the frequency of noise-generating outdoor events at existing land uses in the Plan area. Therefore, there would be **no impact** at the program level related to noise-generating outdoor events with Area Plan Alternatives 1, 2, 3, and 4.

At the project level, the frequency and effects of noise-generating outdoor events at the golf course clubhouse would change with Alternatives 1 and 3 such that nearby off-site residential receptors could be exposed to noise exterior levels that exceed the noise level standards for sensitive receptors established in the Placer County Noise Ordinance. This would be a **significant** impact. Implementation of Mitigation Measure 13-5 would ensure that noise levels generated by outdoor events near the expanded, relocated golf course clubhouse would not exceed Placer County Noise Ordinance Standards at nearby residential land uses. Therefore, this impact would be reduced to a **less-than-significant** level. With Lodge Alternatives 2 and 4, the location of outdoor events at the golf course would not change and no change in event-related noise levels, resulting in **no impact**.

Placer County Tahoe Basin Area Plan Program-Level Analysis

The program-level analysis of noise land use compatibility that would occur under the Area Plan alternatives tiers from the program-level analysis in the RPU EIS. Separate analyses are provided for each Area Plan alternative below.

Alternative 1: Proposed Area Plan

With Area Plan Alternative 1 the change in land uses would not result in any new land uses that host outdoor events or an increase in the frequency of noise-generating outdoor events at existing land uses in the Plan area. Therefore, there would be **no impact** at the program level related to noise-generating outdoor events.

Alternative 2: Area Plan with No Substitute Standards

With Area Plan Alternative 2 the change in land uses would not result in any new land uses that host outdoor events or an increase in the frequency of noise-generating outdoor events at existing land uses in the Plan area. Therefore, there would be **no impact** at the program level related to noise-generating outdoor events.

Alternative 3: Reduced Intensity Area Plan

With Area Plan Alternative 3 the change in land uses would not result in any new land uses that host outdoor events or an increase in the frequency of noise-generating outdoor events at existing land uses in the Plan area. Therefore, there would be **no impact** at the program level related to noise-generating outdoor events.

Alternative 4: No Project

With Area Plan Alternative 4 the change in land uses would not result in any new land uses that host outdoor events or an increase in the frequency of noise-generating outdoor events at existing land uses in the Plan area. Therefore, there would be **no impact** at the program level related to noise-generating outdoor events.

Tahoe City Lodge Project-Level Analysis

Alternative 1: Proposed Lodge

With Alternative 1, the existing clubhouse at the golf course would be demolished and a new, expanded clubhouse would be constructed at the site of the existing putting green just west of the sixth tee. Accordingly, the location of outdoor events would be moved as well and, hence, be closer to nearest off-site residences than under existing conditions. Though the types of noise-generating outdoor events would not change, the frequency of such events may increase.

The new location of outdoor events could be as close as 150 from the nearest off-site residence, which is about 50 feet closer than the current location of outdoor events and is part of the Fairway Tract Plan Area Statement (PAS 002) (TRPA 2002). As described in Section 13.3, "Environmental Setting," a noise analysis recently conducted for a proposed wintertime ice rink at the golf course used reference noise levels of 70 dB L_{eq} and 65 dB CNEL at a distance of 50 feet for music and skating activity at the proposed ice rink (J.C. Brennan & Associates 2016:12). Based on noise analyses of other outdoor events (Bollard Acoustic Consultants 2015:13 and 15.), it is estimated that the L_{max} approximately 5 dB greater than hourly L_{eq} noise level, or 75 dB L_{max} . Assuming that summertime outdoor events near the new clubhouse would produce similar sound levels, it is estimated that the nearest residence would be exposed to noise levels of 53 CNEL, 58 dB L_{eq} , and 63 dB L_{max} during outdoor events near the new clubhouse. See Appendix J for calculations of

noise attenuation. This level of noise exposure would not exceed the 55 CNEL noise threshold established by TRPA in the Fairway Tract PAS (002) (TRPA 2002:3). As a result, this impact would be **less than significant** for the purposes of TRPA environmental review. Noise generated by outdoor events near the new clubhouse would exceed the daytime noise standards of 50 dB L_{eq} and 65 dB L_{max} and the nighttime noise standards of 40 dB L_{eq} and 60 dB L_{max} for noise-sensitive receptors established in the Placer County Noise Ordinance (Table 13-7). As a result, this would be a **significant** impact for the purposes of CEQA environmental review.

Alternative 2: Reduced Scale Lodge

With Alternative 2, the clubhouse at the golf course would not be relocated and special outdoor events at the golf course would take place at the same location that they do now. Thus, the level of noise exposure from outdoor events at nearby residential land uses would not change. Thus, there would be **no impact** related to outdoor event noise.

Alternative 3: Reduced Height Lodge

With Alternative 3, as with Alternative 1, the existing clubhouse at the golf course would be demolished and a new clubhouse would be constructed at the site of the existing putting green just west of the sixth tee. The levels of noise exposure at nearby residential land uses would be the same Alternative 3 with Alternative 1. Noise levels from outdoor events would not exceed the 55 CNEL noise threshold established by TRPA in the Fairway Tract PAS (002) (TRPA 2002:3). As a result, this impact would be **less than significant** for the purposes of TRPA environmental review. However, noise generated by outdoor events near the new clubhouse would exceed the daytime noise standards of 50 dB L_{eq} and 65 dB L_{max} and the nighttime noise standards of 40 dB L_{eq} and 60 dB L_{max} for noise-sensitive receptors established in the Placer County Noise Ordinance (Table 13-7). As a result, this would be a **significant** impact for the purposes of CEQA environmental review.

Alternative 4: No Project

With Alternative 4, the clubhouse at the golf course would not be relocated and special outdoor events at the golf course would take place at the same location that they do now. Thus, the level of noise exposure from outdoor events at nearby residential land uses would not change. Thus, there would be **no impact** related to outdoor event noise.

Mitigation Measure 13-5: Implement measures to ensure compliance with exceedance of Placer County Noise Ordinance Standards at nearby residential land uses

The following mitigation measure applies to Lodge Alternatives 1 and 3.

The Tahoe City Public Utility District shall prohibit outdoor events near the clubhouse or on the golf course between the hours of 10:00 p.m. and 7:00 a.m. The Tahoe City Public Utility District shall ensure that Placer County Noise Ordinance standards of 50 dB L_{eq} and 65 dB L_{max} are not exceeded at the property line of nearby residences between the hours of 7:00 a.m. and 10:00 p.m. Subwoofers shall not be used in amplified sound systems at outdoor events.

Sound level measurements shall be conducted at the property line of the closest residential land use during the sound testing of the amplified sound system prior to each outdoor event. The sound level meter used for the sound level measurements should meet a minimum Type 2 compliance and be fitted with the manufacturer's windscreen and calibrated before use.

Noise reduction measures that can be implemented to ensure compliance with Placer County Noise Ordinance daytime noise standards of 50 dB L_{eq} and 65 dB L_{max} include but are not limited to the following:

- ▲ Locate outdoor events as far as possible from nearby off-site residences along Fairway Drive. If feasible, orient outdoor events such that the new clubhouse serves as a sound barrier between the noise-generating outdoor activity and the nearest off-site residence.

- ▲ Any outdoor generators used during outdoor events shall be located as far as possible from nearby off-site residences along Fairway Drive.
- ▲ Adjust volume settings and orient speakers away from off-site residences.
- ▲ If agreed to by nearby homeowners, install a permanent sound barrier (e.g., a wall, earthen berm, or berm-wall combination) near the property line of off-site residential land uses.
- ▲ If agreed to by nearby homeowners, install a temporary sound barrier during outdoor events near the property line of the affected off-site residential land uses.

Significance after Mitigation

Implementation of Mitigation Measure 13-5 would ensure that noise levels generated by outdoor events near the expanded, relocated golf course clubhouse associated with Lodge Alternatives 1 and 3 would not exceed Placer County Noise Ordinance Standards at nearby residential land uses. Therefore, this impact would be reduced to a **less-than-significant** level.

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